REPORT OF THE

NATIONAL COMMISSION ON AGRICULTURE

1976

PART XIII

RURAL EMPLOYMENT AND SPECIAL AREA PROGRAMMES

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND IRRIGATION
NEW DELHI

P. Agri. 136. XIII
5000

Price: (*Inland*) Rs. 20.00 (*Foreign*) £ 3.11 *or* $ 9 62 *Cents*

PRINTED BY THE GENERAL MANAGER, GOVERNMENT OF INDIA PRESS, MINTO ROAD, NEW DELHI AND PUBLISHED BY THE CONTROLLER OF PUBLICATIONS, CIVIL LINES, DELHI

PREFACE

The Report of the National Commission on Agriculture comprises 69 chapters in 15 parts. A complete list of chapters and parts is given in pages (iii), (iv) and (v). The Terms of Reference of the Commission and its composition are given in Part I—Chapter I—Introduction.

This volume, entitled 'Rural Employment and Special Area Programmes', is Part XIII of the Report and is divided into the following two chapters:

58. Rural Employment

59. Special Area Development Programmes

Certain aspects of employment of agricultural labour are dealt with in Chapter 69 in Part XV.

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RURAL EMPLOYMENT AND SPECIAL AREA PROGRAMMES

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RURAL EMPLOYMENT

1 INTRODUCTION

58.1.1 Rural unemployment in this country is more in the nature of under-employment of varying degrees of those who are prepared to work for their livelihood. For such a class of population a long spell of complete unemployment is not a normal phenomenon. Whereas some amount of employment may be forthcoming to even the severely underemployed, there may not be reasonable remuneration for the employment offered. A good deal of employment is available in family agricultural operations but such labour is highly unremunerative. Agricultural labour market is also one of the least paid of the employment markets; wages are generally low. As a result, a substantial section of rural labour force lives in a state of utter poverty. Growth with social justice demands that fruits of economic growth should be shared by all, rich as well as poor. An effective employment policy is the most appropriate instrument for achieving this goal within the framework of the existing economic and political system. While rapid rate of economic growth is essential, it cannot by itself remove poverty and unemployment. There is, however, no conflict between the objective of rapid economic growth and greater employment, especially in conditions of abundant human resources as in India. This is particularly true of rural growth and employment. There is a vast scope for adopting the modern technology for promoting agricultural as well as non-agricultural employment in the rural sector along with improved production provided the appropriate programmes, techniques and the policy measures are chosen for the purpose.

58.1.2 The context of rural employment has been deliberately chosen because the problems of agricultural employment cannot be considered in isolation from the problems and possibilities in the non-agricultural occupations in the rural areas. Secondly, as explained later, development of the land base though important cannot alone provide an answer to the problem of rural unemployment and under-employment. An integrated view is also necessary in order

to assess the impact of decentralisation of many non-agricultural economic activities to the rural sector. These would be essential for the improvement of rural services and amenities and for taking full advantage of the employment potentialities in the agricultural sector.

58.1.3 The magnitude and the nature of the problems of rural unemployment also make it incumbent to have an integrated approach towards it. About 80 per cent of the total population lives in the rural areas at present. It is estimated that even in 2000 AD approximately 70 per cent of the total population will continue to be in the rural areas. An overwhelmingly large proportion of the total labour force *i.e.*, about 72 per cent is employed as agricultural workers at present. Even with the most optimistic view of the creation of additional employment opportunities in the urban non-agricultural occupations, the transfer of the labour force from agricultural to urban non-agricultural jobs will be rather slow. Bulk of the labour force would continue to depend on agriculture and allied non-agricultural rural occupations even in 2000 AD. The employment strategy in the future, therefore, will have to be two-pronged: firstly, all efforts will have to be made to generate additional employment in the various agricultural activities and secondly, the potentialities of employment in the non-agricultural rural activities will have to be fully exploited in order to accommodate those who cannot find work in the land-based occupations.

58.1.4 The approach towards the problem of creating additional employment opportunities in the rural sector has not been very systematic in the past. A number of schemes of pilot and *ad-hoc* nature have been sanctioned but an effort towards the orientation of the entire plan towards larger employment opportunities and basic needs has been lacking. Employment in developing countries with vast number of rural unemployed cannot be left as a residue of development or a by-product of economic growth. Deliberate efforts have to be made to plan individual projects and programmes in such a way that growth possibilities and employment opportunities are optimised. At present, the activities in which additional employment opportunities both in the agricultural as well as non-agricultural rural sectors could be created, along with increased production, are not fully identified. In the absence of a detailed study we do not have a clear picture of the relative priority of the various growth oriented programmes in the rural sector which can generate additional employment. Therefore, a detailed exercise will have to be undertaken in order to specify all those programmes and projects in the rural sector which can provide additional employment opportunities.

The contention is that in a large number of programmes/projects much larger employment opportunities can be generated through initial support in terms of essential facilities and proper technology, than is realised at present. It follows that having laid down the integrated framework of productive employment policy, deliberate efforts will have to be made to plan each individual project and programme with a view to achieving the objective of sufficient income and employment potential at a point of time.

58.1.5 Since he problem of employment is massive, it may not be possible to remove the entire backlog of unemployment and under-employment within a short period. Therefore, while formulating the various programmes and policies for employment generation, the need for providing gainful employment to the weaker sections of the rural community, *i.e.*, the poor farmers and the landless labourers falling below the poverty line or the hard core of the poor, will have to be given the first priority.

58.1.6 Many attempts have been made in the past to make quantitative assessment of the nature and extent of unemployment in the rural sector. Such assessments are, however, imperfect and are not of any material significance from the point of view of employment planning and policy. A committee of the Planning Commission concluded in 1970 that single dimensional estimates of the number of unemployed serve little practical purpose.[1] From the point of view of a practical policy, what is more important are the characteristics of unemployment or under-employment or what has been described as 'anatomy of unemployment'. Accordingly, while quantitative assessments have been given wherever possible, our main emphasis is on qualitative appraisal and indication of the broad directions and lines on which the specific programmes and policies are to be spelt out relating them to the various categories of unemployed.

2 GROWTH OF RURAL LABOUR FORCE

Estimate of Rural Labour Force

58.2.1 The key factor responsible for the aggravating unemployment situation is the rapid increase in the rural labour force resulting from increase in the population during the last two decades.

[1] 1970. Report of the Committee of Experts on Unemployment Estimates: 30-31. New Delhi, Planning Commission, Government of India.

An attempt has been made in this section to make a brief review of the main trends of growth of the rural labour force. As already indicated, in the absence of complete data, it is not possible to quantify all variables in the situation.

58.2.2 Estimates of rural labour force and their occupational characteristics are available in the decennial population census and through the National Sample Surveys (NSS). Estimates on the basis of decennial censuses are summed up in the statement at Appendix 58.1. These estimates are not strictly comparable over time due to changes in definitions and concepts relating to "workers". However, in so far as figures relating to 1961 and 1971 are concerned, due adjustments have been made for these conceptual differences by the Census Authorities. The proportion of agricultural workers to the total workers was about 72 per cent in 1971. This only shows that the traditional dependence of the labour force on agriculture has remained practically unchanged. The land-man ratio per agricultural worker declined from 1.18 hectares in 1951 to 1.09 hectares in 1971. On the basis of the 1971 census, of the rural workers (excluding child labour) of 138.6 million 117.0 million or about 84.4 per cent were agricultural workers and 21.6 million or about 15.6 per cent are non-agricultural workers (Appendix 58.2). Of the total agricultural workers, 60.2 per cent were cultivators, 36.5 per cent agricultural labourers and 3.3 per cent were workers engaged in 'other agricultural occupations' like livestock, plantations, orchards, forestry, fisheries, hunting etc. The percentage of cultivators to total agricultural workers declined from 74.8 per cent in 1961 to 60.2 per cent in 1971. The proportion of agricultural workers engaged in 'other agricultural occupations' declined from 6 per cent during earlier censuses up to 1931, to 3.3 per cent during the subsequent censuses. On the other hand, the percentage of agricultural labourers increased from 21.7 per cent in 1961 to 36.5 per cent in 1971. Thus, the proportion of cultivators and those engaged in 'other agricultural occupations' has declined while the number of agricultural labourers has increased sharply. In absolutes, the number of cultivators including those in the urban areas declined from 93.2 million in 1961 to 78.2 million in 1971. In the case of agricultural labourers, the number increased from 27.1 million in 1961 to 47.5 million in 1971 (Appendix 58.1).

58.2.3 Projections of the supply of rural labour force is a hazardous exercise on account of a number of imponderables and methodological hurdles. Nevertheless some projections have been attempted with a view to having a broad idea of the magnitude of the problem of surplus rural labour force in future. Certain studies in

respect of developing countries show that the share of agriculture in the total labour force of these countries fell from about 79 per cent in 1950 to 73 per cent in 1960 and 66 per cent in 1970. It has been projected that this percentage would come down to 58.3, 50.4 and 43.0 per cent in 1980, 1990 and 2000 AD respectively. It is expected that "towards the end of the century the rate of growth of the agricultural labour force should begin to tail off in the developing market economies,.....".[1] Although the data for projecting the agricultural labour force as distinct from the total rural labour force are not available, the projections of the rural labour force attempted below will show that though there may be some decline in the share of the rural labour force in the total labour force the increase in absolute number of the rural labour would still be considerably large. Keeping in view the existing behavioural pattern of the rural labour in India, it can safely be assumed that until concerted efforts are made to find alternative occupations in non-agricultural rural sector, there may not be any significant drop in the percentage of rural labour force which would continue to depend on agricultural occupations.

58.2.4 The growth of rural labour force is a function of the growth in population, the participation-rate* and inter-sectoral migration differential. The factors which increase the participation rates are expansion of male and female education, the increasing pressure of inflation, desire for better standard of living, increasing female participation due to late marriages, erosion of joint family and kinship ties and fall in dependency ratio. The factors which would reduce the participation rates are the age composition of the population in favour of children and old persons, progressive withdrawal of children due to increased spread of schooling, minimum period of education prescribed for entering into working force and Government's policy against child labour.

58.2.5 On examination of the various factors determining the participation rates by sex and age, it has been found that there will be an increase in the participation rates even though at a declining rate in the coming three decades for which projections have been attempted. The participation rate will increase due to larger enrolment amongst rural females for secondary and higher secondary education, desire amongst the rural adults for better standard of living, better health services in rural areas and the fall in the high

[1] 1973. Agricultural Employment in Developing Countries: 11-12. Food and Agriculture Organisation of the United Nations.

*Participation rate: The ratio of persons in the labour force to the total population expressed as per cent. It is customary to study participation rates by sex and age.

dependency ratio due to the break-up of the joint family system. There may be some decline in the participation rate on account of longer period of education required for entering into the labour force and the desire of certain section of the rural community to seek more leisure time. Another factor which will operate towards reduction in the participation rate is the objective of government to remove child workers from the field of those seeking employment. But in balance, the over-all participation rate for rural labour force in the country will increase. On this basis the total rural labour force would increase from 138.6 (excluding children) in 1971 to 249.9 million persons (child labour expected to be fully excluded) by 2001 AD. Against an increase in the rural population of 229 million (from 438 million in 1971 to 667 million in 2001 AD), the total rural labour force would increase by 111 million in 2001 AD (Projection 1). A note on the methodology adopted for projectin of rural labour force by 2001 AD is attached (Appendix 58.5). There may be difference of opinion with regard to the impact of the different factors influencing the participation rates. However, even if the participation rates accepted by the Planning Commission for projecting labour force till 1986[1] are assumed to remain constant till 2001 AD, the additions to the rural labour force would be of the order of 105 million persons (Projection 2). Alternatively, even if it is assumed that the sex-age specific participation rates prevailing in 1971 census remain constant till 2001 AD, the addition to the labour force would be 105 million persons (Projection 3). These three sets of projections are presented in the table below:

TABLE 58·1

Rural Labour Force Actuals for 1971, and Projections for 1986 and 2001 A.D.

(millions)

Year	Labour Force (excluding child labour)					
	Projection 1		Projection 2		Projection 3	
	Total	Rural	Total	Rural	Total	Rural
1971	170·0 (31·1)	138·6 (31·6)	170·0 (31·1)	138·6 (31·6)	170·0 (31·1)	138·6 (31·6)
[1]1986	248·0 (33·8)	194·0 (34·7)	257·7 (35·2)	203·7 (36·5)	245·8 (33·5)	191·8 (34·4)
2001	339·9 (35·9)	249·9 (37·4)	328·9 (34·8)	243·5 (36·5)	334·0 (35·3)	244·0 (36·6)

(.....) = Figures in parentheses are participation rates.

[1] Draft Fifth Five Year Plan, 1974—79, Vol. I, p.3.

The most important conclusion from this analysis is that whatever may be the assumption with regard to participation rates for projecting the total rural labour force, the total increase in the rural labour force will not be less than 100 million persons by the end of this century. This amounts to about 72 per cent increase over the present level of rural labour force. Provision of employment for this huge addition to the rural labour force will be a big challenge to rural development planning.

Employment Status

58.2.6 In the absence of adequate to data it is not possible to identify any regional pattern in the growth of rural labour force or the growth in the population of cultivators and agricultural labourers. However, on the basis of participation rates of the rural workers (cultivators, agricultural labourers and other workers) based on 1971 census, it is observed that the States of Jammu and Kashmir, Rajasthan, Uttar Pradesh and Assam have more than 60 per cent of total rural workers as cultivators. On the other hand, the percentage of agricultural labourers to the total rural workers is more than 36.6 per cent in the States of Andhra Pradesh, Bihar, Tamil Nadu and Maharashtra. This only shows that the task of generating additional employment opportunities would vary from one region to another. There is need for detailed study of the characteristics of the rural labour force at the regional level which should take into account various socio-economic and climatological factors.

58.2.7 On the basis of NSS data, certain characteristics in the employment status of the rural workers can be indicated. A substantial prportion of the rural workers is self-employed or works as unpaid family workers and is under-employed. The number of workers seeking wage employment did not change significantly between 1958 and 1965 and remained at 28 per cent of the total rural workers. During the same period the percentage of unpaid family workers declined in the case of females from 50 per cent to 44 per cent, and in the case of males from 21 per cent to 16 per cent. On the other hand, the percentage of self-employed and own account workers to the total rural workers increased both in the case of males and females from 51.6 to 55.9 per cent and 22.2 to 29.2 per cent respectively during the above period. This shows that there is a positive trend towards increase in the number of persons working on their own account and decline in the unpaid family workers. This may be due to increased employment opportunities in local areas, in construction and services sector. Females provide a large

part of the unpaid family labour in agriculture and the proportion of women and children in the labour force tends to be higher than in other sectors.

58.2.8 There is increase in female participation as agricultural labourers. On the basis of census data the participation rate in the case of female agricultural labourers increased from 4.9 per cent in 1961 to 6 per cent in 1971 whereas the participation rate of females as cultivators, declined from 13.0 per cent to 3.5 per cent during the same period. The corresponding change in the participation rates during this period, for male agricultural labourers was 7.4 per cent to 11.2 per cent, and for male cultivators, 29.0 per cent to 24.3 per cent. The magnitude of the problem of unemployment or under-employment in the case of female workers could be more acute in future with the increased participation of the female workers. This factor will have to be duly reckoned in formulating employment programmes.

3 THE UNEMPLOYMENT SITUATION

Estimate of Unemployment

58.3.1 The significance of the trends in the growth of the rural labour force set out above can be realised only by having a cross-section view of the nature and magnitude of the problem of rural unemployment or the disaggregated view of unemployment. To make a precise estimate of the total number of unemployed is a difficult exercise even for the developed countries. In a developing economy like that of India, the exercise becomes more difficult with the majority of the rural labour force being employed in the form of self-employment or unpaid workers on family enterprises.

58.3.2 However, several estimates have been made towards quantifying the magnitude of unemployment. At the time of commencement of the First Plan the level of rural unemployment was estimated at 2.8 million persons on the basis of the first Agricultural Labour Enquiry (ALE) in 1950-51. The emphasis of the First Plan was on agricultural development and it was expected that the rural unemployment would be contained at this level. In the Second Plan, the assumption was that the backlog of unemployment had remained of the same order as in 1950-51. It was expected that rural labour force during the Second Five Year Plan would increase by 7.2 million persons. Second Plan could generate employment for 8 million persons of which 6.5 million were outside agriculture. It was

estimated that at the end of the Second Plan, the backlog of unemployment was about 9 million.[1] While formulating the schemes under the Third Five Year Plan, it was estimated that gainful employment opportunities for 3.5 million persons would be created in agriculture. In the draft Fourth Five Year Plan in 1966, however, it was estimated that there would be a backlog of 7 million persons in the rural areas. Although no such estimates are available for the subsequent period, there is little doubt about the continuous increase in this backlog. The Committee of Experts on Unemployment Estimates (Dantwala Committee) set up by the Planning Commission in 1968 to examine these estimates observed that "in our complex economy, the character of the labour force, is too heterogeneous to justify aggregation into single dimensional magnitudes. We, therefore, recommend separate estimation of different segments of labour force, taking into account other important characteristics as region (State), sex, age, rural-urban residence, status or class of worker and educational attainments".[2] Therefore, no estimates of unemployment and backlog of unemployment were given in the draft Fifth Five Year Plan.

58.3.3 The Committee on Unemployment (Bhagwati Committee), 1973 which used 19th round NSS data to estimate unemployment in India worked out estimates of rural unemployment for 1969 as 9.12 million man-years including 7.82 million as totally unemployed.[3] It was estimated that employment opportunities of the order of 22.52 million man-years would have to be created as in 1969 on the assumption that full time work would have to be provided to all the available labour force. For 1974 and 1979 estimates of employment opportunities needed were placed at 16.78 and 17.94 million man-years respectively. According to the Unemployment Committee, the labour force requiring employment includes the number of unemployed plus the additional man-years that would be required to make those available for additional fully employed for 42 hours per week. "The additional man-years were computed by assuming that those working for less than 28 hours would need two-thirds more employment to make them fully employed and for those with 28—42 hours work, one-sixth more employment."[4] According to Raj Krishna, the estimates of rural unemployment including under-employment were of the order of 26.2 million persons comprising 8.3 million unem-

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[1] Third Five Year Plan, p. 47.

[2] *Ibid.* 1 (p. 4): 31.

[3] 1973. Report of the Committee on Unemployment, Vol. I, Part A: 430. New Delhi Ministry of Labour and Rehabilitation, Government of India. A man-year was taken as 273 man-days.

[4] *Ibid.* 2 (p. 14) page 430,

ployed and 17.9 million, under-employed, as in 1971.[1] These estimates of additional employment required would appear to be inflated because of the implicit assumption that all the unemployed and under-employed are available for full-time additional employment in the labour market. This may not always be the case. The proportion of persons who are willing to work for full-time, may in actual practice, be much smaller and various enquiries show this to be the case.

58.3.4 There may be difference in views with regard to the precision and usefulness of these estimates. They, however, give a clear idea about the aggravating seriousness of the problem of rural unemployment. We have not made any independent attempt to estimate the magnitude of rural unemployment. While agreeing with the view that disaggregated estimates of unemployment are more useful than a uni-dimensional estimate from the point of view of planning of employment, we hold that estimates of unemployment and the additional employment to be created by the plan programmes in totalities along with disaggregated estimates would be useful and should continue to be attempted.

Characteristics of Unemployment

58.3.5 The main characteristics of the unemployment situation which are more relevant from the point of view of employment planning and programming are discussed below. The basic feature is that the main form in which rural unemployment occurs is under-employment. The proportion of those who are chronically unemployed is not very large. It is pertinent that employment in on-the-farm occupations cannot generally be segmented into separate jobs as in the case of industries and is shared among all the labour force. Under-employment or disguised unemployment exists in its acutest form among self-employed workers engaged on their small farms or in the household occupations (in the case of artisans) and agricultural labourers. The prime need in the case of these categories of workers other than agricultural labour is to improve their productivity in their existing occupations and for agricultural labour to increase the wage paid labour opportunities.

58.3.6 Seasonality of work characterised by irregularity of jobs on and off the farms is another important feature. This feature is related to that of under-employment. Seasonal fluctuations in the

[1]Raj Krishna, 1973. 'Unemployment in India', Presidential Address delivered on the occasion of the 32nd Annual Conference of the Indian Society of Agricultural Economics, Dec. 1972, Indian Journal of Agricultural Economics, XXVIII (1), page 7.

demand for agricultural labour are actually the main cause of under-employment. The incidence of seasonal unemployment may vary from region to region and even within the same region over different seasons depending on climate, the cropping pattern and other socio-economic factors. There could also be seasonal movement of labour from labour surplus small and marginal farms to medium and large farms. The seasonality of employment affects different sections of rural population differently due to the periodic entry into and the withdrawal from the labour force. This class of workers constitutes a sizable proportion of the labour force and includes 'non-marketable labour' such as house-wives, young men (under the age of 15 years) and old persons whose attachment to the labour market is partial. The seasonal supply may be further inflated on account of seasonal migrant labour from nearby districts or villages/towns particularly at the time of big agricultural operations.

58.3.7 Because of the various socio-economic constraints and attitudinal factors the mobility of labour is very limited and a sizable proportion of the rural labour force is provided by members of the household to whom the forces of demand and supply operating in a free labour market do not apply. Some may not be willing to work outside their farms and villages and there may still be others who would be satisfied with some part-time employment which could sustain them. Therefore, there is reluctance on their part to seek work outside the locality until the wage rates are sufficiently attractive. In accordance with the NSS, in 1970-71, of the small cultivator households, 46.5 per cent were willing to seek alternative regular wage employment and 27.5 per cent were willing to leave villages in search of employment. Among the landless worker (non-cultivating wage earner) households, 57:3 per cent were willing to take up alternative regular wage employment and 36.9 per cent were willing to leave the village. The State-wise proportions of persons belonging to small cultivator households who were willing to leave their villages in search of employment varied from 68.5 per cent in Delhi to 4.0 per cent in Manipur. The position in respect of landless households were in no way better, where these proportions varied from 66.6 per cent in Delhi to 16.1 per cent in Madhya Pradesh (Appendix 58.3). Mobility of labour is a factor of considerable significance in the planning of employment programmes because the low level of mobility points to the need for creating employment opportunities in a large number of cases in the same areas in which the surplus labour force is available. However, it may not be possible nor desirable to develop employment programmes to cater for lack of mobility on the part of labour force in certain localities. In such cases deli-

berate efforts will have to be made to develop greater mobility of such labour class.

58.3.8 To take another aspect, the sex composition of unemployed and under-employed is also significant. According to NSS data, the proportion of unemployed females has been constantly higher than that of males especially in the rural areas. The incidence of severe under-employment or moderate under-employment was also higher among rural women than among men. While the incidence of unemployment and under-employment among women is higher, their ability to avail of employment opportunities elsewhere is limited due to lack of mobility.

58.3.9 The weaker sections of the rural community consisting of marginal farmers and the landless labourers constitute the bulk of the unemployed and the under-employed in the rural sector. They are also the lowest income groups falling below the poverty line. On the basis of NSS data, it has been found that the mobility of labour in the case of marginal farmers, landless labourers and artisans is higher in comparison with the small farmers. Gainful full time employment opportunities for these categories of workers will, therefore, have to be organised on a high priority.

4 PROGRAMMES AND PLANNING

58.4.1 We have so far analysed broad trends of the growth of rural labour force and brought out the main characteristics of the unemployment situation in the rural sector. The basic objective of employment planning should be to match the employment potential of various programmes and the needs of the unemployed and under-employed placed in varying socio-economic situations. It is only when the characteristics of the employment opportunities generated by different programmes are systematically identified from this point of view that it is possible to have the right kind of employment planning. In the absence of detailed and precise information on norms or yardsticks of employment generation, it is not possible to make a quantitative estimate of the employment potentialities that are likely to be generated in different sectors over time. Therefore, while quantitative estimates have been indicated wherever possible, the emphasis is on bringing out the main features of employment potentialities that are likely to be generated by 2000 AD.

58.4.2 Employment opportunities in the rural sector can be classified as agricultural and non-agricultural employment. Increase in employment opportunities under agricultural programmes can

result from application of improved technology in crop production in irrigated and in rain-fed areas and animal husbandry, forestry and fisheries. While assessing the potentialities of the agricultural programmes, cognizance has been taken also of the impact of mechanisation and land reforms measures. Employment under non-agricultural rural programmes can be generated through (a) development of the infrastructure including irrigation works, rural electrification, rural roads, housing, rural institutions, agro-service centres etc., (b) development of the tertiary and the services sector covering marketing and trade, processing, storage, distribution, transportation and professional services and (c) growth of village and small-scale industries including khadi handloom and other handicrafts.

58.4.3 In developed countries labour is released through increased productivity in agriculture for meeting the increasing requirements of work force in non-agricultural sector. In a developing country like India though planned economic development has been undertaken for more than two decades, due to low capital formation and low rate of investment and heavy pressure of labour force on agriculture, it has not been possible so far nor will it be possible in coming decades to create employment opportunities in the non-rural sector for absorbing unemployed and under-employed labour force in the rural sector. Therefore, additional employment opportunities will have to be created in the rural sector through modernisation and diversification.

Crop Production

58.4.4 Adoption of improved and scientific technology as a result of programmes envisaged under new strategy for agricultural development since 1966-67, has greatly enhanced prospects of employment in crop production. It has also resulted in an appreciable increase in incomes of the farmers through increased output of both food and non-food crops. The demands for additional labour in farm production as a result of improved technology arise from larger number of ploughing, repeated irrigations, line planting, intensive inter-cultural practices and from larger harvest. Apart from larger crops that have to be harvested and threshed, greater care is required in the application of cultivation practices and land and water management. Besides, employment is also created on account of increased intensity of activities that accompany and follow the new technology. These activities include seed production, drying and storage of grains, milling, processing, marketing and transport. In the case of seeds, for instance, the area under improved seeds production is likely to

go up to 2.4 Mha in 2000 AD from a modest coverage today. Thus the new technology increases employment opportunity due to bigger output and the consequential effects.

58.4.5 Despite the fact that the land-man ratio in India is rather low, there is sufficient potential for increasing the labour input and the per hectare productivity of labour on small farms. In Japan the land-man ratio as in 1965, was half that in India. Nevertheless, the per hectare use of fertilisers was almost 40 times as great and the Gross Domestic Product (GDP) almost 6 times as great per worker and 12 times as great per hectare.[1] Even though as in 1965, 55 per cent of arable land was irrigated in Japan as compared with 16 per cent in India and though the experience of Japan may not be fully applicable to Indian conditions, the contrast is obvious and points to the scope for larger employment through technological improvements.

58.4.6 There is evidence to suggest that high yielding varieties wherever introduced in place of local variety both in irrigated and rainfed areas have increased the labour inputs by 25 to 50 per cent depending on the nature and variety of crops and the agro-climatic conditions. It was found that every 400 ha of land transferred from local to improved varieties generated additional employment for 15—20 man-years.[2] It is expected that by 2000 AD, the entire cultivated area will be brought under improved varieties.

58.4.7 The introduction of short duration varieties of crops leading to multiple cropping has further increased the employment opportunities. The extent of this increase is dependent upon the intensity of cropping and also the intra-year cropping sequence. Selected field studies have revealed that the conversion of every 400 ha of mono-cropped to double-cropped land can provide additional employment opportunities for 80—150 man-years, depending on crop combination and soil and climatic conditions. The new technology also ensures more even spread of the labour input throughout the year.[3]

58.4.8 The increased demand for labour in harvesting, post-harvesting and pre-sowing operations and the pressure of completing these operations in limited available time have led to the mechanization of farm operations including use of more sophisticated equipment such as combine harvestors. The immediate impact of such mechanisation is the displacement of farm labour but this may be

[1] *Ibid.* 1 (p. 8): 31.

[2] 1973. Report on Employment Potential in Agriculture, prepared by Progressive Agro-Industrial Consultant : iii & iv. New Delhi; National Commission on Agriculture.

[3] On the basis of 300 man-days per year. *Ibid.* (v).

more than offset by increased cropping intensity and higher yield per acre. It was found in a particular study that in case of tractorisation, the immediate impact was the displacement of labour by 15 per cent. This labour displacement in certain peak periods was offset by an overall increase in labour inputs through cropping intensity in irrigated areas by 7 per cent.[1] But if farm mechanisation is carried up to harvesting operations by use of combine harvestor to overcome the problem of labour shortages, the overall increase in labour inputs resulting from multiple cropping could get largely neutralised. On large farms, the farm mechanisation would facilitate introduction of scientific farming without posing a threat to displacement of labour. In order that farm mechanisation results in least labour displacement, it must be selective. Therefore, whether or not mechanisation will result in larger employment will depend upon the local situation and the operations in question which must be carefully studied in order to decide what degree of mechanisation will be most advantageous. Thus, it might be desirable to confine selective mechanisation to certain activities such as pumping of water from tubewells, heavy land clearance and land preparation needing speedy operations and harvesting of crops, specially under relay system. Efforts will have to be made to identify these areas and activities carefully.[2] This aspect, has been dealt with in Chapter 50 on Farm Power.

58.4.9 On introduction of irrigation in an area, the labour requirement for irrigated crop husbandry becomes substantially more than that needed for dry farming. Additional labour becomes necessary for irrigating the crop, better field preparation, more extensive weeding operations, application of fertilisers and pesticides and for harvesting the increased produce etc. Also, the cropped area increases because multiple cropping increases with irrigation. While several factors such as the use of improved qualities of seeds, application of fertilisers and pesticides, adoption of the latest farming technology etc. contribute towards increased production, it is difficult to quantify the contribution which each makes. But the increase becomes possible mainly because of the introduction of irrigation. In 1970-71, the net sown area in the country was 140 Mha and the cropped area was 165 Mha. The net and gross irrigated areas during that year were 31 Mha and 39 Mha respectively. It is envisaged that 2000 AD while the net sown area would have risen to 150 Mha, the cropped area would increase to 200 Mha. The net and gross irrigated area is

[1] *Ibid.* 1 (p. 22): 23

[2] See also 'A Report on Creation of Employment Opportunities and Mechanisation in Agricultural Sector', a study undertaken for the National Commission on Agriculture by Administrative Staff College of India, Hyderabad, July, 1973.

expected to be 61 Mha and 84 Mha respectively. Thus the cropping intensity in irrigated areas would increase from 1.23 in 1970-71 to 1.38 in 2000 AD.

58.4.10 It is difficult to estimate with any precision the increase in employment potential that can be attributed to irrigation facility alone. However, the future increase in the labour requirement can reasonably be figured out by estimating with the 1970-71 irrigated and unirrigated areas separately as the base. The Working Group on Agriculture set up by the Committee on Unemployment (1968-69) had estimated that on an average, 115 man-days were required per hectare of irrigated cropped area, while only 64 man-days were required per hectare of rainfed cropped area.[1] The future norms would be somewhat different as conditions would change. Also yields would be much higher requiring more labour. It may reasonably be assumed that in 2000 AD, 125 man-days would be required per hectare of irrigated cropped area and 80 man-days per hectare for unirrigated cropped area. Because of mechanisation some skilled labour would also be required. This, however, has been taken into account while calculating the above figures. Accordingly, the employment opportunities on account of more intensive activities in farm operations for irrigated agriculture covering skilled as well as unskilled labour would increase from 15 million man-years to 35 million man-years in 2000 AD.

58.4.11 Crop production in the dry farming areas is associated with the problems of high instability, low productivity and low employment. The magnitude of under-employment in these areas is comparatively much higher. Improvement in the yield of the crops in these areas with limited water resources and scanty rainfall can be achieved through improved methods of soil and moisture conservation. The improved dry-land farming technology aims at evolving suitable crop varieties of the right duration and growth rhythm and proper attention to the application of the package of improved practices and inputs suited to these areas. It is estimated that as a result of the improved dry-land farming technology, the crop intensity in the unirrigated areas would increase from 1.16 to 1.30. It is estimated that this would result in increase in labour requirement from 64 man-days to 80 man-days per hectare by 2000 AD. This will create additional employment of 11.0 million man-years by 2000 AD.

58.4.12 Improved technology will have its impact also on the production of vegetables as well as other horticultural crops. Produc-

[1]1972. Report of the Working Group on Agriculture, Committee on Unemployment: Ministry of Labour and Rehabilitation, Government of India, New Delhi. Table 2·9 at p. 65.

tion of these crops particularly vegetables, is highly labour intensive and quite economical for small and marginal farmers, adding substantially to their income. Profitably developed on the periphery of urban centres these crops can provide employment to the small and marginal farmers and the landless labourers during the off season. As far as the quantitative estimate of addition to the employment potential is concerned, this has already been taken into account while giving estimates of the impact of improved technology on employment potential in the case of crop production. Besides, there will be notable expansion in the tertiary sector related to preservation, processing, canning, marketing, storage etc. in respect of these crops.

Agrarian Reforms

58.4.13 While discussing the agricultural programmes, it will be worthwhile mentioning briefly the effect of agrarian reforms on the employment generation in the rural sector. It is well known that security of tenancy rights and elimination of such practices as share cropping is necessary to induce the tenants to put forth their best and invest in farm production. Redistribution of land may also result in more employment. However, the full potentialities of agrarian reforms and security of tenancy rights can be realised only if the land reform measures are followed up by steps to provide credit and other requisites of production and introduce cooperative organisations for supporting the activities of the farmers.

Irrigation Works and Land Formation

58.4.14 Employment potentialities on account of increased productivity in farm operations for irrigated crop husbandry has been dealt with earlier. In addition, the development of water resources for irrigation provides increased employment opportunities on account of (a) development of surface and groundwater, (b) land formation for irrigated agriculture and lining of water-courses and (c) operation and maintenance of irrigation works. Of the spheres of activities mentioned here, (a) and (b) being one time operation, provide direct employment opportunities only for the duration of work. Operation and maintenance of irrigation works on the other hand provide employment on continuous basis. The first estimates with regard to the employment potential in the construction of major and medium irrigation projects were made in the Planning Commission in 1966-67. It was estimated that about 5,000 persons could be provided employ-

ment for a year per crore of rupees of expenditure on construction. These estimates were corroborated by the Central Water and Power Commission (CWPC) by compiling data from various projects under construction. In 1971, it was estimated that due to rise in cost, an expenditure of a crore of rupees gave employment of only 4,000 man-years. In the case of minor irrigation works also, certain norms were established that year by the Ministry of Agriculture.* These were also in terms of investment. As money value keeps on changing, it is more rational to work out norms in physical terms, that is, per hectare brought under irrigation. By relating expenditure to physical achievement in respect of the data for the year 1970-71, it has been figured out that it requires 1.2 man-years on construction to provide irrigation to an area of one hectare. The same norm applies to the development of surface water and groundwater. The cost estimates in the two cases would, however, be different. It may be pointed out that the above norm is for the country as a whole and that it would vary from region to region and project to project.

58.4.15 Construction of irrigation works generates employment mainly for unskilled labour. The ratio of skilled to unskilled labour in the construction of irrigation projects has been figured out to be 30 :70. The 30 per cent skilled labour comprises 5 per cent engineers, 15 per cent technicians and 10 per cent ministerial staff. The ratio is likely to remain the same in the future years. During the Fourth Plan, on an average, new irrigation facilities were being provided at an annual rate of about 0.6 Mha from surface water and 0.8 Mha from groundwater. Irrigation development from surface water is expected to be stepped up to 1.0 Mha per year by 1980 and continued at that rate till the end of the century. In the case of groundwater the rate of development is envisaged to go upto 1.0 Mha per year by 1980 and then decrease to 0.6 Mha per year in 1990 and furher to 0.4 Mha per year in 2000 AD due to less and less of groundwater that would remain to be developed, as indicated in the Chapter 15 on Irrigation. In groundwater development, major emphasis would be on tubewells and on wells fitted with pumpsets. The life of a tubewell is generally 20 to 25 years; as such at any point of time the replacement programme would need to follow the pace of construction that obtained 20 to 25 years before that time. Similar consideration would obtain in respect of wells and pumps. Taking all this into consideration, in 2000 AD the pace of development of groundwater including replacement is expected to be 1.2 Mha per annum. On the basis of the above norms, employment potentialities in these construc-

*Now Ministry of Agriculture and Irrigation.

tional activities would rise from 1.7 million man-years in 1970-71 to 2.7 million man-years in 2000 AD.

58.4.16 It is only recently that some organised work of land formation has been taken up in a number of irrigation projects. Complete land formation work comprises construction of watercourses, field channels, field drains and access roads, and land levelling and shaping. This work is likely to be partly mechanised and partly manual and would be mostly in new areas to be brought under irrigation, although a certain backlog has to be cleared in respect of areas already provided with irrigation. It is envisaged that by 1980-81 the target of about one million hectares (net cultivated area) per year would have to be attained in respect of land preparation work, which would then be progressively increased to 1.4 Mha by 1985 and continued at that pace till the end of the century. This includes some of the existing irrigated areas which do not have adequate field drainage and access roads and require land levelling and shaping. The employment potential of this work has been estimated to be about half of that required for providing irrigation facilities in the same area. Here again, there would be variation in the employment potential from area to area. The annual employment potential in such works by 2000 AD is estimated at 0.85 million man-years.

58.4.17 Lining of watercourses to minimise seepage losses has been recommended in Chapter 15 on Irrigation. This also would provide considerable employment opportunity as vast areas under irrigation have unlined watercourses at present. The employment potential on this account would be of the order of one man-year for 10 hectares. This would create an annual additional employment potential of 0.2 million man-years by 2000 AD.

58.4.18 The operation and maintenance of an irrigation system provides employment on a continuous basis. According to an assessment made in 1966-67, about 10 persons are employed for the purpose per thousand hectares irrigated in a year. In this case the ratio of skilled to unskilled labour is about 40 : 60. The continuous employment generated on maintenance of irrigation works would increase from about 0.4 million man-years in 1970-71 to about 0.8 million man-years by 2000 AD.

58.4.19 In sum, the employment potentialities under construction activities land formation and lining of watercourses and operation and maintenance of irrigation system would, in all, increase from 2.1 million man-years in 1970-71 to about 4.5 million man-years by 2000 AD.

Soil Conservation and Land Development in Rainfed Areas

58.4.20 In the rainfed areas also, there is considerable scope for additional employment in soil conservation and land development work. In the agricultural land the conservation programme includes erosion control measures, viz. bunding, terracing, levelling, shaping etc. besides other measures for sustained and productive use of lands. Soil and moisture conservation programmes are employment oriented as these are labour intensive involving mostly the earthwork. Productive employment is generated under these programmes in the rural areas near the land owner's home. It has been roughly estimated that about 70 Mha of cultivated lands are liable to erosion and are in need of soil and moisture conservation programmes (Chapter 18 on Soil and Moisture Conservation, paragraph 18.2.4).

58.4.21 During the Fourth Plan, on an average, 1.3 Mha of cultivated lands were receiving soil and moisture conservation measures per year. Taking 1970-71 as the base year when 1.3 Mha were treated, the employment potential that was created during the year and for each year of the Fourth Plan was of the extent of 135 million man days or 0.45 million man years. During the Fifth Plan it has been envisaged to cover 9 Mha of cultivated land by soil conservation measures which works out an average rate of 1.8 Mha per year. The employment potential that is likely to be generated per year of the Fifth Plan is of the extent of 190 million man days or 0.63 million man years which shows an average increase of 40 per cent over the base year referred to above. After the end of the Fifth Plan we shall still have 60 Mha to be treated. By the end of the Fifth Plan the benefits that will accrue on account of increased production on the application of conservation measures are going to accelerate the tempo of work and a much higher rate of performance is expected. If by the turn of the century (i.e. 2000 AD) the whole of the cultivated land area is to be completed by the conservation treatments, then 3 Mha have to be treated annually for a period of 20 years creating an annual employment potential of 320 million man days or 1.0 million man years.

Animal Husbandry

58.4.22 Next to crops, animal husbandry programmes have got the largest employment potential. The most important features of these programmes are that they provide subsidiary occupation, offer gainful employment at the location itself and make better utilisation

of female and child labour. A supplementary programme of diversified agriculture through animal husbandry activities is suitable for raising the income of rural households. Livestock development is of considerable importance in drought prone, hilly, tribal and other less favoured areas where crop production on its own may not be capable of providing suitable job opportunities to the unemployed and under-employed, particularly small and marginal farmers and agricultural labourers.

58.4.23 Livestock development programmes are labour intensive, have favourable cost-benefit ratio and in some cases, a small gestation period. Most of these programmes are paticularly suitable for weaker sections of the rural community and have got redistributive effect on income in favour of them. Rearing of livestock, apart from offering substantial direct employment has also a large in-built potential for generating indirect employment in several ancillary activities like manufacture of livestock feed, fabrication of dairy and poultry equipment, and a large number of animal based industries concerning hides, skins, bones, wool, bristles etc. Animal husbandry programmes like rearing of cattle, buffaloes, sheep, goats, pigs, poultry etc., have large employment potential. The employment potentialities in the animal husbandry sector cannot, however, be assessed in isolation from crop production activities. No systematic assessment of the employment potentialities in this sector has been made so far and surveys in this regard are lacking. Under these limitations our approach is to provide a broad estimate of direct employment likely to be generated on account of improvement in rearing and management of livestock. The estimates of employment potential will have to take note of the existing conditions of productivity of livestock and the increase in work opportunities likely to be brought about as a result of developmental activities envisaged.

58.4.24 According to the Livestock Census, 1972, the total livestock population is around 355 million consisting of 178.9 million cattle, 57.9 million buffaloes, 40.4 million sheep, 68.0 million goats, 6.5 million pigs and 3.3 million of equines, camels and other livestock. In addition, there were about 137 million poultry. The objective of animal husbandry development programmes is to improve the genetic constitution of farm animals, provide them with optimum feed requirements, offer favourable environment and ensure better health cover with a view to raising the productivity per unit. Accordingly, there will be an increase in the total availability of livestock products like milk, meat, eggs, wool etc. both for internal consumption as well as for export. With increase in productivity of animals, the require-

ments of labour for their maintenance, processing and distribution of animal products and supply of inputs will go up considerably.

58.4.25 In 2000 AD it is estimated that total livestock population will be around 708 million including 372 million poultry. The policy envisaged is to decrease the number of unproductive livestock and increase that of the productive ones. However, there may be variations from species to species in this general policy. The total number of cattle may increase up to 1980 thereafter start showing a downward trend. Population of goats may decrease as a result of implementation of projects for limiting their multiplication. The number of sheep may go up because it will be advantageous to have more animals of this species. The number of pigs is expected to increase with the introduction of exotic inheritance, change in rearing practices and greater popularity of pork and other piggery products. Numbers of other species may change only marginally in keeping with changing economic conditions. The poultry population is expected to rise considerably with increasing demand for eggs and poultry meat. The population of different categories of livestock and poultry as per Livestock Census 1972 alongwith projections upto 2000 AD is given in Table 58.2. The detailed basis for these projections has been dealt with in Chapters 28, 30, 31 and 32 of our Report.

58.4.26 No detailed studies on the labour requirements for maintenance of cattle and buffaloes have so far been carried out. However, the preliminary studies conducted at the National Dairy Research Institute, Karnal demonstrated that the employment potential of dairying is greater than that of arable farming. Investigations undertaken by the Directorate of Extension, Udaipur University and Board of Economic Enquiry, Punjab, indicated that poultry farming offered great scope for profitable utilisation of family labour. Keeping in view the objective of growth with social justice, it is visualised that livestock will be kept in comparatively smaller units and will thus offer higher employment opportunities. This factor coupled with the increase in the productivity of animals will generate more employment, as the productive animals require greater individual care. Besides, increased livestock products will result in the growth of a large

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number of organisations for processing, distribution and utilisation of the products.

58.4.27 Based on the programmes and trends of growth of livestock and poultry population, the labour force requirement for rearing different categories of livestock in terms of man-years is discussed below:—

(i) Cattle: Based on studies conducted by the Institute of Agricultural Research Statistics on the labour input in their report on cost of production of milk and similar data collected in fram management studies, it is estimated that one member of the farm family can get full-time employment by attending to 10 non-descript, 5 improved or 3 crossbred adult cattle and 40 non-descript, 30 improved or 15 crossbred youngstock. The total cattle population is expected to decrease from 178.9 million in 1972 to 167.8 million in 2000 AD, but a big change is expected in the composition of the cattle population. The present number of crossbred cows which is about 1.0 million is likely to rise to about 18.9 million by 2000 AD and the number of non-descript cows is expected to decrease from 48.0 million to 21.35 million by 2000 AD. The total man-years of employment would thus increase from 21.99 million man-years in 1972 to 27.05 million man-years by 2000 AD.

(ii) Buffaloes: It is assumed that one member of the farm family can get full time employment by attending to 10 non-descript or 5 improved adult buffaloes, 40 non-descript or 30 improved youngstock. The present number of 57.9 million buffaloes is expected to come down to about 56.8 million by 2000 AD. However, there will be a change in the composition of the buffalo population. The number of improved buffaloes is expected to rise from the present number of 8.0 million to 18.0 million by 2000 AD and the present number of 25.0 million non-descript buffaloes is likely to go down to 13.0 million. On these assumptions the employment potential of 5.50 million man-years in 1972 is expected to increase to 6.79 million man-years by 2000 AD.

(iii) Sheep and Goats: In case of these categories of animals in 1972 one person was able to look after 50 sheep or 75 goats. Improved animals of these species would require the services of one person to look after 20 sheep or 40

goats by 2000 AD. The population of sheep is expected to increase from 40.40 million in 1972 to 60.00 million in 2000 AD whereas the population of the goats is expected to decline from 65.00 million in 1972 to 40.00 million in 2000 AD. Since the entire population of these categories is likely to consist of improved animals the employment potential would increase from 1.70 million man-years in 1972 to 4.00 million man-years by 2000 AD.

(iv) Pigs: With the existing practices of pig rearing, it is estimated that about 40 non-descript pigs require full-time attention of one person. With the improvement of the stock greater attention would be needed to look after the animals. It would not be possible for one person to take care of more than 20 pigs by 2000 AD. The population of pigs is expected to increase from 6.50 million in 1972 to 8.50 million in 2000 AD. This would also increase the employment opportunities from 0.16 million man-years in 1972 to 0.43 million man-years by 2000 AD.

(v) Equines and Camels: It is estmated that for rearing equines and camels one person gets full-time employment per animal. The population of these animals is expected to decline from 2.10 million in 1972 to 1.80 million in 2000 AD. This would correspondingly reduce the employment in rearing equines and camels by about 0.30 million man-years i.e., from 2.10 million man-years in 1972 to 1.80 million man-years by 2000 AD.

(vi) Poultry: Based on the selected studies undertaken by some research institutes and State departments, it is estimated that at present (1972), generally one farm family member could be kept fully engaged in rearing the flock of 100 birds. With improved techniques of rearing and easy availability of inputs and services by 2000 AD, one person may be able to look after on an everage a flock of 150 birds. The poultry population is expected to increase from 137.0 million in 1972 to 372.0 million by 2000 AD. This would increase labour force employed in this occupation from 1.37 million man-years in 1972 to 2.48 million man-years by 2000 AD.

58.4.28 A comparative position of the population of different species of livestock and poultry and employment of labour force as estimated in 1972 and 2000 AD is given in Table 58.2.

TABLE 58.2

Estimates of Population of Livestock and Poultry and Employment of Labour Force in 1972 and 2000 A.D.

(million)

Category of livestock	1972		2000 AD	
	Livestock population	Man-Year	Livestock population	Man-years
Cattle	178·9	21·99	167·8	27·05
Buffaloes	57·9	5·50	56·8	6·79
Sheep	40·4	0·80	60·0	3·00
Goats	68·0	0·90	40·0	1·00
Pigs	6·5	0·16	8·5	0·43
Horses & ponies	1·0	1·00	0·8	0·80
Camels	1·1	1·10	1·0	1·00
Others	1·2	*	1·0	*
Total Livestock	355·0	31·45	335·9	40·07
Poultry	137·0	1·37	372·0	2·48
Grand Total		32 82		42·55

*Not estimated.

Fisheries

58.4.29 In 1971, there were about 1.8 million fishermen comprising 0.8 million fishermen engaged in the production of 0.7 million of inland fish and about 1.0 million fishermen producing about 1.0 million tonnes of marine fish. Thus fisheries employ comparatively a very small percentage of rural labour force. Part-time employment is characteristic of inland capture fisheries where the magnitude of work varies with the seasonal flow of water and is also true in the case of sea fisheries based on migratory species. Employment is generated largely in inland and coastal fisheries. The employment potential of distant water fishing operations which are capital intensive is comparatively small. Aquaculture accounts for the largest part of employment creation in the fishing industry. Employment is created

as a result of exploitation of reservoirs, village ponds and reclamation of swamps. In addition, there are considerable possibilities for expanding the tertiary sectors including preservation, processing and marketing of fish and fish products which would result in creation of additional employment potential. Another important characteristic is that employment is generally at a very low level of income. The main reason for this is the wide margin between the producers' price and the consumers' price of this perishable commodity which is accounted for by high handling charges, large number of middlemen and high retailers' margin.

58.4.30. It has been mentioned in Chapter 37 on Inland Fisheries and Aquaculture that per capita productivity of 200 kg of inland fish would constitute an adequate employment unit to support a family of five persons at the desirable minimum level of consumption. On the basis of the expansion of production of inland fisheries by about 3.7 million tonnes, there will be increase in the employment potential from 0.8 million man-years in 1970 to 2.4 million man-years in 2000 AD. There will be additional potential for employment of about 0.25 million man-years in the coastal regions of the country particularly due to increased activities in mariculture yielding about 1.0 million tonnes of aquatic products. Thus employment potential in marine fishery would increase from 7.0 million in 1970 to 2 million man-years in 2000 AD as a result of increase in production to 3.5 million tonnes.

Forestry

58.4.31 Forestry is an important source of employment in the rural areas. Employment offered in this sector is often in the off-season for crop production and is, therefore, complementary to the employment in farm production. For instance, logging is generally carried out in the lean agricultural months. Secondly, as forests are located in backward areas, direct employment in forestry activities can benefit the backward communities such as tribals. Besides, the activities in the forestry sector require a very high component of unskilled labour and, therefore, would benefit primarily the unemployed and underemployed agricultural labourers and weaker sections of the rural community.

58.4.32 Forest development activities which contribute to the generation of employment opportunities can be those associated with (a) production forestry, (b) social forestry and (c) minor forest produce. As regards forestry production, the related activities are logging, road construction and regeneration. There is increasing

demand for industrial wood and fuelwood. The felling and logging operations which are generally taken up in off-season create employment of 10 to 11 man-days per cubic metre of industrial wood produce. As an additional production of about 35 million cubic metres of industrial wood is expected by 2000 AD, these operations alone are expected to generate additional employment for 350 million man-days or about 1.16 million man-years. Similarly, there will be an additional production of about 50 million cubic metres of fuelwood from regular forests generating additional employment worth 0.33 million man-years annually by 2000 AD.

58.4.33 The regeneration of forests both natural and man-made consists of clearing of forests, collection of seeds, raising of nurseries, preparation of sites etc. This provides employment to unemployed in the neighbouring villages. It is estimated that concentrated regeneration would be of about 0.8 Mha in 2000 AD against the present level (estimated) of about 3 lakh hectares in 1973-74. Considering that at least 250 man-days per hectare are required for creation of man-made forests and about 30 man-days per hectare for regeneration of natural forests, total employment in these regeneration operations would alone be about 0.36 million man-years in 2000 AD. This is based on the programmes suggested in paragraph 42.2.17 of the Chapter 42 on Production and Social Forestry. It may be added that an important consideration in the establishment of forestry plantation is to phase them in such a way as to ensure continuity of employment.

58.4.34 One of the main factors which inhibit adequate exploitation of forest resources is the inaccessibility of forest areas on account of lack of communication facilities. Work on construction of forest roads could be for main roads, branch roads and feeder roads. Based on the experience of road construction in forest areas, the employment of labour for main and branch roads is generally put at 12 to 15 thousand man-days for every kilometre of road construction while for feeder roads, the norm is generally 3,000 man-days per kilometre. For proper development of forestry programmes, the phased programme of construction at the rate of 15,000 kilometres of road may have to be taken up annually. On the assumption that 30 per cent of this construction would be of main and branch roads, total employment generated annually would come to about 0.23 million man-years. The construction of forest roads will open up forest areas for secondary and tertiary employment. This employment would continue to rise with the increase in production in forestry.

58.4.35 Social forestry aims at creating protection and recreation benefits for the community and includes activities concerned with growing and meeting the fuelwood needs of the community as distinct from production forestry. For extension of social forestry programme, raising of shelter belts, plantations on the sides of roads and canals and reforestation in degraded forests have been suggested. The employment generated on this score would be about 0.4 million man-years in 2000 AD. Employment will also be generated in the production of fuelwood and grazing operations. Much of these operations on collection of fuelwood, grasses, leafy fodder etc. is done generally by the family labour and sometimes by hired labour who are engaged in subsidiary agricultural and non-agricultural occupations in the nearby villages. Fuelwood is also collected by the rural population from the shrubs on unculturable waste lands and other uncultivated lands. Employment through harvesting of fuelwood from social forestry will in addition generate employment opportunities of about 1.3 million man-years in 2000 AD at the rate of 2 man-days per cubic metre.

58.4.36 In case of minor forest produce, collection and primary processing are done entirely as subsidiary occupations. Hence the difficulty of estimating employment potential in this sector. The minor forest produce development which has a substantial employment content, covers tendu leaves, resins, gums, tanning materials, medicinal plants, essential oils, dyes, canes, bamboos, grasses, lac, honey, bees-wax etc. The utilisation of minor oilseeds of tree origin like neem, kusum, karanj, sal, etc. also offer considerable scope for additional employment. Taking into account the contribution of minor forest produce in terms of value to the gross value of national forest product, the employment in 1970 worked out to 250 million man-days or 0.8 million man-years. On a rough estimate, the additional employment opportunities in minor forest produce activities would be created for about 750 million man-days or about 2.5 million man-years by 2000 AD provided adequate efforts are put in.

58.4.37 To sum up, in the forestry sector as a whole, the additional employment generated will be of the order of 5.5 million man-years by 2000 AD. In addition, there is a large scope for employment in the rural areas in the transport of forest produce and in forest based industries such as, saw milling, pulp and paper, panel products, matches, *katha*, resin, lac etc.

58.438 The estimates of employment potential in respect of the various agricultural programmes are summed up in Table 58.3.

TABLE 58.3

Estimated Employment Potentials under Different Agricultural Programmes in Rural Areas by 2000 A.D.

(million man-years)

Heads of development	Employment		
	Total 1970	Total 2000	Additional 2000
crop husbandry			
(*i*) irrigated areas	15·0	35·0	20·0
(*ii*) rainfed areas	27·0	38·0	11·0
sub-total (1)	42·0	73·0	31·0
soil conservation and land development in rainfed areas	0·5	1·0	0·5
irrigation			
(*i*) Construction and development* of water resources	1·7	2·7	1·0
(*ii*) land formation and lining of water courses	neg	1·0	1·0
(*iii*) operation and maintenance of* irrigations works	0·4	0·9	0·4
sub-total (3).	2·1	4·5	2·4
animal husbandry (1972)**	32·8	42·5	9·7
fisheries			
(*i*) inland fisheries and aquaculture including mariculture	0·8	2·4	1·6
(*ii*) marine fisheries	1·0	2·0	1·0
sub-total (5).	1·8	4·4	2·6
forestery			
(*i*) production forestry	0·7	2·2	1·5
(*ii*) regeneration operations	0·1	0·4	0·3
(*iii*) road construction	0·1	0·2	0·1
(*iv*) social forestry	0·6	1·7	1·1
(*v*) minor forest produce and ancillary activities	0·8	3·3	2·5
sub-total (6).	2·3	7·8	5·5
total :	81·5	133·2	51·7

*These programmes are essentially in the nature of infra-structure development and cannot strictly be categorised as an agriculture production programme.

**Livestock census was held in 1972.

NOTE: The quantitative estimates of employment indicated here represent 'whole-time employment in man-year of 300 days' as distinct from "main activity status" employment recorded in the Census operations in 1971

It will be seen that against the increase of 111.3 million persons in the total rural labour force in 2001 AD, expansion in the various agricultural programmes is likely to generate employment opportunities for about 52 million persons. The figures of additional employment opportunities, as already indicated, represent only broad estimates and set out the broad parameters of the problems as viewed in a long-term perspective. These also do not take into account any additional impact of the special rural works and employment programmes, discussed in the following section, for which no quantitative estimates are available. Nevertheless, these estimates are adequate to indicate the priorities of the various agricultural programmes from the point of view of employment potential. But the most important conclusion from this analysis is that more than half of the additional increase in the total rural labour force by 2001 AD will have to be provided employment in the non-agricultural rural sectors. This factor will have to be duly weighed in any strategy for rural employment planning.

Special Employment Programmes

58.4.39 Considering the backlog of unemployment and underemployment in the rural areas and the need to find remunerative and useful employment to the increasing rural population, it has been suggested at times that an aggressive rural works programme is one of the possible answers to solve this problem. Dandekar and Rath in their study 'Poverty in India' having assessed the need for remunerative employment to eliminate poverty in the rural sector, have postulated a large scale rural works programme both with a view to giving wage employment to the rural poor and to fill up the gap in employment. They were of the view that what is required for the class of small and marginal farmers and landless labourers is to create a certain amount of secure and dependable employment throughout the year through additional works programmes. These programmes should be able to induce these classes of unemployed and under-employed to withdraw more or less completely from agriculture so that those remaining on the farms find fuller employment in agriculture. This implied a kind of rationalisation in the pattern of rural employment. Dandekar and Rath's thesis was that "if by means of additional works programme, togethter with other plan projects, we could create a certain amount of secure and dependable employment, that is a regular full-time employment throughout the year, for, all those who need it....", the desired change in the

pattern of employment in the rural areas could be achieved on more or less stable basis.[1]

58.4.40 Since the Third Plan period, a number of experiments were made with special employment programmes including Rural Works Programme (RWP) with a view to providing gainful employment. The RWP was taken up as a supplementary programme in areas in which other programmes of development were taken at the district and block levels. The Crash Scheme for Rural Employment (CSRE) was also sanctioned in 1971 for a period of three years. The Pilot Intensive Rural Employment Project (PIREP) was sanctioned in 1972-73 with a view to obtaining information regarding the employment situation in the project areas and throwing up information on the various methodological issues involved in generating employment in the rural areas. Besides, the Small Farmers' Development Agency (SFDA), Marginal Farmers' and Agricultural Labourers' Development Agency (MFAL) and Drought-Prone Areas Programme (DPAP) were taken up during the Fourth Plan, with creation of additional employment as one of the objectives. The aforesaid programmes were taken up in the Central sector.

58.4.41 Among the various employment programmes, the rural works programmes have got a unique place. The main object of these programmes is to provide employment to cultivators with small holdings and landless labourers. Of all rural households, small and marginal farmers represent 52 per cent and agricultural labourers 24 per cent. Majority of them lived below the minimum consumption level of Rs. 40.60 per capita per month at 1972-73 prices.[2] Thus the small and marginal farmers, and agricultural labourers constitute the vast majority in the rural areas and constitute the poorest strata of the population. These classes of rural population are employed partly on their own land, partly in wage-employment on other farms and partly in non-agricultural occupations or on public works. The public works programmes are basically meant to provide opportunities for employment to the lowest strata of the rural community who can also be described as the "left over people". This is because despite best efforts to provide employment under the various programmes examined above, the hard core of the rural poor may still be left out of the scope of these programmes.

[1]Dandekar & Rath, 1971. Poverty in India: 132. Poona, Indian School of Political Economy.

[2]This is on the basis of minimum desirable consumption standard of Rs. 20 per capita per month at 1960-61 prices accepted by the Study Group set up by the Planning Commission in July, 1962.

58.4.42 The limited experience of the operation of the CSRE which was sanctioned in almost all the districts shows that the benefits from it were thinly spread out throughout the district. There was no effort to relate these special programmes with the nature and magnitude of the problem of unemployment at specific locations and specific times of the year.

58.4.43 As already indicated the main objective of the PIREP was to give more accurate information with regard to seasonal peaks and troughs of employment in a particular area. It is necessary to have a clear picture in respect of the number of days when the wage earners had no work and those for which they needed employment. It was envisaged that the scheme would create employment for about 2,800 persons in the age group of 15 to 59 in a block through labour-intensive and assets producing works. The number of persons offering themselves for employment in the block was, however, much larger than the number contemplated in the project. The PIREP had to be selected after taking into consideration all existing works that were planned for implementation in the block under various development programmes. The project envisaged to provide employment for the residual number of unutilised man-days after the employment potential of all the existing and other projects planned for implementation had been considered. Thus, it was stipulated that the minimum size and works taken up under this scheme should be such as to employ about 50 persons continuously for 15 weeks or so. The categories of works covered, therefore, were of the type like construction of drinking water wells, school rooms and houses for harijans. It was also required to make an assessment of requirements for proper type of skills to be developed in the project areas and make arrangements for training the workers in these skills. It would be seen, therefore, that the PIREP is intended to provide valuable information with regard to the basis on which the rural works programme could be integrated with other development programmes and gaps in the execution of such schemes, evidenced in the form of lack of technical skills etc. removed. The detailed results of this pilot project are not yet available. We recommend that suitable steps may be taken to evaluate its results with minimum time lag and the scope of the scheme may be enlarged to cover larger number of districts.

58.4.44 DPAP formerly known as rural works programme was started in 1970-71 in 54 selected chronically drought-prone districts in the country. The programme seeks to strengthen the agricultural infrastructure by organising labour intensive and productive works which will also generate employment for rural labour in those areas.

To start with, the programme was focussed essentially on execution of rural works and on employment generation. Subsequently, it was realised that mere rural works programme would not help meaning fully towards drought mitigating development of these areas. Hence the programme was reoriented on the basis of an area development approach. Following the new approach, certain production activities such as animal husbandry and milk chilling plants were approved in a few selected districts of Rajasthan. Although complete data on employment in different States under this programme are not available, upto 1972-73 a total employment of over 90 million mandays was generated through implementation of various schemes under this programme.

58.4.45 Note may also be taken of the employment potentialities of SFDA/MFAL projects. These schemes taken up as pilot experiments, aim at improvement of the economic conditions of the weaker sections in the rural community. While the emphasis of the SFDA is on intensive agriculture, the MFAL has been drawn up with accent on supplementary employment centred around the areas of consumer demand. By the end of October, 1973, the 46 SFDA agencies had identified 17.91 lakh small farmers and 7.86 lakh marginal farmers and of these, 13.16 lakh had been enrolled as members of cooperatives. Approximately 1.3 lakh units of minor irrigation works like dug-wells, tube-wells, pumpsets, other miscellaneous works including 1167 community works had been set up by the participants in those areas. As regards MFAL at the end of October, 1973, the 41 MFAL agencies had identified 8.94 lakh marginal farmers and 2.68 lakh agricultural labourers and of these about 4.33 lakh had been enrolled as members of cooperatives. Nearly 1.4 lakh agricultural labourers were assisted with additional employment under rural works programmes. Certain field studies have shown that additional economic activities undertaken by the beneficiaries with the help of MFAL assistance have generated direct employment and have also brought about changes in the occupational structure of beneficiary house-holds in the sense that many more beneficiaries and working members of their families are now engaged in dairying than non-beneficiary marginal farmers. A large percentage of members of the family of marginal farmers are having subsidiary occupations like dairying, cattle-care etc.[1] As recommended by us in our Interim Report on 'Re-orientation of Programmes of Small Farmers and Marginal Farmers and Agricul-

[1]S. M. Pandey, 1974. Development of Marginal Farmers and Agricultural Labourers: 107-108. New Delhi. Sri Ram Centre for Industrial Relations and Human Resources.

tural Labourers' Development Agencies' 1973, the SFDA and MFAL programmes should be composite projects serving both the small and marginal farmers and agricultural labourers. The programme has to be extended during the Fifth Five Year Plan to 160 Agency Units covering about 11 million families (including 79.5 existing units). The subsidiary occupations for suitable areas will be supplemental programmes in the project areas and will be funded separately, but coordinated at the project level.

58.4.46 It will be seen that the programmes recommended in the case of marginal farmers *i.e.*, land development, soil conservation, minor irrigation etc. are similar as those undertaken under the rural works programmes. Therefore, there must be proper coordination between these programmes and the rural works programmes meant for the same classes of the rural community. The coverage of the composite SFDA/MFAL programmes could be extended adequately so that similar employment generating programmes are brought within their purview and employment planning for small and marginal farmers and agricultural labourers is done in an integrated manner through these agencies.

58.4.47 Maharashtra started a rural employment programme called the "Employment Guarantee Scheme" in April, 1972. The experience of the working of this Scheme of Maharashtra is of particular significance in the assessment of the feasibility and the advantage of the rural works programmes. On the basis of the experience of the working of the scheme during the first two years, the scope of the programme was widened in September, 1974. The objectives of the scheme are to provide gainful and productive employment to all the able-bodied persons in rural areas who are available and willing to work in manual and unskilled jobs through durable and productive works of labour intensive nature involving large expenditure on wages (60 per cent or more of the total cost of work). The Scheme guarantees jobs to all those who demand and register themselves for the purpose at the place of registration or at work site within 15 days. It is expected to create work consciousness and inculcate the feeling of self-reliance among the rural people. As regards the wage rates, these are to be fixed in accordance with a uniform task schedule for each of the tasks so that the wages do not divert local labour from normal operations on farms, forestry, animal husbandry, fisheries and other allied occupations in the rural areas. The wage rates ranged from Rs. 1.50 to 3.00 a day. The payment is to be made on a weekly basis. The presumption would seem to be that in order that the works programme does not alter the existing pattern of employment, the wages to be paid should be somewhat below the normal wage

Works programmes to be undertaken under the scheme are minor irrigation, soil conservation and land improvement, rural roads, afforestation and other works.

58.4.48 The broad experience of the working of the Maharashtra Scheme in 1974-75 and its continuance in 1975-76 has so far revealed certain significant features of the rural employment situation. They are:

(i) People registering themselves for employment either of a full-time nature or a part-time nature are far in excess of those who actually turn up at the work site when works are started. This is more or less like the registration in the Employment Exchange.

(ii) The number turning out on works and in some cases, even those registering, have no relation to the agricultural labour population enumerated in the district. It is seen that the registration is related to lack of a steady work in the type of agriculture in the district and the nature of land holdings and also the type of crops grown.

(iii) More women turn up at the work site than men showing that men usurp better labour opportunities in the village areas and women being willing to earn, come out. Provision of labour opportunities attract women even to distant work sites.

58.4.49 1974-75 and 1975-76 have been rather good agricultural years in the State of Maharashtra. In the three years preceding this, when there was a general spread of drought in many districts of Maharashtra, it was noticed that even cultivators owning large areas of land in certain districts like Sholapur had come out for rural works. This indicates to some extent the weakness of employment opportunity in normal agriculture in certain drought affected pockets of the country. On the other hand where agriculture is well organised, it is able to meet the vagaries of climate much more effectively. In Maharashtra in a normal year in certain districts with poor agriculture, when employment is offered, labour is forthcoming. The demand for employment opportunities increases in these areas when the season is unfavourable. A Central Team is now examining the situation in other States of the country drawing from the experience of Maharashtra. It may well be that the estimates made by Dandekar and Rath are on the high side. But there is a need for provision of regular dependable employment throughout the year through works programmes. This would draw away in certain regions of the country landless labourers who are prepared to be mobile and to accept wage employment outside their villages.

58.4.50 In all the programmes whether rural works or CSRE or DPAP or small farmers' and marginal farmers' schemes—it has been emphasised that the type of programme to be undertaken should be productive programmes. The old concept of famine relief works as merely wage employment without productivity has been given the go-bye, quite some time ago. But because of lack of the required pre-planning, some of the programmes may lead to non-productive work. This only emphasises the need for ensuring that there is proper pre-planning and shelf of projects to be handled when the demand arises.

58.4.51 It is often pointed out that when the agricultural season fails and labour has to be provided to larger numbers it is difficult to find productive schemes at a reasonable distance from the villages. The Maharashtra experience will be useful in coming to a judgment on this problem. A recent check showed that whereas quite a large number of labour registering themselves were willing to go out for permanent employment, they were first engaged on minor irrigation, soil conservation and such works nearer the village. At the same time, it was noticed that large scale canal works, which could have easily absorbed them, were going without labour. It has, therefore, been decided recently that labour opting for more or less permanent employment should first be directed to the various large scale plan works, like major and medium irrigation, road works, etc., and only after these are saturated, smaller projects should be attempted. It has also been suggested that a shelf of small projects should be kept in hand to be used effectively when the labour demand rises due to a bad agricultural season and more works nearer the village have to be provided. It has been estimated that with such meticulous preplanning the plan projects in hand can more than look after the demands of even a State like Maharashtra where rural under-employment appears to be quite substantial. Marginal investments in a bad year in extremely small works nearer the village would more than look after the problem. Compared to Maharashtra the problem is not so acute in the other States of the country.

58.4.52 It might be clarified that productive works have already been enumerated in the estimates of opportunities for labour given in Table 58.3. These programmes by whatever name called, do not therefore, give any additionality to the labour opportunities.

Non-agricultural Programmes: Development of Infrastructure and Services

58.4.53 Development of infrastructure as already indicated covers rural institutions, organisations and constructions including

rural electrification, rural roads and communications, housing, co-operatives, rural banks, agro-service centres, and farmers' organisation. The impact of irrigation works has already been dealt with along with the agricultural programmes. It might be added that development of infrastructure and services is essential in order to make the rural life more attractive. It may not be correct to assess the rural-urban inequalities in terms of income differentials alone and considerable part of unhealthy mirgration from the rural to the urban sector is more on account of the inadequate amenities and services due to poor development of infrastructure in the rural areas. Although direct employment in the development of infrastructure is limited, it would result in the growth of activities in the tertiary sector as well as development of agro-based and other village and small scale industries.

58.4.54 In our Interim Report on Credit Services for Small and Marginal Farmers and Agricultural Labourers, 1971 we have recommended formation of Farmers' Service Societies (FSS) as cooperative bodies at tehsil/block level with branches as counterpart of the circle extension organisation. We also recommended that there should be union of FSS and functional organisations for specific commodities at the district level. Growth of FSS and the functional organisations will result in employment opportunities for various skilled and semi-skilled categories. To illustrate, there will be growth of extension agencies and expansion in employment of semi-skilled and skilled personnel required for dealing with various activities to be undertaken by these societies. However, the main form in which the FSS will be instrumental in generating additional employment will be by providing better facilities to small and marginal farmers and agricultural labourers for improving various subsidiary activities. The multi-purpose approach of these societies will help in tackling these new lines of employment in the rural sector. Similarly, ancillary farm occupations which form the most useful source of employment, mainly for agricultural labourers will be fully encouraged. Expansion of branches of the commercial banks and financial institutions in the rural areas will have a similar impact in promoting subsidiary and ancillary employment in non-agricultural occupations.

58.4.55 As regards essential facilities like roads and communications, construction of rural roads provides increased employment for skilled as well as unskilled labour. Generally construction of rural roads is taken up off the season and employment in it is of temporary nature. Rural roads include farm and village roads, approach and feeder roads or district roads. Commercialisation of agriculture and development of various economic activities would be consider-

ably boosted up through the development of the rural roads which will be connecting the villages with the towns and marketing and growth centres. It would help in quicker movement of agricultural inputs, disposal of farm and non-farm produce and would also promote rural industries. A well dispersed network of all-weather rural roads will reduce the concentration of population in towns and urban centres by providing easy access to the various facilities and services in the urban areas.

58.4.56 The Committee on Rural Roads (1968) set up by the Ministry of Transport and Communications recommended that every village in an agricultural and developed area should be brought within 4 miles (6.4 km) of metalled road and 1.5 miles (2.4 km) of any kind of road; in a semi-developed area within 8 miles (12.8 km) of metalled road and 3 miles (4.8 km) of any kind of road[1] in an undeveloped and uncultivated area within 12 miles (19.2 km) of metalled road and 5 miles (8 km) of any kind of road[1]. With the spread of new technology and development of agriculture, the approachability through rural roads of various types will have to be further improved.

58.4.57 According to the findings of the Committee on Rural Roads, rural road lengths which can be constructed in the next 20 years (or say, by 1990 AD) are 3.24 lakh kilometres of 'village roads' and 2.30 lakh kilometres of 'other district roads'. The Working Group on Agriculture of the Committee on Unemployment had estimated that in the construction phase these roads would provide employment on an average at the rate of about 80 man-years per kilometre of road construction. Maintenance of each mile of metalled road on an average is expected to provide employment to one person for the whole year. This will result in employment for about 2 lakh man-years on a continuing basis in the operation/maintenance of these roads.

58.4.58 Electricity has got a vital role in the development of agriculture and indeed the entire rural economy. It is required for pumping of water for irrigation and domestic supply, processing of agricultural produce, cottage and small and medium scale industries and for providing amenities like heating, lighting etc. and is also an essential medium of instruction and education. It has been suggested in Chapter 19 on Electricity in Rural Development that the tempo of rural electrification should be stepped up so as to make electricity available for pumping sets and rural industries in practically all the villages by 1990 AD. There is no estimate of direct employment

[1]1968. Report, Committee on Rural Roads. New Delhi, Ministry of Transport and Shipping (Roads Wing), Government of India.

likely to be generated as a result of rural electrification but its impact in the development of various activities enumerated above its significant. To cite an instance, setting up of cold storage plants in rural areas for storing perishable commodities can avoid considerable losses and make them available during off-season, thus increasing the producers' income. Rural electrification also reduces the drudgery of household duties and can open job opportunities more suitable for the female population.

58.4.59 Rural housing is yet another field in which constructional activities can enable the labour family to follow suitable subsidiary occupations. The Committee on Unemployment had estimated that at the beginning of Fifth Plan there would be a backlog of about 18.1 million housing units in the rural area. In addition, the replacement of old houses as well as construction of additional units to meet the requirements of the growing population would necessitate the construction of about 3.12 million housing units per year in rural areas during the Fifth Plan.[1] The wage component forms 30 per cent of the total investment for rural housing. Construction of houses would also have an indirect effect on generation of employment in the supply of materials, transportation etc. The indirect employment in these ancillary activities is expected to be 1.6 times more than the direct employment in construction programme. Apart from construction of house sites, there is large scope for construction of public buildings such as schools, hospitals, recreational centres, markets, storage and warehouses in rural areas. The constructions will also result in sizeable additional employment.

58.4.60 It has been observed that the tertiary sector represents by far the most dynamic sector in the creation of new employment in the developed countries. The tertiary sector including services covers various kinds of activities including electricity, gas, water, sanitary services, commerce, banking, insurance, transport, warehousing, communications, public administration and so on. There is a wide scope for creating additional employment in this sector. There has been a discernible tendency in developing countries like Taiwan and Philippines to absorb a large bulk of the additional labour force in the tertiary sector.[2] Development of infrastructure helps generate continuous employment in the tertiary sector.

58.4.61 Deliberate efforts will have to be made to see that the production of sophisticated goods and services which is at present

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[1] *Ibid.* 2 (p. 13): 224.

[2] Bhalla, A. S., 1973, "The Role of Services in Employment Expansion", in Richard Jolly et al., Ed. Third World Employment, Problems and Strategy: 298-99: London, Penguin Books.

concentrated in the urban sector is decentralised and shifted to the rural areas. These sophisticated goods and services would cover a number of dairy products, processed food of various kinds including malts and beverages, jams, jellies and squashes, biscuits, processing especially at primary stage including milling, tanning, oil extraction, chilling of milk, fruit processing, canning and preservation, packaging, storage etc. There is a wide margin between the price received by the farmer for his produce and price paid by the consumer or the price of the processed products in the urban areas. This difference is accounted for by processing, marketing, transport, packaging and advertising charges. These activities have large employment content, in India, the price spread between the farmer and the consumer is at present due to commission and profits of various intermediaries besides marketing and transport charges. This has to be eliminated. In the future, the trend in consumption will be towards use of processed materials and in some cases in packaged forms. This trend is welcome and should be encouraged because it provides greater employment opportunities in these sectors. But in order to ensure that these benefits go to the rural or semi-urban areas, there is need for bringing activities such as wholesale and retail trade, distribution, packaging and processing, marketing etc. within the fold of rural sector in organised forms. This is discussed further in Section 5 of this chapter. These are only broad indications of the main directions in which the tertiary sector will have to be developed.

Rural Industry

58.4.62 Despite best efforts to create additional employment in the tertiary sector, a large backlog of unemployment in the rural areas will still remain and development of rural industries and decentralisation of the appropriate manufacturing units to the rural sector are necessary in order to remove this backlog. As observed by the Estimates Committee, "neither agriculture nor large-scale industry nor even both of them together can absorb the growing number of unemployed and underemployed in villages". In view of the Committee, 'a well thought out and comprehensive programme of decentralised industries in rural areas implemented with drive, sincerity and a sense of paramount urgency can provide an effective answer to the vast problem of rural unemployment'.[1]

[1]One Hundred & Seventh Report of the Estimates Committee (1965-66) Third Lok Sabha, Ministry of Industry; Office of Development Commissioner, Small Scale Industries—Rural Industries, p. 3.

58.4.63 In many rural areas, cottage and small-scale industries have traditionally provided substantial employment opportunities especially in the off season for agricultural work. There are some industries like the manufacture and maintenance of simpler machinery and implements, and the mixing of fertilisers and animal feeds which can provide additional employment opportunities in the rural areas. Similarly, the case of milling of cereals, canning of fruits and vegetables, cotton ginning and initial processing of other industrial fibres and the curing of hides and skins and leather production, there is considerable scope for adjusting the technology with a view to providing additional employment. Secondly, there may be a series of products required by the large industrial units which can be manufactured in the rural areas in a decentralised manner. The experience of Japan is relevant in this connection where the growth of vast number of small industrial units catering to the needs of the large units in respect of component parts and products has successfully solved the problem of unemployment.

58.4.64 Broadly, industrial employment in the rural areas can be provided in two ways: firstly, through the expansion of the handicrafts and small-scale industries which have been traditionally in existence as well as agro-based industries and secondly, by promoting the decentralisation of industry from urban to the rural sectors. Our objects has to be to strengthen the traditional village industries including khadi as also to identify new modern small-scale industries with a strong economic base. The expansion in the various agricultural programmes and the resultant increase in rural incomes would provide the basis for the growth of agro-based industries as well as the industries meeting the consumption needs of the economically better rural classes. As already indicated development of infra-structure and the economic and social overheads including electrification, rural roads and communications are essential for the development of village industries.

58.4.65 Growth of handicrafts and small-scale industries is associated with a number of advantages. These are generally labour intensive with a shorter gestation period. They also offer employment in close proximity of the villages providing subsidiary or alternative occupations. The local raw materials can be profitably utilised and the needs of the local market could be catered to. Application of improved techniques can give more employment in this sector along with better productivity. Application of small electric motors to the craft workers' machines, introduction of semi-automatic pedal-looms in cotton weaving and the use of simple press in the preparation of fruit juices are some illustrative cases. Larger employment opportunities can be generated by shifting demand to simpler products that can be more

easily produced with labour intensive techniques. With improved marketing system, the minimum support prices can be used for encouraging the diversification of production towards more labour intensive products.

58.4.66 In order that the handicrafts and the small-scale industries are made viable, it will be necessary to take a number of steps. An important lesson learnt from the Third Plan was that where individual small industries, including village industries, had failed to adopt improved techniques or to achieve economies of scale production costs had remained relatively high and problems of unsold stocks and of decline in production and employment had arisen. The modern production techniques have to be studied and applied with suitable adaptations in the reorganisation of the small scale units which could improve the quality of the goods and the productivity of labour without creating unemployment. Suitable technical and financial assistance, raw materials and implements, as well as facilities for training for imparting the requisite skills will have to be provided. Greater attention will have to be paid to integrating the very small units within the framework of a viable organisation such as a cooperative society. The development of agro-industries connected with processing of agricultural produce or production of inputs including implements, pesticides etc. will link the decentralised sector of the rural industries with agriculture. On the other hand, development of ancillary industries connected with production of spare-parts and original components will link them with the organised large sector. A balanced and inter-connected development of these industries only can ensure proper development of employment opportunities.

58.4.67 Among the handicrafts industries, sericulture occupies an enviable position from the point of view of providing employment and additional income. Sericulture can be fitted in the lean or leisure periods of the farmer and can beneficially engage women and old and handicapped members of the rural households. It is estimated that the production of all kinds of raw silk will increase from 3.2 thousand tonnes in 1974-75 to 16.8 thousand tonnes by 2000 AD. As brought out in Chapter 26 on Sericulture the employment potential resulting from the increased production is likely to go up from 3.5 million man-years in 1974-75 to 10 million man-years by 2000 AD

58.4.68 As regards decentralisation of modern industries to the rural areas the experience of China which has been described as "walking on two legs" represents the kind of decentralisation which may not be feasible in all circumstances. China represents the unique

example of the setting up of not only light but also some of the heavy non-agricultural industries in the rural areas. While there may be some question as to the desirability of the shifting of many heavy industries to the rural areas, there may not be much difficulty in decentralising industries such as the construction industry, small fertiliser plants and machinery and assembly and repair shops to give only a few examples.

58.4.69 The modern industries that could be decentralised to rural areas will be determined by the rural markets and the raw material available locally. From this point of view, apart from the examples cited above, there is a wide range of other smaller industries which could be conveniently located in the rural areas such as fertiliser mixing, pesticides formulation, forest-based industries, food industries etc.

58.4.70 For proper development of agro-based an rural industries, it is necessary to continue the existing principle of reservation for the protection of small-scale and traditional industries from undue competition. Considering the large scope for the expansion of the rural industries sector in future, it would be necessary to modify and extend the principle of reservation for the small-scale industries in the light of the growing potentialities and performance of the various industries in the rural areas. A careful identification will have to be made of the industries, parts, components and processes which can be taken care of by the small scale units without having any material effect on economic efficiency. Thus the items or lines of production selected for reservation should be technically and economically feasible; should provide output of acceptable quality and should be ones wherein a large number of small units could be set up, preferably on a decentralised basis. However, extension of the principle of reservation to the rural industries will be ineffective unless steps are taken to evolve the right technology for the small units and provide appropriate support in the form of quality control and suitable fiscal, credit and marketing policies as well as arrangements for supply of raw materials and other essential needs. We, therefore, recommend that a review of the list of industries reserved for exclusive development in the small scale sector may be made periodically in the context of the increasing relevance of agro-based and rural industries and the principle of reservation extended to all those items that fulfil the above mentioned criteria.

58.4.71 In order the proper technology is developed for the various rural industries systematic research in the field will be

necessary. It has been said that there is an imperative need for development of an intermediate technology which is an improvement upon the traditional methods but is not so expensive as the methods adopted in the organised industrial sectors. In a number of cases, production in organised sector and that in the decentralised rural sector may be complementary. A typical example is the Amul industry.

58.4.72 Growth of infra-structure and of social and economic overheads is necessary for the growth of rural industries. In rural areas, certain growth points or centres may be developed for facilitating secondary and tertiary activities. The rural growth points or rural towns will become centres for the organisation of extension, credit, marketing and other services to the farmers. These measures will help in avoiding unhealthy migration of the rural unemployed to the urban areas and make the rural life worth living.

5 THE STRATEGY AND POLICIES

Perspective for Future

58.5.1 The foregoing analysis brings out the possibilities of increasing employment potentials in the rural areas in both agricultural as well as non-agricultural programmes. In 1971, the total population of rural workers was 148.4 million of which 9.8 million were child workers. As already pointed out, it should be our objective to remove children from the field of those seeking employment and prepare them sociologically through education and training for taking up more remunerative and skilled employment in the rural sector. It is our hope that this transformation will take place much before 2000 AD. The number of workers other than child workers in the rural areas was 138.6 million of whom 117.0 million (84.4 per cent) were employed directly on agriculture and 21.6 million (15.6 per cent) on non-agricultural labour (Appendix 58.2). In accordance with the forecast of increase in the population of rural labour force (projection 1 under Table 58.1), the total rural labour force other than children is expected to be of the order of 249.9 million in 2000 AD. Thus, we shall have to find by 2000 AD, employment opportunities for the additional 111.3 million.

58.5.2 Under Section 4, we have estimated that by the various programmes postulated, it should be possible to find full-time employment of 300 days a year, directly in the agricultural sector for an additional population of about 52 million by 2000 AD

quantitative estimates in respect of non-agricultural rural programmes are not available except in the case of a few items. We have, however, stressed while dealing with these programmes, the need for diversifying employment opportunities in the rural sector and providing the rural labour greater opportunities in the secondary and tertiary fields both with a view to increasing employment and remunerative employment in more skilled opportunities. The demand for more and more sophisticated processed food and processed agricultural raw materials would stimulate further the growth of the secondary and tertiary sectors. There has to be a national will to ensure that this opportunity is reserved for the rural sector. in order to increase significantly the percentage of rural labour to be diversted to non-agricultural sector in the rural areas it is essential to organise as far as possible, the growth of the secondary and tertiary sectors in the rural areas.

58.5.3 As pointed out in paragraph 58.4.61 the farmer gets as his share only a portion of the retail price paid by the consumer for agricultural commodities. The difference goes towards giving employment to a large number of persons engaged in the secondary and tertiary sectors of trade and marketing which is necessary to meet the sophisticated needs of the consumer market. In this country the *per capita* annual expenditure on consumption in urban areas (Rs. 1,550 at 1971-72 prices) as estimated in 2001 AD is 1.8 times the corresponding figure for the rural areas. Even now the urban consumption basket is different from that of the rural basket and shows greater sophistication. By 2000 AD it is reasonable to expect that the higher consumption expenditure in the urban areas will be reflected in more and more sophisticated processed food material. It will be reasonable to expect that by 2000 AD the degree of sophistication that we reach will enable a substantial addition to the sescondary and tertiary employment opportunities. If our recommendation to ensure that this increased labour opportunity is by national policy substantially diverted to the rural areas, is implemented, a completely new line of employment opportunities will arise in the rural sector. In the present rural economy, the employment of 21.6 million in the non-agricultural sector constitutes 15.6 per cent of the total labour population. This comprises of persons employed in various secondary and tertiary occupations including those employed in village industries. As indicated earlier, in sericulture alone where 3.5 million people are engaged there is scope to employ ten million people by 2000 AD provided the recommendations for its improvement in Chapter 26 on Sericulture is imple-

mented. Similarly, there are opportunities in handlooms and various village industries which, if properly exploited, are likely to give similar substantial additions to employment opportunities. Taking the sophistication in the food processing and food trade sector and the growing opportunities in the village industries sector, it is our judgement that by 2000 AD, the non-agricultural, employment opportunities in the rural sector may absorb about 30 per cent of the rural labour force.

58.5.4 This will mean that the number of people in the rural sector who can be employed in non-agricultural employment including village industries will be of the order of 75 million and the additional employment opportunities that can be created in the non-agricultural sector by 2000 AD will be about 53.5 million. Taken together with about 52 million man-years which we have already identified under the agricultural programmes, this will provide full employment of 300 days for an additional labour force of 105.5 millions. Development efforts needed for bringing about this change in the occupational structure should be organised through a set of national policies.

58.5.5 We have already drawn attention to the various estimates of backlog of unemployment and under-employment. These estimates are based on the data in the 17th, 19th and 21st rounds of the NSS. Raj Krishna has pointed out averaging the ratios for these rounds, "17.7 per cent of the labour force is idle, that is, wholly unemployed or getting work for 28 hours or less in the reference week; about 12.4 per cent is willing, that is, wholly unemployed, or severely or moderately under-employed and available for additional work ....."[1] The corresponding figures for the rural labour force are 18.2 and 13.2 per cent. This to some extent reflects the nature of the labour market in the rural areas. There is a class of workers who though underemployed, are not available for any additional work because they may not need it. This is a possible situation in a labour market where some of the officers are of the cultivators' class who have their own lands and other occupations which require their attention. Therefore, 13.2 per cent of the rural labour can be assumed to be wholly, or severely unemployed, that is, having work for 28 hours or less and available for additional work. There is no reliable statistical basis for fixing norms for translating the available labour into man-years of unemployment required to fill the gap.

58.5.6 Some idea of what can be called full employment in the rural sector is needed to bring to focus the magnitude of the problem

[1] *Ibid.*2(p. 15): 5.

of under-employment. The Bhagwati Committee considered that 273 days of employment of 8 hours a day can be treated as full employment in the rural sector. Their argument is that 42 hours of employment a week is fair employment and on a 8-hours a day, this is equivalent to 273 days full employment in the year. On the other hand, the Rural Labour Enquiry (1964-65) has estimated the actual number of days worked by labour in employment at full intensity. This data has been analysed and presented at Appendix 58.4.

58.5.7 Taking into consideration both non-agricultural employment and self-employment and taking the weighted average on participation rates of men and women, full employment of rural labour households in 1964-65 can be taken as 254 days. Therefore, the rural sector with its employment opportunities cannot at present be expected to give full employment for more than 254 days per year. Even assuming that various programmes like Employment Guarantee Scheme of Maharashtra is organised in a large way throughout the country, by 2000 AD, we can expect that full employment in the rural sector can lead to employment for a period somewhat between 254 and 273 days. It would be reasonable to assume an optimum of 265 days for 2000 AD. We expect the additional employment opportunities to be of the order of 105.5 million man-years of 300 days per year by 2000 AD. This is, therefore, equivalent to employment opportunities of 119.6 million man-years for fully employed labour on the basis of the employment for 265 days.

58.5.8 We are, however, proceeding on the assumption that every person seeking employment in the rural sector will be prepared to accept full-time employment. Rural labour is of two kinds; (a) pure agricultural labour which is expected to be reasonably mobile and (b) cultivator households which are generally not mobile. In Appendix 58.3 the percentage of the small cultivators and non-cultivating wage-earner households who are willing to take up full-time jobs within and outside the village in 1970-71 is given. This is based on the 25th round of the NSS. It will be seen that even amongst non-cultivating wage earner households, a significant percentage was not willing to go outside their village, in many States. In the case of small cultivator households the percentage willing to go out was naturally less than those amogst non-cultivating wage earner households. Therefore, though we may be able to generate full-time employment in certain fixed occupations, unless this fits in with the location of the wage earner and his predilections towards mobility, the two may not fit. As a result, the general experience will be that on the average the rural wage earner will not be working for the full 265 days that we are postulating. It follows that the

work-stock that will be created as a result of various development programmes will be shared by a much larger number of people than what is indicated by the estimates of the number of persons who can be provided whole-time jobs. This will have, in turn, a redistributive effect on income in favour of the weaker sections of the rural community because most of the additional employment that will be generated will suit the requirements of unskilled and the weaker sections. Many of these jobs will be suited for the female workers. We are, therefore, satisfied that if the recommendations made about the various new opportunities for employment are implemented with due care and effort and the time frame of operation is adhered to, there is no reason to apprehend that the additional labour force cannot be found employment opportunities in the rural sector. Of course, these estimates are based on assumptions regarding family planning performance and migration from the rural to the urban areas.

Employment and Rural Poverty

58.5.9 The effect of additional employment opportunities on rural poverty will depend to a great extent on the level of wages. The agricultural wage for unskilled labour in many parts of the country is rather low. This is the main reason why more than 45 per cent (1968-69) of the rural population was below the poverty line. Rural population below the poverty line refers here to those whose per capita per annum expenditure on consumption is below Rs. 180 at 1960-61 prices, which was considered as the desirable minimum level in terms of nutritional adequacy by Dandekar and Rath.[1] The most important step to be taken to enable the agricultural labour to move above the poverty line is to ensure a reasonable level of minimum wage along with guaranteed employment. No doubt the study made in Musahri shows that low wages may not necessarily be because of lack of willingness to pay, but inability on the part of the small farmers to pay a wage without reducing his share of income, to below the poverty line. The whole trend of our recommendations is based on greater productivity per hectare of land which should take care of the basic problem of the farmer not being able to earn enough to pay a reasonable minimum wage to the labour. Without increased productivity and expansion of subsidiary occupations, it will not be possible to ensure the reasonable minimum wage to the labour. But if these conditions are fulfilled and our

[1] *Ibid.* 1 (p. 45): 8.

recommendations tre accepted, it should be possible to pay this rate of wages to the workers. Recently Madhya Pradesh has declared a minimum wage of Rs. 3.50 to Rs. 4.00. Even this would not be a reasonable minimum wage. But considering the present stage of the agricultural economy, it can be taken as a fair measure of the capacity to pay in a backward agriculutral State.

58.5.10 The average productivity in the agricultural sector per hectare of land is expected to nearly double by 2000 AD. This is based on analysis in Chapter 11 on Supply Possibilities. Taking the Madhya Pradesh decision to fix a minimum wage of Rs. 3.50 to Rs. 4.00 and the expected increase in the productivity as a fair measure of the capacity to pay, the landholders must be in a position to pay Rs. 6.00 per day at 1974-75 prices by 2000 AD. By 2001 AD, the rural population is expected to be of the order of 667 million of whom workers would be of the order of 249.9 million. Considering that in many types of secondary and tertiary occupations, not more than one member per household is the earning member and assuming an average of 5 members per household, it will be evident that in the case of agricultural labourers who depend upon unskilled work, there will be more than two workers per household by 2000 AD. Even on the minimum assumption of two workers per household, the per capita annual income of a five member household at the above wage rate of Rs. 6.00 would be of the order of Rs. 636 at 1974-75 prices. Considering that a per capita annual income of Rs. 565 at 1974-75 prices (or Rs. 47.10 per capita per month) which is equivalent of Rs. 180 (or Rs. 15 per capita per month) at 1960-61 prices, is sufficient to put a person above the poverty line, a minimum wage rate of Rs. 6.00 at 1974-75 prices in 2000 AD should see the unskilled labourer classes going above the poverty line. It is our expectation that the minimum wage for agricultural labour of the unskilled type will be fixed periodically so that it fits in with the productivity levels then prevailing. It goes without saying that skilled labour will be getting much higher wages by 2000 AD.

58.5.11 In 1971, out of the total agricultural workers, 60 per cent were cultivators. The cultivators are always at a better standard than the pure agricultural labourers in the present rural economy. With greater productivity per hectare of land, this gap between the two classes is bound to widen further in favour of the cultivators. It is, even therefore, all the more reasonable to expect that the cultivators will all be brought well above the poverty line by 2000 AD. As already indicated, by 2000 AD the non-agricultural occupations will be absorbing 75 million out of the total rural labour population

of 249.9 million. The population in this sector is bound to have a much higher standard of consumption than either the agricultural labour or the cultivators. By 2000 AD the picture of distribution of consumption between the different classes will change completely reducing the spread between the top and bottom and bringing about a better and gradual trend between the different deciles.

Work Planning and Direction

58.5.12 Creation of whole-time jobs should be restricted to those who are in a position to withdraw completely from the land-based occupation. The 'hard-core' of the rural poor including the landless labourers will be the primary source of supply of this category of workers. The rural works programmes should be planned in such a way that these are able to provide secure and continuous jobs to these workers. Since the mobility of this class of workers is comparatively higher, it should be possible to concentrate such programmes at selected centres and attract this class of workers to these programmes by providing suitable wage rates.

58.5.13 Needless to say, employment generation cannot be left to a few *ad hoc* employment programmes. The approach should be to reorient the entire rural development plan towards larger employment. There is need for an integrated frame work of policy and action in this regard. The first component of this integrated policy framework is proper coordination in the creation as well as utilisation of employment opportunities in the various agricultural and non-agricultural programmes. The planning and scheduling of the various employment generating programmes, therefore, should take care of the part-time and off-season unemployment.

58.5.14 From this point of view proper employment planning can be done only at the micro-level. The nature and incidence of employment will vary from region to region and area to area. In order that employment opportunities created by various development programmes match the demand for jobs of different kinds, it is necessary to have precise information at the local level about the classes of people unemployed, their economic condition and present occupations and suitability for various types of jobs i.e., on-the-farm or off-the-farm, seasonal or permanent. Regional characteristics of the problem of unemployment will, therefore, have to be taken into account and the areas having higher incidence of unemployment will have to be given priority in the allocation of resources.

58.5.15 As indicated above, proper phasing and scheduling of different programmes is important. Each programme has two phases i.e., construction phase and the maintenance and/or pro-

duction phase. At the construction phase, the employment potential of a programme is higher and declines at the maintenance/production phase. In order to ensure continuity in the employment opportunities, it is necessary that there should be proper phasing of the employment programme over time so that the labour force rendered surplus under one programme could be utilised under other programmes. The complementary and the inter-relationship of the different programmes are significant from this point of view.

58.5.16 It is imperative that the programmes selected should have a sound economic basis and should not be in the nature of relief works and remedial measures. The object should be to raise productive capacity of the agro-based sector on a permanent basis. The development programmes should be able to create productive assets and should be integrated with a comprehensive view of rural resource development. The possibilities of development discussed earlier confirm that the object of greater production can be very well combined with more employment through the application of improved technology.

58.5.17 To find adequate resources for supporting the various programmes indicated above will be a big task. Attempt will, therefore, have to be made to utilise those factors of production which are more plentiful in rural areas but are at present underutilised. Accordingly, efforts will have to be made to concentrate initially on such sectors and programmes where the labour requirement can be clearly identified.

58.5.18 The experience of the working of the various programmes will have to be assessed systematically with a view to obtaining information on the creation of employment opportunities. It is also necessary to collect detailed information about the nature and incidence of unemployment. The district planning organisation suggested in Chapter 62 on Administration should be suitably equipped to carry out continuous research in this field.

58.5.19 In Chapter 10 on Demand Projections, in paragraph 10.2.8 it has been assessed that by 2000 AD 29 per cent of the total population will be in urban sector. This change we expect will take place by natural increase, addition of more rural centres under the urban classification and by net migration from the rural areas to urban centres. At present, the rate of urban growth is of the order of 3.29 per cent (compound rate) whereas the population growth is of the order of 2.24 per cent (compound rate). It is our expectation that by suitable controls and organisation we can restrict the urban growth rate. The main reason for a higher growth of urban population is the migration from the rural areas because of lack of employ-

ment opportunities in the rural areas and the prospect of being able to find better labour opportunities in the urban centres. On the basis of detailed analysis of the labour opportunities in the rural sector indicated earlier, it can be stated that by 2000 AD the rural sector would be in a position to provide not only full employment but employment at much higher wage rates than at present prevalent, to the estimated increased rural labour force by that date. Thus, the strategy aims at reducing migration to urban areas and providing better employment in the rural areas. In addition, better amenities and services are expected to develop in the rural sector so that migration from rural sector to urban areas in the expectation of better amenities and services may also be discouraged.

Improvement of Skills

58.5.20 The intensification and diversification of production suggested for creating the employment potentialities call for improved skills and training facilities. Those who will be employed in non-agricultural rural sector will require more skills than agricultural labourers. These skills including the skills in the village industries can certainly be imparted to the rural labour in a systematic programme of training and education. Much of the training would become part of the school curriculum where certainly the basic economic and accounting principles will be taught. It is also our expectation that by 2000 AD the children in the rural area will be at a much higher educational level. In this connection it may be pointed out that existing training facilities are totally inadequate. This aspect has been dealt with in Chapter 54 on Extension. Considering the vast range of skills required in both the agricultural as well as non-agricutural rural programme, the institutional facilities for training as well as research for further development of the skills will have to be adequately strengthened.

Manpower

58.5.21 Discussing manpower, we generally consider only highly trained manpower in the government administrative structures and high management structures. Much of the employment in the rural sector is self-employment which requires certain skills. In various parts of our report we have indicated the trends that are desirable in improving agriculture in various sectors. We have also drawn attention to the increasing necessity for a proper organisational frame and supporting entrepreneurial effort. Research also requires substantial improvement and support from the highly educated man-

power. It is not possible to quantify the requirements of the educated manpower which will be required in the various sectors of agriculture at this stage. Much depends on the pace at which the various changes that we have advised will be carried out and can be carried out. In planning the changes, note will have to be taken of the requirement of the trained manpower also for the changing situation and take steps at the right moment in ensuring that educated manpower is made available when it is needed. In this connection, we have to note that in a highly complex situation requiring action and decision by several authorities it is not always possible to ensure performance *vis-a-vis* planned programmes/projects. On the other hand, we have also got the experience that given the appropriate situation and atmosphere, coordination and performance show rapid improvement. Sometimes there may be shortage in the required manpower. The country has to choose between having some unemployed manpower hand in case programmes are not implemented according to the planned schedule or face shortages when programmes do get going. It is preferable to have a surplus situation rather than one of shortage if the nation is to go forward quickly.

58.5.22 The non-agricultural sector available for labour in the rural areas will require skills of various kinds. In Chapter 54 on Extension, we have pointed out how the farmer himself will have to be trained in various techniques and skills to enable him to take advantage of modern agriculture. We have also given some indication of the types of skills needed. As and when the demand arises, the necessary educational programmes will have to be stepped up. It is not possible to furnish a quantitative estimate of the skilled manpower by 2000 AD. The non-agricultural occupations include such village industries as handlooms, handicrafts, sericulture etc. All these require specialised training programmes which will have to be taken note of in the relevant village industries programmes.

6. SUMMARY OF RECOMMENDATIONS

58.6.1. The main recommendations are as under:

1. The strategy for creating larger employment opportunities will have to be two-pronged: firstly, all efforts will have to be made to generate additional employment in the various agricultural activities and secondly, the potentialities of employment in the non-agricultural rural jobs will have to be fully exploited in order to accommodate those who cannot find work in the land-based occupations.

(Paragraph 58.1.3.)

2. Estimates of unemployment and the additional employment to be created as a result of the plan programmes should be attempted in aggregates as well as disaggregated estimates.

(Paragraph 58.3.4)

3. There are potentialities in the different agricultural programmes for providing additional employment opportunities of the order of about 52 million man-years by 2000 AD. Every attempt should be made to ensure that measures required for realising these potentialities are adopted quickly.

(Paragraph 58.4.1 and 58.4.72)

4. The rural works programmes are basically meant to provide opportunities for employment to the poorest strata of the rural community or the hard core of the rural poor.

(Paragraph 58.4.41)

5. Suitable steps should be taken to evaluate the results under the Pilot Intensive Rural Employment Projects (PIREP) with the minimum time lag and the scope of the scheme should be enlarged to cover a larger number of districts.

(Paragraph 58.4.43)

6. The scope of the SFDA/MFAL agencies could be extended adequately so that similar other employment generating programmes are brought within their purview and employment planning for small and marginal farmers and agricultural labourers is done in an integrated manner.

(Paragraph 58.4.46)

7. There should be provision for regular dependable employment throughout the year through rural works programme to draw away in certain regions of the country, landless labourers who are mobile and are prepared to accept wage employment outside their village.

(Paragraph 58.4.49)

8. The rural works programmes should be pre-planned thoroughly in order to avoid any non-productive item of work and a shelf of properly planned projects should be readily available to be handled when the demand arises.

(Paragraph 58.4.50)

9. Labourers opting for more or less permanent employment should first be directed to the various large scale plan works like major and medium irrigation, road works etc., and only after these are saturated, smaller projects should be taken up. Since the mobility of this class of workers is comparatively higher, it should be possible to concentrate such programmes at selected centres and

attract the workers to these programmes by providing suitable wage rates.

(Paragraphs 58.4.51 and 58.5.12)

10. A shelf of small projects of rural works should be kept in hand to be used effectively when the demand for labour rises due to a bad agricultural season and more works nearer the village have to be provided.

(Paragraph 58.4.51)

11. Production of sophisticated goods and services which is at present concentrated in the urban sector should be decentralised and shifted to the rural areas. Employment opportunities in the production of more sophisticated processed food and processed agricultural raw materials should be reserved for the rural sector as a matter of national policy. Accordingly, activities such as wholesale and retail trade distribution, packaging and processing, marketing, etc. should be brought within the fold of the rural sector.

(Paragraphs 58.4.61, 58.5.2 and 58.5.3)

12. Review of the list of industries reserved for exclusive development in the small scale sector should be made periodically in the light of the increasing relevance of the agro-based and rural industries and the principle of reservation extended to all these items which fulfil the criterion laid for the purpose.

(Paragraph 58.4.70)

13. It should be our objective to remove children from the field of rural workers seeking employment and prepare them sociologically through education and training for taking up more remunerative and skilled employment in the rural sector.

(Paragraph 58.5.1)

14. There are potentialities in the non-agricultural rural sector for providing employment to about 30 per cent of the total rural labour force as in 2000 AD. Every attempt should be made to ensure that measures required for this change in the occupational structure are adopted as a national policy.

(Paragraphs 58.5.3 and 58.5.4)

15. A reasonable level of minimum wage should be ensured along with better employment to enable the class of agricultural labourers to move above the poverty line. The minimum wage for agricultural labour should be fixed periodically so that it fits in with the prevailing productivity levels in the agricultural sector.

(Paragraphs 58.5.9 and 58.5.10)

16. Creation of employment should not be left to a few *ad hoc* employment programmes. The entire rural development plan should

be reoriented towards larger employment. There should be proper coordination in the creation as well as utilisation of employment opportunities in the various agricultural and non-agricultural programmes. (Paragraph 58.5.13)

17. Detailed employment planning should be done at the micro-level. Regional characteristics of unemployment should be taken into account and the areas having higher incidence of unemployment should be given priority in the allocation of resources.

(Paragraph 58.5.14)

18. There should be proper phasing of the employment programmes over-time so that the labour force rendered surplus under one programme could be utilised under other programmes.

(Paragraph 58.5.15)

19. The programmes selected for creation of employment opportunities should have a sound economic basis and should not be in the nature of relief works or remedial measures. The object should be to raise the productive capability of the agro-based sector on a permanent basis.

(Paragraph 58.5.16)

20. Attempt should be made to utilise those factors of production which are plentiful in rural areas but are under-utilised. Accordingly, efforts should be made to concentrate on such sectors and programmes where the labour requirement can be clearly identified.

(Paragraph 58.5.17)

21. The district planning organisation, suggested in the Chapter 62 on Administration, should be suitably equipped to collect information on the nature and incidence of unemployment and to assess the experience of the working of the various employment generating programmes.

(Paragraph 58.5.18)

22. The strategy should be to restrict unhealthy migration from rural to urban areas by providing more employment alongwith better amenities and services in the rural areas.

(Paragraph 58.5.19)

23. The institutional facilities for training as well as research for further development of the skills required in connection with greater employment in the rural areas will have to be adequately strengthened.

(Paragraph 58.5.20)

24. The object should be to avoid shortages of trained manpower even if this results in unemployed manpower on hand in some cases.

(Paragraph 58.5.21)

APPENDIX 58·1

(Paragraph 58·2·2)

Distribution of Workers† by Industrial Categories, 1901-1971: All India.[1]

(millions)

Year	Workers			Agricultural workers		Others**
	Total	Agriculture	Non-agriculture	Cultivators	Agricultural labourers	
1	2*	3*	4	5	6	7
1901 . .	111·4 (46·6)	79·9 (71·7)	31·5 (28·3)	56·4 (50·6)	18·8 (16·9)	4·7 (4·2)
1911 . .	121·4 (48·1)	90·9 (74·9)	30·5 (25·1)	60·4 (49·8)	25·0 (20·6)	5·5 (4·5)
1921 . .	117·9 (46·9)	89·6 (76·0)	28·3 (24·0)	64·1 (54·4)	20·5 (17·4)	5·0 (4·2)
1931 . .	120·6 (43·3)	90·2 (74·8)	30·4 (25·2)	54·4 (45·1)	29·9 (24·8)	5·9 (4·9)
1951 . .	139·5 (39·1)	100·6 (72·1)	38·9 (27·9)	69·8 (50·0)	27·5 (19·7)	3·3 (2·4)
1961@ . .	175·1 (29·9)	124·7 (71·2)	50·4 (28·8)	93·2 (53·2)	27·1 (15·5)	4·4 (2·5)
1971 . .	180·4 (32·9)	130·0 (72·1)	50·4 (27·9)	78.2 (43·4)	47·5 (26·3)	4·3 (2·4)

†These estimates are not strictly comparable over time due to changes in definition of workers, their reference period of regular work and economic classifications of occupations adopted for different censuses.

*Figures in parentheses in col. (3) are the percentages of total workers, whereas in col. (2) they are percentages of total population.

**Engaged in livestock, forestry, fishing, hunting, plantations, orchards, etc. as per (i) below.

@Adjusted on 1971 census estimates as per (ii) below.

[1] (i) India Pocket Book of Economic Information 1972: Tables 1·8 and 1·9. New Delhi, Ministry of Finance, Government of India.

(*ii*) Report on Resurvey on Economic Questions—some Results: Census of India 1971: Series I, India; Miscellaneous Studies, Paper I of 1974, New Delhi Registrar General and Census Commissioner of India.

APPENDIX 58·2

(Paragraph 58·5·1)

Distribution of Workers by Industrial Categories with and without Child Workers, 1971: All-India[1]

(millions)

	Total workers			Child workers (below the age of *15 years*)			Workers without child workers		
	Total	Agrl.	Non-agrl.	Total	Agrl.	Non-agrl.	Total	Agrl.	Non-agrl.
1	2	3	4	5	6	7	8	9	10
Total	180·4 (100·0)	130·0 (72·1)	50·4 (27·9)	10·4 (100·0)	90.0 (86·5)	1·4 (13·5)	170·0 (100·0)	121·0 (71·2)	49·0 (28·8)
Rural	148·4 (100·0)	125·9 (84·8)	22·5 (15·2)	9·8 (100·0)	8·9 (90·8)	0·9 (9·2)	138·6 (100·0)	117·0 (84·4)	21·6 (15·6)
Urban	32·0 (100·0)	4·1 (12·8)	27·9 (87·2)	0·6 (100·0)	0·1 (16·7)	0·5 (83·3)	31·4 (100·0)	4·0 (12·7)	27·4 (87·3)

1. (i) Census of India, 1971 Series I—India paper 3 of 1972. Economic characteristics of population (Selected Tables) B-1 Part A. New Delhi, Registrar General and Census Commissioner of India.

(ii) Revised Series of Population Projection (Memiographed), Expert Committee on Population Projections of the Planning Commission, Government of India.

NOTE: Figures in brackets denote percentages.

APPENDIX 58·3

(Paragraph 58·3·7)

Percentage of small Cultivator and Non-Cultivating Wage earner Households Willing to take up Full Time Jobs within and outside Village, 1970-71[1]

State	Percentage of Workers house-holds		Small Cultivator households		Non-Cultivating wage earner households	
	Small Culti-vators	Non-Culti-vating Wage earners	Within Village	Outside Village	Within Village	Outside Village
1	2	3	4	5	6	7
Andhra Pradesh	52·1	59·3	33·6	18·5	32·8	26·5
Assam . .	29·2	43·5	14·7	14·5	16 3	27·2
Bihar . .	68·2	65·4	33·7	34·5	36·3	29·1
Gujarat . .	37·3	44·0	13·2	24·1	10·2	33·8
Haryana .	42·0	57·0	4·7	37·3	8·0	49·0
Karnataka .	40·7	45·1	24·2	16·5	27·4	17·7
Kerala . .	55·2	73·2	23·8	31·4	22·2	51·0
Madhya Pradesh	34·7	37·9	21·8	12·5	21·8	16·1
Maharashtra .	38·8	46·0	21·9	16·9	20·4	25 6
Manipur . .	12·0	80·0	8·0	4·0	20·0	60 0
Orissa . .	53·9	55·0	27·9	26·0	26·6	28·4
Punjab . .	43·5	70·5	6·8	36·7	16·0	54·5
Rajasthan .	52·2	53·3	21·7	30·5	24·2	29·1
T amil Nadu .	54 2	51·3	23·5	30·7	19·9	31·4
Tripura . .	63·3	64·1	22·8	40·5	18·0	46·1
Uttar Pradesh .	38·8	47·1	14·7	24·1	12·3	34·8
Delhi . .	73·7	81·8	5·2	68·5	15·2	66·6
Average . .	46·5	57·3	19·0	27·4	20·5	36·9

[1]N.S.S. 25th Round, 1970-71-State Reports

APPENDIX 58·4

(Paragraph 58.5·6)

Employment (number of days in a year) of Agricultural Labourers.[1]

	Agricultural labour Households			Rural labour house-holds
	1950-51	1956-57	1964-65	1964-65
1	2	3	4	5
1. men—				
(a) wage employment . . .	218	222	242	245
(i) agricultural	189	194	217	219
(ii) non-agricultural . . .	29	28	25	26
(b) self-employment . . .	49*	33	25	25
2. women—				
(a) wage employment . . .	134	141	160	172
(i) agricultural	120	131	149	161
(ii) non-agricultural . . .	14	10	11	11
(b) self-employment . . .	NA	27	18	18
3. children—				
(a) wage employment . . .	165	204	224	223
(i) agricultural	150	187	207	207
(ii) non agricultural . . .	15	17	17	16
(b) self-employment . . .	NA	44	22	22

NA—Not available

*—Includes 16 percent of the agricultural labourers who did not report wage-paid employment on any day during the year but were assumed to be self employed for half the time.

1. The Indian Labour Year Book 1970:407. New Delhi, Labour Bureau, Ministry of Labour and Rehabilitation (Department of Labour and Employment), Govt. of India.

APPENDIX 58.5

(Paragraph 58.2.5)

A Note on Methodology adopted for Projection of Rural Labour Force by 2001 A.D.

Projection of rural labour force by 2001 A.D. has been attempted with a view to establishing trends of growth of rural labour force in relation to the employment opportunities. The object is to estimate broadly the additional rural labour force that would have to be found employment during this time phase in agriculture and agriculture-based opportunities and the non-agricultural rural activities.

2. The growth of labour force as is known is a function of a number of factors such as growth of population, its composition and the sex and age specific labour force participation rates at different phases of time. These participation rates are subject to a large number of imponderable factors. It is difficult to quantify all these factors and their inter-relationships. The factors which would increase the participation rates are: expansion in male and female education, better health measures, desire for better standard of living, erosion of joint families and kinship ties, fall in the dependency ratios and increase in female participation due to late marriage, etc. The factors which would depress the participation rates are: age composition of the population in favour of children and old persons, increase in school enrolment in the age-group of 15—19 and the minimum period of education prescribed for entering into the working force, withdrawal of children from the labour force due to spread of schooling and Government policy against employment of child labour. In addition there are a few social and cultural factors which may also effect the participation rates.

3. For projecting the rural labour force, S. Raghavachari's population projection[1] accepted by the Commission have been taken as the basis. The sex and the age specific participation rates of the rural labour force as in 1971 have been worked out on the basis of 1971 Census.[2] The rural labour force excluding child labour has been taken as 138.6 million[3] as in 1971 as the basis for further projection.

4. The projections of the rural labour force as in 2001 A.D. is based on the following assumptions in view of the lack of firm data regarding past trends of labour force participation-rates. It is assumed that due to rising trends in enrolment in school education and longer period required for attaining this for completion of the schooling period, the participation rates for rural males in the age-group of 15—29 would decline from 79.3 per cent in 1971 to 78.6 per cent in 1986 and 77.7 per cent in 2001 A.D.

[1] Raghavachari, S. 1974. Population Projections, 1976—2001 in Ed. Ashish Bose *et al.* Population in India's Development 1947—2000 : 431-444, table 5. Delhi Vikas Publishing House Private Ltd.

[2] Census of India 1971, Series I Inidia, Paper 3 of 1972 Economic Characteristics of Population (Selected Tables), B-1 Part A. New Delhi, Registrar General and Census Commissioner, India.

[3] Draft Fifth Five Year Plan : Volume I,p.3

On the other hand in the case of rural females, due to increased enrolment for school education in conjunction with the upward trend in the age at marriage and larger job opportunities in rural areas, the paticipation rates would increase from 19.9 per cent in 1971 to 20.9 per cent in 1986 and 22.1 per cent in 2001 A.D. Better health measures and stronger pulls for better standard of living would induce some increase in the participation rates in the age group of 30—59 for rural males as well as females from 96.2 per cent to 98.0 per cent and 22.9 per cent to 25.2 per cent respectively in 2001 A.D. In the case of rural males in the age group of 60 and above, the participation rates would increase from 76.2 per cent to 79.0 per cent during the above time phase due to factors such as break-up of the joint family system, better health measures and fall in dependency ratio. However, the increase in the case of rural females in this age-group is assumed to increase from 11.4 per cent in 1971 to 11.6 per cent in 2001 A.D. Based on the above assumptions the overall participation rates for rural labour force would increase from 31.6 per cent in 1971 to 34.7 per cent in 1986 and 37.4 per cent in 2001 A.D. These assumptions and trends regarding the participation rates are based on observations and judgement of the Commission.

5. This accounts for the increase in the rural labour force from 138.6 million in 1971 to 249.9 million in 2001 A.D.

Rural labour force and their participation rates : 1971—2001 AD

Workers: (million)

Participation rate: (per cent)

Year	MALES			FEMALES			TOTAL			Total
	15—29	30—59	60 & above	15—29	30—59	60 & above	15—29	30—59	60 & above	
1	2	3	4	5	6	7	8	9	10	11
1971	44·1 (79·3)*	59·7 (96·2)	9·3 (76·2)	11·1 (19.9)	13·1 (22·9)	1·3 (11·4)	55·2 (49·6)	72·8 (61·0)	10·6 (45·6)	138·6** (31 6)
1976	49·0 (79·1)	65·9 (96·6)	10·7 (76·7)	12·5 (20·2)	14·7 (23·2)	1·4 (11·4)	61·5 (49·7)	80·6 (61·2)	12·1 (45·8)	154·2 (32·3)
1981	55·9 (78·9)	72·5 (97·0)	12·4 (77·2)	14·3 (20·5)	16·8 (23·6)	1·6 (11·5)	70·2 (49·9)	89·3 (61·2)	14·0 (46·6)	173·5 (33·5)
1986	62·1 (78·6)	80·4 (97·3)	14·3 (77·7)	16·1 (20·9)	19·2 (24·0)	1·9 (11·5)	78·2 (50·1)	99·6 (61·3)	16·2 (46·7)	194·0 (34 7)
1991	65·1 (78·3)	90·1 (97·6)	16·7 (78·2)	17·3 (20·3)	22·0 (24·4)	2·2 (11·6)	82·4 (50·1)	112·1 (61·5)	18·9 (46·8)	213·4 (35·8)
1996	66·2 (78·0)	101·0 (97·8)	19·3 (78·6)	18·1 (21·7)	25·1 (24·8)	2·6 (11·6)	84·3 (50·1)	126·1 (61·6)	21·9 (46·8)	232·3 (36·7)
2001	66·2 (77·7)	112·2 (98·0)	21·6 (79·0)	18·6 (22·1)	28·3 (25·2)	3·0 (11·6)	84·8 (50·0)	140·5 (61·9)	24·6 (46·1)	249·9 (37·4)

*Figures in brackets indicate participation rates.

**The age and sex specific participation rates have been slightly adjusted in keeping with the total rural labour force of 138·6 million.

59

SPECIAL AREA DEVELOPMENT PROGRAMMES

1 INTRODUCTION

59.1.1 The areas which lag in development are hill, tribal, arid (hot and cold deserts) and semi-arid drought prone areas. Moreover, the Kutch area in Gujarat and the Sundarban in West Bengal, which have salinity problems, need special programmes of development. These areas not only lack in agricultural development but are also deficient in roads and communications and other infrastructural facilities, including services and supplies, extension and education and marketing. In considering the development needs of these areas, the entire resources and infrastructure situation will have to be kept in view. In earlier chapters we have indicated the production possibilities of various agricultural commodities in different areas including the underdeveloped regions and given our recommendations. In this chapter we shall discuss specially the development needs of backward and underdeveloped areas and indicate the desirable approach and broad outlines of the programmes suitable for these areas.

59.1.2 In Chapter 6 on *Growth with Social Justice* we have stressed the need for making special efforts for accelerating the growth of areas lagging in development. One of the objectives of planning is the reduction of regional imbalances and successive five year plans have spelt out special measures necessary for development of backward areas particularly from the Fourth Plan onwards. However, past efforts were not adequate to hasten the pace of progress in these backward areas. As the strategy of development was based largely on overall considerations for the national economy as a whole, sufficient attention was not given to the special problems and requirements of each specific area.

59.1.3 The problems of development of different types of backward regions vary a great deal. Physico-geographical factors exert a decisive influence on the development of potential and limitations of each region. So also the social and cultural background of the people

inhabiting it. Given the diversities among different areas and people, it is, therefore, not possible to adopt a uniform strategy and policy of development for all the areas. The physico-geographical conditions in the Himalayan regions are different from those obtaining in the hills in South India. Again, the tribal areas, which are spread over the country, require policies and programmes to suit the variations in natural endowments and social and cultural habits. Also, the development needs of the desert and drought prone areas are different. There are areas which are still inaccessible and are not exposed to the monetised economy and as such they need an entirely different kind of treatment. Lack of understanding of the special characteristics may result in applying to these backward areas a development strategy which is applicable, more appropriately, to relatively developed areas in the country. Different field situations would admit different modes of development depending on the resource situation and the social and cultural conditions.

59.1.4 Lack of development in the areas referred to in this chapter is not always due to the insufficiency of natural resources. Absence of a consistent policy and concerted action has failed to develop the potential and kept the economy depressed. Low level of productive activity, employment and income is the result of a number of deficiencies relating to organisation, infrastructure, institutions, education and attitude, research etc. In these areas the basic approach should be an integrated area development considering the lack of development not only in agriculture but in every sphere. This would ensure that each element in development will reinforce and supplement the other in the overall economic development of the areas. These considerations should form the basis for evolving the strategy of development of the backward and underdeveloped areas in the country.

2 HILL AREAS

General Description

59.2.1 The hill areas of the country comprise the Himalayan ranges and the hills of the Deccan Plateau. The Himalayan region may be divided into the three sub-regions: the western Himalayas covering Jammu & Kashmir and Himachal Pradesh; the central Himalayas consisting of eight hill districts of Uttarkhand in Uttar Pradesh; and the eastern Himalayas and the north eastern ranges comprising Darjeeling district in West Bengal and hill areas of Assam, Aruna-

chal Pradesh, Meghalaya, Mizoram, Nagaland, Manipur and Tripura. The Himalayas have several ranges. They are described as outer Himalayas, the middle Himalayas and the main Himalayas. Sometimes only two classifications are made, namely, the greater Himalayas and the lesser Himalayas. The Karakoram in the north of Jammu & Kashmir is the highest of the Himalayan ranges and includes the high plateau of Ladak. The southern part of the Himalayas has the lower range of hills known as the Siwalik range. These ranges include deep valleys running from west to east. Lahaul, Spiti and Kulu being important among them. At the far eastern end are the low flat hills of Assam and the bald-round-headed hills of Manipur. These hills are not very high but are thickly forested except where the practice of jhum cultivation has depleted the forest cover and the top soils. The great mountain wall of the Himalayas consists of mountains and hills of varying sizes and has a total length of 2,500 km and an average breadth of 400 km.

59.2.2 The hill areas in different Himalayan States have been identified as follows:

Jammu & Kashmir	all the ten districts
Himachal Pradesh	all the ten districts
Uttar Pradesh	Uttarkashi, Chamoli, Pithoragarh, Tehri, Pauri, Almora, Nainital and Dehra Dun.
West Bengal	Darjeeling district
Arunachal Pradesh	all the five districts
Assam	United Mikir and North Cachar districts
Manipur	all the five districts
Meghalaya	entire Meghalaya (two districts)
Nagaland	all the three districts
Mizoram	entire Mizoram (one district)
Tripura	all the three districts

59.2.3 The Deccan Plateau covers almost the entire region south of the Indo-Gangetic plains. The plateau is like an inverted triangle. In the north west lie the Aravali ranges running from south west to north east. To a little south of these ranges lie the plateau of Malwa and the Vindhya and the Satpura ranges. In the north east are the Rajmahal and the Chotanagpur Hills. The Western Ghat and the Eastern Ghat ranges run along the western and eastern coasts of the country respectively. They form the two sides of the triangle and meet at the Nilgiris hills. These are the important hill areas in the South.

Past Efforts at Development

59.2.4 During the first three plan periods, the development of hill areas did not receive adequate attention. However, higher rates of

Central financial assistance were granted to concerned State Governments for certain special schemes in specific areas. There was no concerted effort at formulating an integrated programme of agricultural development embracing crop production, horticulture, animal husbandry and forestry and other allied development with the result that the piecemeal effort did not produce any perceptible impact on the living conditions of the people.

59.2.5 During the Fourth Five Year Plan, however, there was greater appreciation of the factors accounting for the backwardness of the lagging areas and multi-directional approach to area development was accepted as a policy for accelerating the development of these areas. It was recognised that no uniform programme could be formulated and successfully imposed from the national level. In envisaging such a policy, the Government of India took a view that the agricultural development of backward areas was essentially the responsibility of the State Governments and the Central Government could only undertake certain selective measures to help solve particular problems in selected backward areas. Some weightage was given in the allocation of Central assistance to the underdeveloped States to meet the special needs and problems of the weaker sections and backward areas. Special area development schemes were also taken up in backward areas.

59.2.6 In respect of the development of the hill areas, certain projects were taken up under the Indo-German assistance programme. These projects were located in Mandi and Kangra districts of Himachal Pradesh, Almora in Uttar Pradesh and Nilgiris in Tamil Nadu. They were launched with a view to experimenting on integrated development of crop production, horticulture, animal husbandry and dairying as well as of infrastructural facilities in the spheres of minor irrigation, drainage, soil conservation, storage, processing and marketing. The projects helped in the dissemination of knowledge and were instrumental in making durable improvements in the infrastructure in the areas where these were located. New institutions were established and the existing ones strengthened which included trial farms, seed farms, cattle farms, artificial insemination centres, implement workshops, soil testing laboratories, processing units, storage godowns etc. The credit and marketing institutions were also strengthened. These experimental projects were intended mainly to evolve a suitable approach for development of the backward hill regions within a short period. It is, however, contended that although these projects have benefited the respective areas, the results do not seem to be commensurate with the amount of investment made. The benefits have also been spread too thinly to make any appreciable impact on

the economy of the districts.

59.2.7 The Ministry of Agriculture and Irrigation has since taken up two more such projects, one at Pauri Garhwal in Uttar Pradesh and the other in Nungba sub-division in Manipur State. These projects were launched during the Fourth Five Year Plan and have been in operation since 1972-73. The basic approach in these two projects comprises in the first instance, the selection of complete water sheds of moderate size, undertaking soil conservation measures and construction of irrigation works in the water shed areas to cover, to the possible optimum, the area and all types of farmers. Keeping this in view, a suitable pattern of land utilisation in the area for crop production, horticulture, forestry etc. is to be evolved. The land development work will be followed by local verification trials to evolve suitable cropping patterns which are to form the basis for recommending improved package of practices for different crops. Adoption of suitable crop rotations and development of horticulture are to be taken up along with animal husbandry, dairying, poultry rearing, etc. Development of markets, construction of link roads, erection of godowns, establishment of processing facilities, etc. are to be taken up to develop and utilise fully the agricultural potential of the project area.

59.2.8 According to the draft Fifth Five Year Plan, due to markedly low levels of development, poor infrastructure and higher cost of implementing development programmes, development planning of hill areas should receive special treatment. Unless appropriate programmes are evolved for the conservation and development of resources in the hill areas, a number of problems would arise which would seriously affect the economy of the plains as well. For hill areas, efforts are being made by the States in consultation with the Planning Commission to prepare comprehensive and integrated subplans of development for which special supplementary assistance has been set apart in the Fifth Plan.

Himalayan Hills

59.2.9 Himalayan hills do not constitute a homogeneous region. Conditions vary from place to place with respect to altitude and topography, climate and rainfall, afforestation, water resources, etc. The geographical factors exert a decisive influence in regard to the possibilities for agricultural development. There are wide variations in rainfall due to altitude, direction of the mountains and other factors. While some areas like Darjeeling district and parts of Assam get very heavy rains, some parts of Himachal Pradesh, such as Chini, are

semiarid and get only about 75 cm of rainfall annually. The Ladakh area is all arid, the average rainfall being only about 25 cm. A number of water sources can be found in the hill regions but because of the different sizes of the catchment areas, the quantities of water available in the fields in the valleys differ widely resulting in varied potentialities of crop production. In the case of animal husbandry, the scope for rearing different types of livestock varies from area to area. The programme of forestry also depends on the characteristics of different hill regions. For formulating development programmes, therefore, it is necessary to differentiate between the problems of hill areas in different zones classified on the basis of climate, rainfall, topography, etc.

59.2.10 The economy of hill farmers is largely based on land, animal and forest resources. Almost all the farmers are small farmers, since holdings are generally small because of topography. The land available for cultivation is limited to the valleys and slopes and the holdings are scattered. The poorest sections of the hill people are also members of the Scheduled Castes and Scheduled Tribes Their proportion in the total population is high.

59.2.11 The hill areas are sparsely populated. The density of population in the hills is only 35 per sq km as against 167 for the country as a whole. But there is heavy pressure on land as only about 5 per cent of the total geographical area is arable. Owing to the preponderance of forests and barren and uncultivated land, per capita availability of land for cultivation in the hill areas is lower than the all India average of about 0.3 ha. The lowest is in Arunachal Pradesh and Mizoram (0.12 ha). Cultivation has been extended to marginal lands, through extensive deforestation, resulting in low productivity and soil erosion.

Strategy of Development

59.2.12 The development of hill areas has to be planned within the framework of an articulated long term plan in which the resource development programmes are adequately balanced by essential infrastructural facilities, particularly communications and minimum social development programmes like drinking water. As in the northern and north eastern hills there are long winter months and the labour force cannot be engaged in outdoor occupations, provision of indoor employment opportunities in appropriate small scale processing and agro-industries and handicrafts should be accorded a very high priority. The reorientation of the development programme from traditional pattern to the pattern suitable for hill development, requires

a concentrated effort in research investigation, survey and particularly in formulation of viable projects. In the past development efforts in hill areas were frustrated by project gap.

59.2.13 Any strategy for development has to take note of the economic constraints of the environments and try to maximise productivity directly by crop production and supplementally by suitable subsidiary occupations which the environment can support. Broadly, the Himalayan hill terrain consists of steep hills and narrow valleys. The soils are liable to rapid erosion unless complete vegetative cover is provided. On the steep slopes, except where terracing is possible, the best cover is forests. In certain hills where the soil cover is poor, the best cover is grass. Hence a substantial part of the terrain is economically suited to, and also ecologically requires, either a forestry programme or a pasture development programme. Cultivation of crop is possible only in the valleys and on terraced farm up a hill slope. Such land being limited, the most valuable crops should be grown. The terrain can support horticulture for which even slopes can be used. Being suited to grow fruits of the temperate regions like apples, pears, peaches, plums, etc., which command a very lucrative market in the tropical plains, horticulture gives the maximum return per unit of land. Crops will have to be the most valuable which the ecology can sustain.

59.2.14 Both these programmes may thereby impinge upon the present pattern of production in the hills which lays heavy emphasis on the growing of food crops consumed by the local population. If a suitable production programme, which will optimise the economic return to the population, is to be adopted, it may be necessary to make alternative arrangements to provide foodgrains through controlled channels from other parts of the country. This is being done even now in Jammu & Kashmir, though the State has been emphasising the production of foodgrains programme for agricultural lands. The pattern of agriculture, which has developed in Kerala, with similar constraints of terrain, can be a pointer. Kerala has opted by trial for a plantation economy and thereby has increased the per hectare return in agriculture. At the same time, the nation, which requires the plantation crops, has taken the responsibility for feeding the population of Kerala. A rational land use pattern for maximising production and productivity of land leads thus to a national food production and distribution responsibility. Taking too narrow a view of the responsibility for food can lead to the hill areas remaining backward and finding it difficult to support economically its growing population.

Land Use

59.2.15 In the absence of detailed cadastral surveys particularly in the central and north-eastern regions, the information available on land use may be taken as indicative of the pattern. Available statistics on the land use pattern, with all their limitations, indicate the overwhelming importance of forestry in the hill areas. It will be seen from Appendix 59.1 that of the total reporting area, forests occupy 53 per cent. Crop land, on the other hand, is relatively limited (about 11 per cent). Pastures and grazing lands, miscellaneous tree crops and culturable wastes account for about 8 per cent. The remaining area (28 per cent) is not available for cultivation being barren or unculturable waste or put to non-agricultural uses. Whereas for the country as a whole the net area sown forms about 46 per cent of the reporting area, it is 11 per cent in Himachal Pradesh, 16 per cent in Jammu & Kashmir and about 17 per cent in the hills of Uttar Pradesh. In the north-eastern region, it varies from about 2 per cent to about 7 per cent in different States except Tripura where it is about 23 per cent. The low acreage of net sown area in the north-eastern region is perhaps explained by only recording land under permanent cultivation and non-inclusion of large areas under shifting cultivation, which is a widespread practice in agriculture in this region.

59.2.16 In utilising the land resource, the objective should be to develop each hill area on the basis of utilising its natural advantages to the maximum. It entails the use of lands according to their capabilities and their management for higher productivity and income. In other words, agricultural production should suit different ecological zones which vary widely in configuration, altitude and climate from the sub-mountainous to the low, medium and high hills. Considering these factors, forests, will continue to occupy the most important place in the land use pattern in the future. Forests should not only be maintained but also improved in areas where denudation has taken place. Along with forests, adequate area is required to be put under grassland development to support the livestock in the hills. Terracing of slopes for crop production is possible in several areas of the north-eastern region. Even then, not much change in the existing cropped area is expected, although there is scope to rearrange the cropping pattern.

Soil Erosion

59.2.17 Soil erosion is an important problem to be tackled in

the hill areas. Denudation of forests, overgrazing of grasslands, cultivation on the slopes accompanied by shifting cultivation as in the north-eastern region as well as fast flowing streams and landslides in the rainy season result in soil erosion. Adequate steps are yet to be taken to prevent people from cultivating lands susceptible to soil erosion. The depth of the soil cover has thereby become shallow impairing yield levels and reducing the potential for further improvement in yields. Soil erosion also gives rise to problems of accumulation of silt in the valley region. Soil and moisture conservation measures should, therefore, be adopted for the development of the hill areas and should include complete land management to ensure the efficient use of soil instead of being for merely erosion control. The improvement of agricultural land would need soil conservation on watershed basis and by land development and afforestation. It implies that the production of field crops should preferably be confined to such areas where soil erosion is minimum and can be checked effectively and on gentle slopes in the valleys where intensive cropping and better management of inputs are possible. The techniques of cultivation should be such as would facilitate soil and moisture conservation. Without these measures, it will not be possible to improve the yield levels, and thereby the income of the farming population.

Reclamation of Land

59.2.18 Although there are a few plan schemes for land reclamation and soil conservation under implementation in different hill States, a consistent policy for the reclamation of land in the hill areas is yet to be developed. Reclamation of waste lands as in the hills of Uttar Pradesh and redevelopment of lands denuded of forest cover can held in increasing agricultural production. Considering the need to conserve the soil resource, the emphasis in lands so reclaimed, except where terraced cultivation is possible, should be on horticulture or forestry but not on growing food crops.

Shifting Cultivation

59.2.19 In the north-eastern region, immense damage has been done to the soil and forest wealth by shifting cultivation on extensive areas, disturbing thereby the ecological balance. The problem has become more acute as the cycle of shifting cultivation has shrunk to three to four years. In earlier days a longer cycle (about 20 years) at least provided sufficient time for the recuperation of soil.

The impact of the short cycle on productivity or soil fertility is, therefore, severe. Agriculture in the hill areas in this region can, however, substantially improve and the ecological balance can be restored if the destructive process of shifting cultivation is controlled and permanent cultivation and tree growth encouraged. The State Governments in this region are encouraging permanent cultivation in the hills by making terraces for the conservation of soil in some areas. This requires land shaping in the form of benching or terracing. Sustained raising of crops is possible only on such terraced and developed lands which is, however, very expensive. Wet rice cultivation on the permanently terraced fields is being done in the hill districts of Assam and in parts of Nagaland and Meghalaya. In the hills of Assam and Manipur, attempts have been made to introduce horticulture on the fields which are usually under shifting cultivation. In the valleys proper, levelling and bunding will lead to greater productivity and minimum soil erosion. On the gentle slopes, through suitable contour bunding and contour ploughing, food crops like maize can be grown without depleting the soils. Similarly, development of forests will have to be taken up on an extensive scale for ecological balance and soil conservation. The various aspects of shifting cultivation have been examined in detail in Chapter 42 on Production and Social Forestry.

Water Utilisation

59.2.20 The potential for irrigation in the hill areas is limited. The proportion of irrigated areas is much less (about 6.4 per cent) compared with that for the country as a whole (22 per cent). The areas which need irrigation are not in large and continuous tracts as in the plains. So is the topography different. Irrigation by canals, which is the cheapest mode, is therefore not possible. There is practically no possibility in the hilly terrain for major irrigation schemes. The scope for medium schemes is also limited to the valley areas near the foothills. Irrigation development will largely be through minor schemes of lifting water from streams, pumping water from the periphery of reservoirs which might be constructed and pucca kulhs (small gravity channels irrigating about a hundred hectares) as in Himachal Pradesh. There are a few lift irrigation schemes under construction in Jammu & Kashmir, some minor schemes of kulhs in Himachal Pradesh and a few medium and minor schemes in the hill districts of Uttar Pradesh.

59.2.21 We are informed that in Himachal Pradesh the rights of the farmers are standing in the way of optimum utilisation of kulh

irrigation. The use of water is governed by the settlement rights made as early as 1918. As a result, a few farmers located at the head of the kulhs are monopolising the use of water and the surplus is going waste. Since optimising the use of available water is basic to the development of the hill areas, it is necessary to rectify the present situation. We recommend that the State Government should review the entire position and revise suitable measures to ensure that there is full utilisation of the water and all the farmers within the command of a kulh receive a share. Control measures like *warabandi* may be necessary as emphasised in Chapter 16 on Command Area Development (Paragraph 16.8.4).

59.2.22 The Geological Survey of India has started investigations into the groundwater potential in the hilly areas. It is possible that groundwater sources may be located at several places there. There are prospects of lift irrigation in the valley areas in the hills of Uttar Pradesh. In the Bahl Valley in Mandi district of Himachal Pradesh tubewells have been constructed successfully. When the results of the investigations are available and the scope to utilise groundwater is determined, it should be possible to formulate a programme for the construction of tubewells in the hill areas. Since horticultural and plantation crops are important from the point of view of the hill economy, these should receive irrigation support as far as possible. Apart from its limited potential, irrigation development is also more expensive in the hills than in the plains; but considerations of social return may allow a larger expenditure. While efforts need to be directed towards developing irrigation, wherever possible, to improve the economy of the hill farmers, the crops and the cropping pattern should also be such as would maximise the returns. Irrigating orchards and plantations will be important in this context.

59.2.23 Bulk of the hill regions will have to depend on monsoon rainfall. In the western and the central Himalayas the duration of the precipitation is not more than four months. Molten snow, however, adds to water availability and moisture. There are also areas in this region like Lahaul, Spiti and Kinnaur in Himachal Pradesh and Ladakh in Jammu & Kashmir where rainfall is scanty. Ladakh is a cold desert giving rise to special problems. We shall refer to this area separately in the section on Arid and Semiarid Areas. In the north-eastern region monsoon rains are received for a longer period and in greater volume. Since the bulk of the hill area depends mostly on rainfall, the adoption of appropriate water harvesting, soil management and rainfed farming technique becomes important.

Power Development

59.2.24 The hill streams offer scope for the generation of cheap hydro-electric power for local use. The availability of cheap power may make it possible to establish several types of processing and manufacturing industries as also lift irrigation. Considering these possibilities, power development should be an integral part of the hill area development programme.

Crop Development

59.2.25 Food Crops: An overwhelming proportion (87 per cent) of the total cropped area in the hill regions is devoted to growing foodgrains. Rabi crops like wheat and barley and kharif crops like rice and maize are the principal cereals produced and occupy most of the cropped area. Small millets and pulses are also taken, but the area these occupy is not large. Compared with foodgrains, the area under fruits and vegetables is small (4 per cent). The hill areas also grow condiments and spices, flowers and aromatic and medicinal plants, but on a limited area. Plantations account for about one per cent of the area under crops. Appendix 59.2 shows the distribution of cropped area in the hill areas in different States. The information, however, is only indicative and not complete.

59.2.26 From the considerations of temperature and water availability as well as the income of the farmers, horticultural and plantation crops hold much greater promise in the hill areas than foodgrains. In spite of these advantages, the difficult terrain, far-flung habitations, long lines of communication and costly transport make it necessary for the hill areas to grow some of their own requirements of food. In Chapter 21 on Foodgrain Crops we have highlighted the importance of the choice of appropriate crops in different areas depending upon agro-climatic factors. We have also indicated the suitability of different crops under different rainfall and other conditions in the country. This should be the basic policy in hill areas also and the areas for different crops have to be determined accordingly. Based on this, it should be possible to readjust, wherever possible, the area under different crops in the hill regions for best results.

59.2.27 In Jammu & Kashmir hills, paddy, maize and barley are the important foodcrops grown. Paddy is taken in the valley regions while maize and barley grow on slopes at intermediate heights. This pattern agrees with the agro-climatic conditions in this area. In Himachal Pradesh and Uttar Pradesh hills, which form one contiguous area having similar characteristics, wheat, barley, paddy and maize are taken. Small millets and pulses are also grown. In this area it

would be desirable to confine rice cultivation to valley situations. The Garhwal hills in Uttar Pradesh offer good scope for growing superior variety of rice for export. This needs encouragement. However, rice should not be encouraged in the upper slopes. On these slopes it will be desirable to encourage maize and potato. Hill slopes provide natural drainage and are suitable for growing maize. The temperate climate of the hills is particularly suitable for the production of potato seed as well as table potato. Certain varieties of pulses also offer good scope for development in this region. Pulses can be encouraged not only for local consumption but also for surplus production for improving the economy of the grower. Pulse legumes are useful as fodder. Pulses can be taken in the spaces between fruit trees by inter cropping. Small millets are widely grown for home consumption. But some millet area is suitable for horticulture, and even green fodder. Wherever possible, if such area is put under horticulture or green fodder to support a livestock economy, the grower can increase the return from land. Such a transition will, however, necessitate alternative arrangements for food supply.

59.2.28 The north eastern region is a high rainfall area. This area is also difficult for transport and communications. It will be desirable to plan the production in this region for food self-sufficiency. Paddy is the main foodcrop taken. It should be cultivated in all valleys in the region. So far as upper slopes are concerned, it will be desirable to discourage production of cereals. These slopes could be devoted to growing fruit crops or green fodder or grains for the livestock. The livestock is presently fed on wastes and by-products of crops and there is no systematic cultivation of green fodder throughout this region.

59.2.29 The above description is only indicative of the possible and desirable changes in the existing land use pattern. More work will be required to be done at the local level to determine the cropping pattern on the basis of agro-climatic suitability. However, if such adjustments are made, more area should become available for growing horticultural and plantation crops as well as fodder for which conditions in the hills are eminently suitable.

59.2.30 In the limited area under food crops, the effort should be to secure a substantial improvement in yields for increasing the return per unit of land and availability. Considerable emphasis will have to be placed on the introduction of appropriate seeds and farming practices, research and extension and the development of necessary organisations for supplies and services. We have indicated in Chapter 21 on Foodgrain Crops the various measures required to improve the yield levels. In respect of wheat, best course is to dis-

courage its cultivation due to its proneness to disease in temperate climate. If this cannot be done, it will be necessary to evolve varieties resistent to yellow rust common in the hills and extend the coverage by irrigation for higher yields. For rice, appropriate high yielding varieties have to be evolved which would be early maturing and have some degree of cold tolerance and blast resistance.

59.2.31 The use of high yielding varieties of seeds is at present minimum in the hill areas. Development has in fact been handicapped by the absence of suitable varieties of various cereals and cash crops with high yield potential as these have not been evolved particularly for the varied agro-climatic conditions of the hills. Yields are also low for lack of appropriate farm practices suited to the hill areas. Development and adoption of appropriate varieties and evolution of suitable techniques for the rainfed cultivation in the hills will help increase the crop yields of cereals. We have suggested a regional system of research and extension in Chapter 21 on Foodgrain Crops. Among the various regions, Jammu & Kashmir, Himachal Pradesh and the hill region of Uttar Pradesh will form one region and the north-eastern States another. This system can be of help in analysing the problems of each area and developing and propagating appropriate varieties and farm practices.

59.2.32 Horticultural crops operating under various natural constraints, most hill farmers cannot hope to improve their economy by producing only food crops. The scope for intensive use of the land through cereals-pulses-millet cropping is limited. Given the terrain and the agro-climatic features, there is, however, considerable scope for growing high value crops, mainly horticultural and plantation crops, which may give much higher income to the grower per unit of land area. Since every family tries to be self-reliant in regard to its food needs, the production of such crops needs to be combined with horticulture wherever the land area is sufficient to make it economically sound. If the State can evolve a food distribution system, as we think it should in course of time, the economy can be organised for greater horticultural production which is needed by the nation.

59.2.33 The agro-climatic conditions in the hills favour the growing of a variety of temperate fruits and off-season vegetables as well as potato and other vegetable seeds. Horticultural and plantation crops can be grown in areas where other crops do not fare well. In the Chapters 22, 23 and 24 on Commercial, Horticultural and Plantation crops respectively, we have discussed for the country as a whole the status and growth prospects of oilseeds, fruits, vegetables, condiments and spices, floriculture, aromatic and medicinal plants and plantation crops and have indicated various measures for their deve-

lopment. In the following paragraphs we shall highlight the possibilities in the hill regions.

59.2.34 In order to improve the hill economy, as well as for soil conservation, greater emphasis on horticultural development is necessary. The impact that the cultivation of fruits and vegetables can have on the earnings and living conditions of the hill people has been demonstrated in some pockets in the hills of Uttar Pradesh (like Ramgarh) as well as some areas of Himachal Pradesh (like Upper Mahasu and Kulu) and Jammu & Kashmir. In all areas where the economics of horticulture in terms of its higher pay-off is established, high return from fruits and vegetables is inducing a change in the cropping pattern in favour of horticultural crops. Considerable parts of crop land in Nainital and Almora districts of Uttar Pradesh have been brought under horticulture. In that State intensive horticulture is proposed to be introduced in compact or contiguous areas in the form of fruit belts or garden colonies in each of the hill districts.

59.2.35 Similarly, intensive horticultural programmes are being undertaken in the States of Jammu & Kashmir and Himachal Pradesh. In the former State, under a special scheme, called the Horticulture Area Development Programme which is being financed by Agricultural Refinance and Development Corporation, orchard areas are being extended in compact blocks in Kashmir. Under another scheme, Intensive Fruit Development Scheme, attempts are being made to increase the productivity of existing orchards by application of fertilisers, better agronomic practices, timely plant protection and improved methods of pruning. In Himachal Pradesh, the policy of the State is to popularise fruit growing at intermediate heights and in high hills and encourage cereal production in the valley region. Between 1965-66 and 1973-74, the area under all fruits has increased from 22,800 ha to 59,500 ha in Jammu & Kashmir and from 22,000 ha to 54,900 ha in Himachal Pradesh. This, in our view, is the correct approach.

59.2.36 In the north eastern region, steps have been taken in Mizoram for the cultivation of a variety of tropical and sub-tropical fruits. At elevations below 750 m. areas have been selected for raising tropical fruits of many varieties, particularly pineapple, citrus fruits, etc. and arecanut. It is proposed to localise the areas at higher elevations for the cultivation of apples, apricot, plum, cherry, etc. In Assam also, similar programmes have been drawn up for the Mikir and North Cachar hill districts.

59.2.37 The variety of agro-climatic conditions ranging from temperate transitional type to the sub-temperate and sub-tropical types makes it possible to raise many kinds of horticultural crops.

Many fruits like apples, pears and cherries can be grown at elevations between 1,500 and 2,500 m. stone fruits like peaches, plums and apricot at elevations between 900 and 1,500 m. and in the sub-mountainous regions upto 900 m. sub-tropical fruits like citrus fruits, guava, litchi, pineapple, papaya, pomegranate and grapes. In high altitudes with dry areas, nut crops like almonds and walnuts, can be grown. The important fruits grown at present in the hill areas of different States are indicated below:

Jammu & Kashmir . .	apple, peach, plum, apricot, pear and cherry.
Himachal Pradesh . . .	apple, peach, plum, apricot, pear, nuts, citrus fruits, mango, litchi.
Uttar Pradesh hills . . .	apple, pear, peach, plum, apricot, walnut, chestnut, citrus fruits, mango, papaya and banana.
Assam	pineapple, banana, papaya, orange and other citrus fruits.
Arunachal Pradesh . . .	banana, jack fruit, pineapple and citrus fruits.
Nagaland . . .	pineapple, guava, banana, potato, ginger and citrus fruits.
Manipur.	pineapple, orange.
Meghalaya	pineapple, banana and citrus fruits are grown in lower elevations. In higher elevations, pear, plum, peach and other deciduous fruits are also grown.
West Bengal (Darjeeling hills) .	orange.

59.2.38 The climatic conditions in the hills are conducive to the production of many types of cash crops. In the northern hills potential exists for many new crops like sunflower, mushroom, hop, many temperate climate vegetables and production of seed of temperate climate vegetables like cauliflower, beetroot and sugarbeet which do not produce seed in the plains. Also, the cultivation of soyabean can be extended. Apart from growing soyabean as a single crop, it can be taken as inter crop in orchards, where the space between fruit trees at present lying unused can be utilised. Soyabean also improves soil fertility. Sunflower, another oil producing crop, has potential for cultivation in the hill regions particularly at intermediate heights and in high hills.

59.2.39 The commercial cultivation of mushroom has good potential and has increased considerably in recent years. The climate in Jammu & Kashmir, Himachal Pradesh and the hills of Uttar Pradesh is suitable for raising two to three crops in natural conditions and one or two crops by controlling the temperature. The cultivation of mushroom is very paying but requires considerable care and technical knowledge. For artificial cultivation, the availability of spawns is a limiting factor. The supply of quality spawns has, therefore, to be ensured. The scope for mushroom cultivation can be

enlarged considerably by developing suitable canning and processing facilities and exploring markets in India and abroad. Truffles need to be popularised throughout the sub-Himalayan oak belt for which it will be necessary for the Hill Fruit Research Station at Chaubattia, Uttar Pradesh to take up the required research work.

59.2.40 Himachal Pradesh is the largest producer and supplier of disease-free high yielding seed potato in the country. The production of seed potato in this State deserves all the encouragement and necessary supporting measures. The State also produces ginger. Its climate is suitable for the production of high quality vegetable seeds, particularly those of temperate vegetables. The State has taken up production of sugarbeet seed on a commercial scale in Kinnaur district. Every year the State produces about 15,000 tonnes of off-season vegetables like tomato, peas, beans, cabbage, cauliflower, capsicum etc. and supplies them to other parts of the country.

59.2.41 In Jammu & Kashmir, the development of vegetables is being planned to meet the market demand in the plains during summer months. In the temperate areas new crops such as hop, strawberry, mushroom, beetroot and sugarbeet seed can be grown profitably. A programme for hop cultivation has been launched recently. Strawberry offers a lucrative source of income to the farmers since they can be grown in rotation with paddy crops as in Japan. In dry areas, sunflower has shown promising results. In the lower belts of the Jammu hills, sub-tropical fruits including citrus fruits can be grown.

59.2.42 In the hills of Uttar Pradesh, apart from temperate fruits, potato and other vegetables, minor produce like spices, chillies, ginger, etc. have very good possibilities in specific areas. Similarly, conditions for the cultivation of soyabean by substituting the local variety called 'Bhat' are also favourable. The potential in this regard can be exploited on the basis of a production programme and marketing programme linked to a definite outside demand.

59.2.43 The States in the north eastern region are important for the production of ginger. Planning should seek to develop the potential both for internal use and external trade. Darjeeling hills are suitable for growing potato which can be supplied to the neighbouring States; but it is not used for seed purposes because of the prevalence of wart disease. Potato is an important crop in Khasi and Jaintia hills.

59.2.44 The north eastern region has a natural endowment for the development of plantation crops. Tea is an important crop confined to the Assam valley and Darjeeling areas. We have noted in our Interim Report on Certain Important Aspects of Selected

Export Oriented Agricultural Commodities* that there are nearly 1,50,000 hectares of surplus land in the tea grants available mostly in Assam and to some extent, in West Bengal for expanding tea cultivation. Some areas in Manipur and Tripura also offer scope for tea cultivation. Further, the Coffee Board has identified some areas in Assam and Tripura, which can be usefully brought under coffee plantation. We have pointed out in Chapter 24 on Plantation Crops that trial plantations have been made to grow natural rubber in Assam and Tripura and that the performance has been found to be promising. In Tripura it has been observed that rubber plantations are at present entirely free from fungal disease, which has a favourable impact on yield. This has given Tripura a definite edge over the traditional rubber growing areas of the South. Similar favourable conditions are found in agro-climatically identical areas of Assam and adjoining States of the north eastern region which can have a good proportion of future increases in area under natural rubber. We have estimated in that chapter that about one lakh hectares could be brought under rubber in Assam and adjoining parts and the Andamans. Among the new plantation crops, it is reported that cashew and black pepper have been tried out in Assam with good results.

59.2.45 The hill areas provide good scope for floriculture. The need is to organise and expand production and marketing to make floriculture more lucrative. Research is already on and requires to be strengthened for the improvement of indigenous flowers. In respect of orchids, the production of new varieties and attractive hybrids and the proliferation of natural orchid flora are necessary. We have suggested the creation of orchid sanctuaries—one has been sanctioned by the Indian Council of Agricultural Research (ICAR) for Kalimpong (West Bengal)—in all the natural habitats and the regulation of exploitation. Another direction in which the hill areas can specialise is aromatic and medicinal plants. Many of these are wild growth in the hill forests. Plantations are also found as cinchona in Darjeeling district. We have discused about these plants in the Chapters 23 and 43 on Horticultural Crops and Minor Forest Produce respectively.

Livestock Development**

59.2.46 The hill areas have a large number of livestock and poultry. Its distribution in various regions is shown in Appendix 59.3.

*Hereafter referred to as Interim Report on Export of Selected Agricultural Commodities in this Chapter.

**Including poultry.

According to the distribution of the livestock population in the hills of Jammu & Kashmir, Himachal Pradesh and Uttar Pradesh, cattle and sheep are more important. In the north eastern States, cattle, pig and poultry are more prominent. A substantial section of the population depends on livestock as the principal means of livelihood. Most hill farmers keep some animals which provide food of animal origin to the farmer families and others. Livestock is, therefore, an integral part of the life and economy of the hill population and acquires considerable importance in the growth and development of the hill economy. The strategy of development in the hill areas should include a well laid out livestock programme. We have already stressed the need for mixed farming in the hill areas in Chapter 33 on Mixed Farming. Since most of the livestock found in the hill areas are indigenous and low yielders, measures are necessary for their improvement for better yield and higher income to the farmers.

59.2.47 Among the livestock species in the hills cattle is the most important. The hill farmers of Assam and the tribals of the States in the north eastern region maintain cattle primarily for purposes of meat and draught power. Farmers who are settlers from other areas and those around townships, however, keep cattle for milk production. Production and marketing of milk and milk products are not organised in these hill States. In Assam, steps have been taken to organise milk production in the Mikir and North Cachar hills.

59.2.48 Milch cattle are maintained in all hill districts of Uttar Pradesh. They are, however, poor yielders and are maintained mostly for the purpose of producing bullocks. The buffaloes which are generally of graded types are maintained for milch purposes. In Himachal Pradesh, milk supply schemes have been launched in potential areas like Mandi, Nahan and Palampur. A milk supply scheme is also being started for Simla. Under these schemes, it is proposed to organise milk cooperatives and advance loans to the farmers for the purchase of milch animals.

59.2.49 *Guijars*, a nomadic tribe in Uttar Pradesh, move to the forests and pastures in the hill areas of Uttarkashi, Tehri-Garhwal, Chamoli and Dehra Dun during summer months with their herds of buffaloes. After rains they start returning to the foothills, where they spend the winters. This practice of migratory grazing is also prevalent in Jammu & Kashmir and Himachal Pradesh. We have been informed that these nomadic cattle breeders are experiencing difficulty in grazing their animals in forest areas and also in the disposal of milk for want of marketing facilities. We also learn that the local livestock owners sometimes object to the intrusion by animals of

Gujjars, in the forest areas due to the limitation of grazing facilities even for the local stock. In our view, grazing in the forests by the animals of *Gujjars,* should be allowed but it should be strictly subject to control on the principles outlined in Chapter 41 on Forest Policy and 42 on Production and Social Forestry. We have recommended there that the resources of the forest areas should be utilised only for feeding of the essential livestock and the number allowed to be grazed should be strictly regulated according to the carrying capacity of the forests. We have also stated in Chapter 34 on Livestock Feeding that livestock camps may be allowed near the inaccessible forest areas, where hand feeding of animals with hay from forests can be done. Within the framework of this policy, it should be possible to provide enough feed to the productive animals of *Gujjars* without in any way affecting the grazing of cattle of the local people. It is needless to reiterate that the grass areas, wherever occuring in the forests, should be developed with application of fertiliser and introduction of better variety of grasses, so that production of grasses per unit area may increase, thereby enhancing the carrying capacity. The milk plants at Almora and Haldwani should make suitable arrangements for the collection of milk from the buffaloes of *Gujjars.*

59.2.50 There is potential to develop milk sheds in various hill areas to meet the demands for milk and milk products from consuming centres in the urban areas. A successful milk production programme in the hill areas can be organised by taking up intensive programmes of crossbreeding of local cattle with exotic breeds. In the Himalayan region even purebred exotic cattle can be successfully raised provided adequate nutrition and health cover are ensured. This region is particularly suitable for raising on a large scale of crossbred heifers for sale to milk project areas in the plains. Such systematic crossbreeding programmes in the hill areas would augment the incomes of the cattle breeders individually and also bring about considerable improvement in the general economy of the hill areas. In our Interim Report on Milk Production through Small and Marginal Farmers and Agricultural Labourers*, we have indicated the hill districts where milk production programme through small and marginal farmers and agricultural labourers can be taken up. The names of the districts are given in Appendix 59.4. Milk production in these districts should be organised on the lines recommended in that Report. We have also indicated the lines of development of cattle in the north eastern region in our Interim Report on some Important Aspects of Livestock Production in the North Eastern States.** In

*Hereafter referred to as Interim Report on milk production in this Chapter.

**Hereafter referred to as Interim Report on Livestock Production in NE States.

that Report, we have recommended a planned crossbreeding programme using exotic breeds, expansion of the existing purebred cattle breeding farms and the establishment of additional cattle farms. The importance of mithuns, which are found in large number in the States of Arunachal Pradesh and Nagaland, has been stressed. Special studies have been suggested to explore the possibility of crossbreeding mithuns with local cattle for increased milk and meat production and draught capacity.

59.2.51 The crossbred animals require considerable care in management, feeding and housing. The crossbreeding programme has, therefore, to be supported by a systematic fodder production and feed conservation programme in the hill areas. At present, the large animal population in the hills of Uttar Pradesh is supported more on various types of forest produce than on grown fodder. Where forests provide pastures, the total yield of milk is known to be good. In the north eastern States, the livestock is fed on wastes and there is no systematic production of green fodder.

59.2.52 A programme of development of pastures should be taken up in each of the hill States simultaneously with the introduction of measures to improve the cattle. The Regional Animal Nutrition Centre, Palampur, of the Indian Veterinary Research Institute (IVRI) has done considerable, research to identify and evolve suitable varieties of fodder and grasses which can be grown in the hill areas. Planned programme for the introduction of promising varieties of these grasses and fodders should form an integral part of the crossbreeding programme. Pastures with better nutrition are available in different parts of Himachal Pradesh, Jammu & Kashmir and the hills of Uttar Pradesh. A systematic programme for cutting and conserving the nutritious grass can be of considerable help during scarcity periods. The crossbreeding programme will also have to be supported by an efficient animal health cover to ensure its success.

59.2.53 Sheep rearing is one of the main occupation in the hill areas of Uttar Pradesh, Himachal Pradesh and Jammu & Kashmir. Sheep rearing for wool and meat is an important industry especially in the border districts of Uttar Kashi, Chamoli and Pithoragarh in Uttar Pradesh where a large number of sheep is found. Sheep are at present maintained on high alpine pastures by professional shepherds. But the industry is not organised with regard to marketing, spinning and weaving. In Himachal Pradesh sheep rearing is mainly for wool production and constitutes a major source of income to the sheep breeders. The State is, however, contemplating the introduction of dual type breed for wool as well as mutton in selected areas. Sheep rearing is the only source of living for migratory sheep breed-

ers. During winter, their sheep flocks migrate to the lower hills. Sheep rearing for wool and mutton is also an important activity in the hill areas of Jammu & Kashmir and is in the hands of the most backward classes like the *Bakerwals, Gujjars, Goddis* and other nomadic tribes. They maintain the sheep flocks mostly on migratory basis. As stated in Chapter 30 on Sheep and Goat, because of the constant movement of sheep over long distances with uncertain grazing and stock watering facilities, the sheep owners are unable to adopt scientific methods of breeding for genetic improvement of stock. Shearing of sheep in distant places and sale of wool at far away markets do not give them any chance for organised collection, processing and marketing of wool and the sheep breeders are unable to bargain for a remunerative price. As recommended in that Chapter, the State Animal Husbandry/Sheep Departments should set up service centres on the migration routes and take up a systematic and integrated programme of shearing, grading and marketing of wool to alleviate the difficulties of the nomads. In Himachal Pradesh, the Khadi Board and the Handicrafts Corporation of the State have recently set up wool collection centres along the migratory routes of sheep. There is no organised sheep rearing for wool or for mutton in the hill areas of north eastern States. In Arunachal Pradesh, sheep rearing for wool is a traditional practice with the Mompas of Kameng district.

59.2.54 The climatic conditions in the western and central Himalayas offer very good scope for sheep development. Sheep breeding farms have been established in these areas for breed improvement and the number of crossbred sheep available is gradually increasing. However, a number of measures are required for sheep development. In our Interim Report on Poultry, Sheep and Pig Production through Small and Marginal Farmers and Agricultural Labourers for supplementing their Income[1] and Chapter 30 on Sheep and Goat, we have indicated the areas where and the lines on which sheep development should be undertaken. In the hill areas, the districts identified for sheep development are shown in Appendix 59.4.

59.2.55 For the maintenance of sheep, adequate grazing lands are required. Pasture lands are available in Kamong district in Arunachal Pradesh which can be used for grazing. Grasses grow in abundance in monsoon which can be conserved for use in the dry season. The situation is, however, different in the hill areas in the northern region. In Uttar Pradesh, it is difficult to increase the sheep population due to the limited grazing land available. Intensive sheep rearing is possible if pastures are developed for regulated grazing.

[1] Hereafter referred to as Interim Report on Poultry, sheep and pig production in this Chapter.

There are also prospects of maintaining sheep in orchards where nutritious grasses can be grown. In Himachal Pradesh such a programme will help sheep development. However, as it is, the hill pastures are the only source of fodder for migratory as well as stationary flock of sheep. In Jammu & Kashmir pastures are overburdened with an excessive livestock population which is one of the important factors for their low productivity. There are approximately 8 heads of cattle or 30—45 sheep on a hectare of land. Overgrazing also gives rise to the problem of soil erosion.

59.2.56 Regulation of grazing in line with the carrying capacity of the pastures is therefore essential. In view of the fodder situation, there is need to reduce the scrub population on the one hand and increase the production of fodder on the other. Efforts are being made in Jammu & Kashmir for aerial seeding and fertilisation of fodder on alternate sites. Aerial top dressing which was undertaken during 1969-70 and 1970-71, has yielded encouraging results. The fodder species have improved both in quality and quantity. It is necessary that more grazing area in the hills should be identified, seeded, fertilised and brought in rotation. Simultaneously with arrangements for feed, pasture development should be an important programme in the areas where sheep population is concentrated and crossbreeding is undertaken.

59.2.57 Goat rearing is an important subsidiary occupation in the region. However, the practice of letting goats loose in the forest areas should be discouraged as this species, due to its browsing and acrobatic habits, causes immense damage to growing plants. We are not in favour of increasing the number of goats in this region but their quality must be improved to get more milk and meat. We have dealt with this aspect in detail in Chapter 30 on *Sheep and Goat*. Further, special programmes to increase the production of pashmina in Ladakh region and mohair in the hilly areas of Uttar Pradesh and Himachal Pradesh should be taken up as recommended in that Chapter. Pashmina and mohair are in great demand by cottage industry as well as in the foreign markets. Increase in their production will considerably improve the economy of the concerned regions.

59.2.58 There is scope for rapid development of piggery in the north eastern hills, though its scope is limited in the western and central Himalayas as pig rearing is not favoured by the local people. Pig rearing for meat is common in the north eastern region and Darjeeling hills. The north eastern region is a high density area in regard to pigs having 16 per cent of the country's total pig population. The pigs reared are mostly of indigenous breed and of small size. All the States have programmes for improving the stock and production of

breeds and distribution of piglings to the pig farmers. Pig rearing which was introduced in Himachal Pradesh and in Chamoli and Pithoragarh districts of Uttar Pradesh has not made much progress. A small unit at Paonta in Sirmur district in Himachal Pradesh is functioning. The unit in Chamoli has been closed down for lack of interest, but that in Pithoragarh is working.

59.2.59 The economy of the pig farmers can be improved and more meat made available for consumption, if crossbreeding with exotic stock is undertaken and purebred exotic stock is introduced. In our Interim Report on livestock production in NE States we have recommended an integrated programme of piggery development which envisages the setting up of farms with purebred exotic breeds of pigs, improved breeding of pigs in the rural areas and establishment of pork processing plants. The programme should be taken up in selected districts on the lines recommended in our Interim Report on poultry, sheep and pig production. The districts are indicated in Appendix 59.4. In that Report we have suggested piggery development in Sirmur and Simla in Himachal Pradesh and Darjeeling in West Bengal. In Darjeeling, piggery development has been undertaken under the scheme of Small and Marginal Farmers Development Agency. A pork processing unit is also proposed to be set up there.

59.2.60 There is good potential for developing poultry in the hill regions. It would be necessary to improve poultry breeding in rural areas with crossbreed birds. Our recommendations in respect of the area where and the lines on which poultry development should be undertaken are given in our Interim Report on poultry, sheep and pig production and in Chapter 31 on Poultry. The districts where the programme should be taken up are shown in Appendix 59.4. In our Interim Report on Livestock production in NE States also we have given our recommendations for poultry development in this region.

Fisheries

59.2.61 In the high altitudes, there is potential for development of cold water fisheries. The water resources for fisheries development in the hill areas are mainly the streams and lakes wherein the indigenous varieties of snow-trout and mahseer abound. In some of the States, trout has been introduced as sport fish and common carp for commercial culture. Before Independence the efforts to develop fisheries were confined mainly to sport fishing but, of late, attention has been given to commercial aspects as well. Presently the local production is not adequate to meet the demand. For instance, in the

north-eastern region, as against an estimated annual requirement of about 2.3 lakh tonnes of fish, only about 40 thousand tonnes are being produced. As production is considerably below the demand, the markets are supplied with dried fish from the coastal regions. Considering the demand for fish from the local population and also as an added attraction for tourists, hill areas offer good scope for the development of fisheries—both for commercial and sport purposes.

59.2.62 In Chapter 37 on Inland Fisheries and Agriculture, we have indicated in detail the present stage of fisheries development in the hill areas and the possible lines on which improvements can be made. The water resources in the high altitude would continue to be mainly the cold streams and lakes. However, in low regions many ponds, tanks and 'beels' will have to be suitably reclaimed for developing culture fisheries of major carps. Reservoirs too can be profitably exploited. But emphasis has to be on intensive pisciculture practices. We have, in the chapter referred to above, stressed the importance of availability of scientific data in respect of ecological and biological conditions, the absence of which greatly hampers the development of fisheries in hill areas. There is also a need for hydrographic surveys of water areas suitable for pisciculture. We attach equally great importance to the training of officers and fishermen in the techniques of cold water fisheries.

Forest Development

59.2.63 Forests in the hill areas constitute an important wealth for the entire country. More than 40 per cent of land area in the north-eastern States, 50 per cent in Himachal Pradesh and 60 per cent in Jammu & Kashmir is covered with forests. In Uttar Pradesh, except for areas like Pithoragarh district which are above the snow line, hills are extensively covered by forests. The total area under forests in that State is 4.8 million hectares, of which approximately an area of 4 million hectares is in the hills. The economy of the farming population is supported by the availability of grasses for fodder as well as fuelwood and building material. Supplementary employment is also available in forestry activities including the collection of minor forest produce. There are extensive areas under forests but with inadequate communications where forest wealth has not adequately been utilised. However, the landscape is often barren at intermediate heights ranging from 1,000 m to 1,600 m. Natural cover is poor particularly in this range and there is no significant forest development activity by which the situation may be expected to improve. Further, indiscriminate cutting down of trees resulting

in the denudation of forests has given rise to serious problems of soil erosion and ecology. In the north-eastern hills, the problem is particularly acute due to shifting cultivation.

59.2.64 The current programmes for hill area development have not sufficiently emphasised the development of forests and pastures. Forest wealth needs to be not only maintained for soil conservation and ecological balance but also improved for meeting the demand for wood and woodbased products. In order to ensure the economic viability of a large scale programme of forest development we have, in our Interim Report on Production Forestry—Man-made Forests, emphasised the need for an aggressive programme of production forestry in the country including the hill regions and opening up of inaccessible forests. In improving the quality of the forests, the improvement of natural meadows should become a specific objective of the working plan of the Forest Departments, and it should be linked integrally to the requirements of an intensive development of livestock in the hill areas. These and other aspects of forest development in hill areas have been discussed in detail in the various chapters on forestry.

Sericulture

59.2.65 The hill areas offer scope for the development of different kinds of sericulture like mulberry silk, *tasar* and *muca*. Being a highly labour intensive occupation, their production can be an important source of full or part-time employment for small and marginal farmers and rural craftsmen. In Chapter 26 on Sericulture we have indicated the possibility of expanding, and the measures required for the development of various types of sericulture in the country including the Himalayan hill regions. There is good scope for improving and extending moriculture (mulberry silk) in Jammu & Kashmir, Himachal Pradesh, Darjeeling district in West Bengal and several hill districts of Uttar Pradesh. Possibility also exists for taking up *tasar* culture, which is now largely confined to Assam, throughout the oak belt of the Himalayas. The development of *tasar* hybrid, which thrives well on oak, has opened up opportunities for extending its cultivation and production of high quality material. Similarly, *muga* culture, at present practised in Assam, can be extended to other parts of the north-eastern region.

Apiculture

59.2.66 Apiculture, i.e., production, collection and marketing of honey and honey products, could be a useful subsidiary occupation

giving supplemental income to the people in the hills. All the apiaries in the country are now being developed in the vicinity of forests or on the hills which are rich in vegetation. We have examined in Chapter 27 on Apiculture the scope for increasing honey yields in the country through organised apiculture and coordinated efforts of the Department of Agriculture, Horticulture and Forests. In particular, the Forest Departments have a significant role to play in the protection of honey bees in the forest areas and developing forest trees as a source of bee fauna. It is in this context that we have recommended a detailed survey of the vegetation of forests with regard to its floristic composition. Local surveys have been done in the Mahabaleswar hills of Maharashtra. Similar surveys have been extended to the Kodaikanal hills in Tamil Nadu, Coorg in Karnataka, Himachal Pradesh and Jammu & Kashmir. We have also suggested that the Department of Agriculture and agricultural universities in the States should actively take up the propagation of apiculture activities in the country through necessary research, education and training.

Storage, Marketing, Processing and Transportation

59.2.67 The utilisation of the production potential in the hills needs to be efficiently supported by the provision of storage, marketing, processing and transportation. The development of these facilities will generate additional employment opportunities and should be actively encouraged. Without these, the production programme itself cannot be developed. In respect of horticultural crops, it will be difficult for the hill farmers to change over from the present subsistence economy to commercial horticulture to any large extent till such time as these infrastrutcural arrangements are made and the farmers are assured of a reasonable return on their investment. Since the demand for vegetables and fruits is largely in the plains and in the export sector, the production of these commodities will have to be suitably integrated with the rest of the economy. Such integration by assuring the market can provide the necessary impetus to the hill people to take to high value crops. In this context, the infrastructural facilities become extremely important in formulating any development strategy for the hill areas. Production increases that have already taken place have given rise to problems of storage, packaging and marketing which have to be studied carefully before a well defined programme of horticultural development can be drawn up.

59.2.68 The present methods of marketing of horticultural produce are not efficient. The primary producers are mostly tied up

through advances given by the private traders and sell the crop around the time of fruit setting. A substantial part of the value of the produce does not accrue to the grower. In Kashmir, for example, a farmer used to get for a crate of apples about Rs. 6 to Rs. 8, while the consumer in the plains paid a wholesale price of Rs. 45. In Himachal Pradesh it has been estimated that marketing costs account for 44 to 55 paise in the consumer's rupee. The absence of an efficient marketing system has allowed neither the grower a reasonable return nor the consumer the benefit of a reasonable price. The farmer is now very much at the mercy of the middlemen. If in another 4-5 years, double the present quantity of apples is put on the market and steps are not taken to improve the marketing system, the grower may be most adversely affected. For planning of horticultural crops, it is necessary to have a proper estimate of the production and its trend in relation to the likely demand for the products.

59.2.69 As production increases, the farmer will have to consider the marketing aspects more seriously. He has to balance between quantity and quality and the relative price he gets in the market. Transport charges will obviously play an important part in this selection. For an area too far from organised transport facilities, higher quality apples will have to be produced. The Horticulture Department in Jammu & Kashmir has evolved a method of top working which can change the variety of apples into any variety the farmer wants to grow. This should enable a systematic changeover to varieties which will be the best for marketing. What these changes will be and their effect on the volume and quantity of production will need continuous assessment for planning production and marketing in future.

59.2.70 Fruit production is subject to wide fluctuations from year to year because of natural factors. In a good year prices fall and affect the income of the grower since fruit consumption may not keep pace with higher production. In a bad year, however, prices rise but the growers are not adequately compensated. The problem becomes more difficult because of lack of market for culled fruits. Some States have now set up marketing corporations exclusively for horticultural produce. We have discussed various aspects of marketing and storage in the Chapter 56 on Marketing, Transport and Storage.

59.2.71 Adequate arrangements for storage both at the producing and consuming centres will be necessary. Existing facilities for post-harvest care of fruits and for proper cold storage are not adequate. Cold storage by enabling the spreading of the period of marketing is an answer to the problem of a possible glut in the market. Detailed studies will have to be made on the problem of cold storage and its

costing in the prices of fruits so that some lead may be given to the fruit grower on the types of fruits that should be grown. The extent of cold storage capacity in the important consuming centres will have to be examined. The development of refrigerated transportation facilities is another aspect of marketing which deserves priority attention.

59.2.72 Apart from marketing fresh fruits, there will be scope for supplying processed fruits to both Indian and foreign markets. As production expands, there will be surplus which can be processed and sold. For this, an integrated approach linking up production and processing will be necessary so that processing facilities develop in line with production. Farmers' interests can thus be served by setting up a chain of processing units which can utilise the surplus produce as well as damaged fruits. It may be advantageous to locate the plants in the foothills or nearby plains to economise on transport costs. Such integrated projects were thought of in Uttar Pradesh some years back.

59.2.73 An important aspect of milk production programme in the hill areas will be to develop suitable storage, processing and marketing facilities for milk and milk products. Because of difficult terrain and communications, it will be necessary to locate collection and chilling centres at suitable places. Processing plants can also be established at appropriate locations. For the piggery development programme processing plants should be established at the State pig breeding farms, in respect of sheep, units are required to be established top grading and processing of wool in the areas of sheep concentration. In particular, arrangements are necessary for collecting raw wool and getting them processed at urban or semi-urban centres, carded and graded and the wool sent back to the villages for being woven or knitted into durggets and garments. The development of cottage wool industry on proper lines can create considerable employment opportunities and enhance the income of the local people. Special attention to the development of home industries including rural crafts is necessary to provide employment especially in high altitude areas where in winter no outdoor work is possible for long periods. In the field of forestry, the extensive forest areas provide scope for locating wood-based industries. Moreover, arrangements have to be made for the processing of various minor forest produce near the sources of raw material and their proper storage and timely transportation to and marketing in the consuming centres.

59.2.74 The lack of roads and communications in the hill areas is a serious impediment to development. Due to the topography it is difficult and more expensive than in the plains to build a network of roads. Access to many areas is still difficult due to this reason. However, if the hill economy is to develop, this bottleneck has to be

overcome. Feeder roads should be constructed linking production centres and villages with the main roads to facilitate the movement of the inputs as well as the produce. Construction of roads should have high priority in the programme of hill area development. In difficult areas, the possibility of constructing ropeways could be considered to ensure quick transit of the agricultural produce.

Research, Extension, Education and Organisation

59.2.75 A much enlarged production programme in the hill areas will need adequate research backing. We have already referred to this need earlier. Scientific research needs to be directed towards evolving varieties of crops which are suited to different agro-climatic conditions and are preferred by the consumer and give higher yields. In horticulture, if the varieties suitable for commercial production could be fewer in number and research could identify such varieties, it will be easier for the States to concentrate their development effort on such varieties only. Other areas of special importance for research are control of pests and diseases, nutritional plants and agronomic practices.

59.2.76 Considerable effort will be needed to initiate the hill farmers in modern methods of production. Necessary extension and educational work will be extremely important and should form part of the integrated programme of development in the hill areas. The vast area and sparse population make it difficult for the existing extension organisation to reach out to the people effectively. The community development blocks are often too large for intensive work because of difficulties of communications. It will, therefore, be necessary to adapt the extension system to the local situation.

59.2.77 The problem in this regard is two-fold. The technical personnel working in these remote and inaccessible areas, viz., subject-matter specialists at the block-level and the extension workers at the village level, are far too few in number from the point of view of the vastness of the area and the inherent difficulties of terrain and topography and the long lines of communications. What is also crucial is the lack of expertise in technical staff of all categories who need to be trained and oriented to the special problems of hill areas, be it in the fields of crop prduction, horticulture, animal husbandry or fisheries. We have already stressed that enlargement of production programmes in the hills needs research support. The research results need to be translated into extension recommendations adapted to the hill situation. The technical staff should acquire the needed com-

petence to be able to educate the hill farmers in the adoption of the recommended improved practices.

59.2.78 The motivation of the farmers to adopt improved methods of production depends to a great extent upon the effectiveness with which the extension work is carried out. For that, regular and continuous extension activities as well as intimate farmer—staff contacts in the field are necessary. Keeping in view the communication difficulties, the area of operation of the technical staff in the hill districts—supervisory as well as field staff—should, therefore, be so demarcated as to make intensive work possible and extension advice effective. We have recommended the establishment of farmers' service societies at the block level with branches having operational jurisdiction over smaller areas for providing integrated agricultural credit service. We suggest that farmers' service societies being set up in the hill areas should have areas of operation determined with the due regard to the constraints imposed by terrain and topography. These societies, charged with the responsibility of providing integrated credit service to the farmers, should have technical staff stationed at their headquarters who would have their areas of operation co-terminus with the area of operation of the society. By doing so, it should be possible to extend effective technical guidance and support alongside timely supply of credit and other inputs to the farmers.

Southern Hills

59.2.79 The hill ranges of Aravali, Satpura, Vindhya and Chotanagpur as well as the Eastern Ghats are inhabited mainly by tribals. In the following section on Tribal Areas, we shall deal with the development of tribal people inhabiting, among other places, these hill areas. Here, we shall deal with the problems of agricultural development in the hills of Western Ghats.

59.2.80 The hill sections of the Western Ghats traverse through the States of Maharashtra, Karnataka, Tamil Nadu and Kerala and the Union Territory of Goa. The Ghat region has varying elevations and is generally a high rainfall area. The Malnad region in Karnataka and the Nilgiris hills in Tamil Nadu receive heavy and assured rainfall varying from 100 to 600 cm from the east to the west. Kerala hills also receive an annual precipitation of 250 to over 500 cm. Rainfall in the hill ranges in Maharashtra varies from 250 to 750 cm and in Goa it is around 250 cm. An attempt has been made to identify areas in these States which fall in the mountainous region on the basis of elevation and rainfall. These are indicated in Appendix 59.5. We would, however, like to point out that this identification may be

taken as a first approximation only as some hill features not covered by raingauge stations may not figure in the list. Detailed studies are necessary for a complete identification of the areas. Any comprehensive development plan for the region should include such hill features.

Land Use Pattern

59.2.81 The land use and cropping patterns in the Western Ghat region is indicated in Appendices 59.6 and 59.7. In Kerala hills the variations in altitude have led to two distinct agronomic environments. In the region below 500 metres mean sea level (msl), high rainfall humid tropical conditions prevail. The highlands above 1,000 metres (msl) have high rainfall, cool humid temperate climatic conditions. The highlands are thickly forested in their upper reaches while in the lower reaches the forests are interspersed with plantations. The region between 500 and 1,000 m is occupied by evergreen forests. The land use and traditional cropping patterns in Kerala are more or less consistent with the agronomic environment obtaining in different rainfall zones of the hills. Under conditions of undulating topography, differing altitudes and soil conditions, the cropping patterns vary from area to area. Tea, coffee, rubber and cashew are grown on hill tops and upper slopes; pepper, arecanut and coconut on the lower slopes; and paddy in the valleys. Tea and coffee are grown in the cool humid temperate climate of the hill tops and rubber, coconut and arecanut is hot humid tropical conditions. Thus perennial crops dominate the cropping pattern of Kerala accounting for nearly 50 per cent of the gross cropped area and nearly 60 per cent of the net area sown. High density of population and intensive land use have taken the margin of cultivation to the extreme. A higher proportion (56 per cent) of net area sown in relation to reporting area is observed. Excluding the forests, which occupy 29 per cent of the reporting area of the State, the percentage of net area sown to reporting area will be as high as 79 leaving thereby very little scope for extension of area under crops. Similarly the intensity of cropping with 60 per cent of the net area being under plantations is as high as 150 per cent, which is considerably higher than the national average of 110 per cent. Further increase in intensity of cropping can only be brought about through inter cropping in areas occupied by plantation crops. New developments in agronomy have opened up possibilities for intensive land use in plantation areas through appropriate choice of inter crops.

59.2.82 In Karnataka forests dominate the coastal and adjoining areas, the Coorg hills and South Mysore. 81 per cent of North Kanara is forested. Coorg and eastern taluks of South Kanara and Chikmagalur are 30 to 40 per cent forested. As against this only 15 per cent of the geographical area of the State is under forests. In the Ghat region the cropped area is about 5 per cent of the total gross cropped area of the State, where paddy predominates. Because of abundance of rainfall, natural grasses grow extensively in this region supporting cattle rearing which is common in this area. Next in significance is the dominance of the plantation crops, namely, coffee, tea, pepper, cardamom, cashewnut, arecanut, coconut and rubber which are confined (with the exception of coconut and arecanut) to the hilly areas. From the point of view of area, coffee is the dominant crop in the hill districts of Coorg and Chikmagalur. In terms of total area under plantation crops. Coorg has 46 per cent of the area under plantation and Chikmagalur, 29 per cent.

59.2.83 In Tamil Nadu, Nilgiris have 43 per cent of the geographical area under forests, the State average being only 14 per cent. Tea, coffee and cardamom plantations are dominant in the Nilgiris. Potato is also an important crop.

59.2.84 Mahabaleshwar hills in Satara district of Maharashtra has the largest area under forests (59 per cent) with parts of Kolhapur district also having substantial area under forests. Cereals and millets dominate the cropping pattern, there being no area under plantations in the hill regions of Maharashtra.

Soil Erosion

59.2.85 The concentration of rainfall leads to high intensity precipitation which results in severe erosion of fertile top soil and leaching of plant nutrients and impairment of soil fertility. Much of the heavy precipitation is lost as run off and only a part of it enters the soil by percolation. For a given rainfall, the relative moisture availability varies depending on whether it is on the hill top, on the slopes and in the valley and periods of moisture availability would be longer in that order. In Kerala, traditionally, the valleys are put under crops which tolerate excessive moisture such as paddy. The hill tops or steep slopes, especially the upper slopes, are put to perennial crops such as plantations which can stand moisture stress of summer months and do not disturb the top soil. The slopes with mild gradients are put to seasonal and annual crops which entail disturbance of top soil but do not result in soil erosion. The lower portions of the steeper slopes are put under crops such as arecanut, pepper, etc.

demanding moist but well drained soils. Thus land capability is better exploited through a proper choice of crops that go well with the agronomic environments. Wherever attempts were made to disturb the balance in the cropping pattern, they have resulted in serious soil erosion and low productivity. For example, although traditionally in the high hills of Kerala coffee, tea and cardamom are grown because of well-drained soil and cool humid climate, extension of cultivation to marginal lands and growing tapioca on the steep slopes have accelerated soil erosion. On the hill tops and upper slopes growing cashewnut or raising natural grasses is a most desirable practice from the point of view of erosion control. But increasingly cashewnut is being replaced by coconut with low yields. In the steep slopes plantation crops have a good potential in maintaining soil productivity. It is, therefore, necessary to evolve a cropping pattern appropriate to the hills which could help control soil erosion.

Development Strategy

59.2.86 As we have noted, the agro-climatic conditions in the Western Ghats favour forest development and plantations. In the strategy of development of these areas, the order of priorities should be forestry, plantations and livestock development. In the following paragraphs we shall deal with each of these aspects.

Forest development

59.2.87 Over 24 per cent of the total geographical area of the States in the region is under forests. As the Ghat forests are situated in high rainfall zone, a relatively high proportion of these is timber-rich, moist and deciduous type. This is the only large area of evergreen forests in the country. There are extensive areas where possibilities of commercial afforestation exist. In Maharashtra, at present, the forests contain only some species which are commercially valuable. The rate of regeneration in areas which are worked from year to year is also quite low. In Karnataka, much of the forest area is under regular working and being developed. In Kerala, the wide variations in climatic and topographical conditions have resulted in a wide variety of forests. Among the natural forests, deciduous forests comprise 80 per cent of the growth. In Tamil Nadu, Coimbatore and Nilgiri districts together contribute 80 per cent of the total value of the timber produced in the State. In Goa, the evergreen forests are found mostly in patches along deep ravines and steep hills where the rainfall is very heavy. The forest areas, parti-

cularly in Karnataka and Maharashtra, can also support intensive fodder development which could in turn be the basis of a commercially viable animal husbandry programme.

59.2.88 These areas are suitable for an aggressive programme of production forestry. Our approach in this regard is discussed in the Interim Report on Production Forestry—Man-made Forests. This has been accepted by the States. Corporations are being established and project reports prepared to handle this task on a commercial basis.

Plantation Crops

59.2.89 The Western Ghats are particularly suitable for raising plantation crops. Whatever foodcrops are taken should be confined to the valleys only. In the upper reaches of the hills and the accent needs to be on plantation crops. Extension of the area under plantation crops will have to be on the basis of a study of soils, climate, rainfall and water resources. If irrigation support is available in any potential area, the area under plantation should be extended in preference to other crops.

59.2.90 Intensive work needs to be done to improve land utilisation under plantation crops. Low yielding plantation crops, particularly in small plantations, will have to be replaced by plantation crops with higher yield potential which would allow for better land utilisation and suit the agro-climatic condition. We have discussed this aspect and made suggestions in our Interim Report on Certain Important Aspects of Export Oriented Agricultural Commodities. It is necessary to introduce horticultural crops like orange or pineapple in areas unsuitable for coffee particularly in Coorg in Karnataka. Similarly, there are horticultural farms at altitudes where Arabica or Robusta will give much better returns under scientific plantation techniques. A changeover to coffee in such areas is indicated. We have stressed the need for rectifying such anomalies and mentioned that in the Malnad of Karnataka an area programme could be developed for coffee cultivation as part of the hill area development programme.

59.2.91 In the Interim Report referred to above we have also suggested that potential hill areas in Karnataka, Tamil Nadu and Maharashtra should be examined for the cultivation of pepper and cardamom and that the congenial situations in Karnataka and Maharashtra could be tried for raising rubber plantations. Similarly, it is possible to increase the area under cashew in the southern hill region. In Kerala there is scope for gradual shifting of cashew plantations

from the existing unproductive sites to more promising areas, both in private as well as in forest lands. We have discussed the various aspects of development of these plantations in Chapter 24 on Plantation Crops.

Livestock Development

59.2.92 The distribution of livestock population in the Western Ghat hill region is shown in Appendix 59.8. Livestock rearing is widely practised all over the region as a subsidiary source of income to the farmers and the plantation labourers. Grazing facilities on hill slopes, cool temperate climate and evergreen forests interspread with plantation crops offer considerable scope for rearing different categories of livestock. What is needed is specialisation of the activity to suit local conditions.

59.2.93 Cattle and buffalo population in the region consists of non-descript types except in certain pockets where crossbred animals are found. Cattle rearing forms an important subsidiary occupation of the farmers and plantation labourers. In para 8.11 of our Interim Report on milk production we have indicated that in the Malnad area of the South (Kerala, Tamil Nadu and Karnataka) good grazing facilities are available. The farmers in these areas keep cattle mainly on forest grazing. Grazing facilities and cool climate are very favourable for rearing of crossbred animals. Crossbreeding work is already being undertaken in the States of Kerala and Karnataka. As early as 1963 an Indo-Swiss Project was launched in Kerala and a breeding-cum-research station was established at Mattupatti in 1964. The objective was to undertake crossbreeding with a view to evolving a dairy breed of cattle and undertaking fodder production.

59.2.94 Organised milk production has come into being in the districts of Coorg and Shimoga in Karnataka and the Nilgiris hills in Tamil Nadu. There is considerable scope for developing milksheds in the hills of Kerala (Cannanore and Quilon districts) and Maharashtra (Ratnagiri, Satara, Poona and Kolhapur districts). We recommend that a suitable programme is taken up in these districts. The farmers may be encouraged to rear crossbred heifers up to the age of weaning so that these could be supplied to the milkshed areas in the plains.

59.2.95 The hill region in the South is not very favourable for sheep development due to heavy rainfall and humid climate except in a very few selected areas. In Tamil Nadu the Nilgiris breed

*Including poultry

which has been evolved by crossing indigenous hill breeds with exotic breeds like Cape Merino, South Dane and Chevoit produces fine wool. In Kodaikanal there is a sub-centre of the Central Sheep and Wool Research Institute where extensive crossbreeding with exotic wool breeds is being undertaken. Since sheep, excepting in these pockets, grow very little wool or no wool, it is suggested that measures should be taken for augmenting meat production in areas where sheep can be reared. In our Interim Report on poultry, sheep and pig production, we have suggested taking up sheep development in Satara, Kolhapur and Poona districts of Maharashtra on an intensive area basis. We suggest that pasture development at appropriate locations in the hills where sheep rearing is undertaken should simultaneously be taken up to support sheep development.

59.2.96 In the hilly region Kerala, among the southern States, has a large poultry population. With the exception of Kottayam, there is scope for poultry production along improved lines in all the hill districts of the State. Likewise, it is only in Kerala (Cannanore, Kottayam and Quilon districts) and Karnataka (Coorg district) that there is scope for improved pig production on an intensive scale. Pig production properly organised and developed as recommended in our Interim Report could be a useful source of subsidiary income to the hill population. In Section 1 of Chapter 32 on other Livestock, we have also discussed the upgrading of local pigs with the exotic breeds in these areas. In Appendix 59.9 we have indicated the areas in the Western Ghat region which are suitable for different types of livestock production.

Fisheries

59.2.97 In paragraphs 59.2.61 and 59.2.62 as well as Chapter 37 on Inland Fisheries and Aquaculture, we have indicated the potential for the development of cold water fisheries in high altitudes and the possible lines on which improvements can be effected. The water resources for the coldwater fisheries development in the high altitudes of southern hills are also mainly streams and lakes wherein mainly the rainbow trout abound. Main areas are streams in Munnar high ranges in Kerala and Nilgiris and Kodaikanal hills in Tamil Nadu. As problems for the development of cold water fisheries are identical both in the northern and southern hills, the steps suggested for improvement of fisheries in the northern hills are equally necessary for southern hills.

Apiculture

59.2.98 In paragraph 59.2.66, we have referred to the scope for developing apiculture in the hill areas. Detailed recommendations have been made for its development in Chapter 27 on Apiculture. Mahabaleshwar hills in Maharashtra, Kodaikanal hills in Tamil Nadu and Coorg hills in Karnataka are areas suitable for the development of apiculture.

3 TRIBAL AREAS

59.3.1 According to the Population Census of 1971, the tribal population in India is over 38 million. They constitute 6.94 per cent of the total population of the country. Appendix 59.10 gives the Statewise distribution of the tribal population according to the Census of 1971. In percentage terms tribal communities comprise about 93 per cent of the population in Lakshadweep. The percentage of the tribal population is also high in the hill regions of north eastern India. The tribal belt passing over central India and covering the States of Andhra Pradesh, Orissa, West Bengal, Bihar, Madhya Pradesh, Rajasthan, Gujarat and Maharashtra accounts for over 85 per cent of the total tribal population in the country. Tribal communities are also found in the Himalayan hills and the plateau region of Uttar Pradesh as well as the southern States of Tamil Nadu, Karnataka and Kerala and the Union Territory of Andaman and Nicobar Islands. Their number in these areas is relatively small. Most of the tribals in the southern States live in scattered pockets in hilly areas.

59.3.2 The tribal communities living in different parts of the country belong to different ethnic groups and are at various levels of economic, social, educational and political development. In the earlier section, we have dealt with the development of the hill regions which would cater to the needs of the tribal communities living there. In this section, the major emphasis will be on the problems of development of the tribal communities in central India.

Problems of Tribal Areas

59.3.3 The economy of the tribal population is mainly agricultural. About 88 per cent of the working force are cultivators and agricultural labourers. Crop production, rearing of livestock and forests provide the main sources of livelihood to the tribals. Since

the geographical configuration of tribal areas is in altitudes between 300 and 800 metres above the sea level, the terrain is mostly hilly. The agricultural economy of these areas represents, by and large, subsistence farming in its most primitive form. The tribal population relies mainly on the natural growth of crops for its sustenance. Farming practices vary from shifting cultivation to settled cultivation. While in the three States of Madhya Pradesh, Rajasthan and Maharashtra the majority of tribal holdings are 2 hectares and above, the majority of such holdings in Andhra Pradesh, Orissa, Bihar, West Bengal and Gujarat is below 2 hectares. The holdings give low yields due to lack of knowledge about management of soil and water, inadequate irrigation facilities, lack of knowledge of improved practices and low investment.

59.3.4 In central India shifting cultivation is practised largely in Andhra Pradesh and Orissa and to some extent in Madhya Pradesh and Bihar. Apart from the loss of valuable timber following the slash and burn technique adopted by the tribals, the terrain suffers soil erosion and loss of fertility. This poses special problems in these areas.

59.3.5 A major impediment to the development of agriculture is the problem of land alienation. A considerable extent of land has been alienated to non-tribals, traders and moneylenders. Lack of land records as also proper titles to the land has stood in the way of financing of farm development plans. Tribals dispossessed of their land have tried to eke out a meagre living through their personal labour.

59.3.6 The construction of irrigation as well as industrial projects has necessitated the acquisition of tribal land. Past experience shows that the rehabilitation of dispossessed tribals has not been adequate, disrupting the tribal economy and giving rise to various social and economic problems. In industrial projects in particular, it has been found that only a very small portion of the tribals could be absorbed in the projects as they did not have the requisite skill and could not stand the competition from workers from outside their areas.

59.3.7 Indebtedness is a major problem of the tribal people. Living in a subsistence economy, the tribals easily get indebted for the purchase of agricultural requirements like seed, implements, etc., for the performance of social and religious ceremonies and for their daily necessities like cloth, salt and kerosene. This exposes them to large scale exploitation by the traders and moneylenders. Moreover, in inaccessible areas, the tribal economy is yet to be monetized. Transactions are still conducted on the basis of the barter system.

The market is unorganised and loans from moneylenders and traders predominate. Essential consumer goods, which have to be brought from outside (for example, salt, kerosene, coarse cloth, tea, gur, cheap varieties of soap, aluminium utensils, etc.) are purchased from traders, who are also moneylenders, in exchange of agricultural and forest produce. These traders advance money to tribals for various ceremonies on personal surety stipulating repayment of the loan with interest in the form of forest products or agricultural crops after the harvest. The entire crop is thus mortgaged in advance and very little remains with the farmers for personal consumption after the produce is collected by the trader. This results in further borrowings not only in cash but also in kind from the same trader at exorbitant rates of interest. The burden of debt thus increases. It is beyond the capacity of the tribals to liquidate the accumulated debt and the burden is passed on from generation to generation. A corollary of this situation is the existence of bonded labour. Bonded labour, such as Vetti in Andhra Pradesh, Gothi in Orissa, Sagari in Rajasthan and Uttar Pradesh, is still prevalent in various parts of the tribal belt.

59.3.8 The tribal economy is intimately linked with the forests where they have various rights and privileges. Almost all the tribes have a dual economy based on crop production and collections from forests. The tribals collect, consume and sell minor forest produce. The vital place the forests have in the tribal economy has been recognised in the Forest Policy Resolution of 1952. However, there are certain operational problems which need attention.

59.3.9 The development of the tribal economy is hampered, among others, by the lack of infrastructural facilities. Communication facilities are poor as a result of which the tribal economy at many places are not linked with outside markets. The inadequacy of organisation to cater to the needs of the tribals is another important deficiency which impedes growth. Lack of facilities also hinders educational and extension work.

59.3.10 Extremely low level of literacy and prevalence of certain social factors impede rapid development of tribal economy. Except for areas such as the north eastern region, where the level of literacy is high due to the efforts made by the missionaries, the extent of literacy in the tribal belt in the plateau region is dismally low. There are also various social customs and prejudices which stand in the way of propagation of modern methods.

59.3.11 This synoptic view of the problems of the tribal areas indicates the basic reasons for their poverty. Continuous neglect

and lack of appreciation of their special problems cover a long period, inadequate investment and non-integration of the tribal economy with the rest of the society have contributed to the present state of backwardness in these areas. Large scale exploitation of the tribals by non-tribals and moneylenders and traders has impoverished them. All this has resulted in a feeling of inferiority, insecurity and helplessness among the tribals. However, the tribal communities are not immune from the political consciousness in the country. They also have aspirations to lead a better life. Apathy and exploitation on the one hand, and the impact of political developments in the country on the other, have led to tribal unrest in some areas. There have been cases of violence as in Andhra Pradesh, West Bengal and Bihar and demands for greater attention and for removal of economic disabilities. The stirrings in the tribal communities have introduced an element of urgency in lacking their problems on a priority basis.

Planning Efforts in the Past

59.3.12 Past efforts in the planned economic and social development of the tribal economy were handicapped by inadequate appreciation of the special problems of the tribal areas and lack of provision of investments for the development of the resource potential of the tribal economies. Economic and social development of these areas was also hampered greatly by the lack of social and economic infrastructure.

59.3.13 From the First Plan, the expenditure on tribal welfare is identifiable in terms of outlay incurred on the schemes for the welfare of Backward Classes. Notwithstanding progressive increase in expenditure for the scheduled tribes, the expenditure on tribal development as a percentage of the total plan expenditure has declined from plan to plan. This will be clear from Table 59.1.

TABLE 59.1

Plan Expenditure for Schduled Tribes

Plan period	Total plan (Rs. crores)	Scheduled tribes (Rs. crores)	Percentage of outlay
First Plan	1,960	19·93	1·0
Second Plan	4,672	42·92	0·9
Third Plan	8,577	50·53	0·6
Annual Plans (1966—69)	6,756	32·32	0·5
Fourth Plan	15,902 (outlay)	75·00	0.04

The outlay on the programmes for scheduled tribes was intended to supplement whatever provision was made for the development of tribal and scheduled areas under general sector programmes of development. In the absence of area-based programmes, such flow of funds from the general sectors to tribal development programmes cannot be specified. It is generally agreed, however, that the flow was not significant. The Study Team on Tribal Development Programmes (1969), which examined the flow of funds from the general sectors to the tribal areas, has observed that no conscious attempt has been made by any of the State Governments, except Andhra Pradesh, to ensure that the tribals received a reasonable share of the benefits from the general development programmes. "Even in Andhra Pradesh the direction of the State Government that 3 per cent of the total provision of each Department should be earmarked for the welfare of the Scheduled Tribes has largely been ignored and broadly speaking the planners in the State have proceeded on the basis that the special provision is the only provision available to finance tribal development programmes". The result has been that infrastructure development in tribal areas received inadequate attention. Basic facilities such as roads, culverts, bridges etc., are still very meagre and basic institutions such as servicing organisations, schools, hospitals and even primary health centres conspicuously absent.

59.3.14 From the Second Plan onwards, the tribal development schemes were taken up under two distinct sectors, namely; the State plan schemes and the Centrally-sponsored schemes. The State plan schemes were grouped under three broad categories: (a) education, (b) economic development, and (c) health, housing and others. The Centrally-sponsored schemes were confined to programmes which commanded high priority or were related to the removal of special disabilities of a nature which required intensive measures over a long period. The classification of various programmes under these two sectors is as follows:

Centrally sponsored schemes:

(i) tribal Development Blocks
(ii) cooperation including forest cooperatives
(iii) girls' hostels
(iv) post-matric scholarships
(v) coaching and pre-examination training
(vi) tribal research and training

[1] 1969, Report of the Study Team on Tribal Development Programmes, All-India: 13, New Delhi Committee on Plan Projects, Planning Commission, Government of India.

State plan schemes:

(i) education	—	prematric scholarships, stipends, boarding grants, hostels, supply of free books, stationery, uniforms, mid-day meals, etc.
(ii) economic development	—	subsidy for agricultural implements, seeds, fertilisers etc. cottage industries rehabilitation, communications, animal husbandry, horticulture, pisciculture, co-operation, minor irrigation, soil conservation.
(iii) health, housing and others	—	housing, drinking water supply, medical and public health, social and cultural activities, aid to voluntary agencies, legal aid and miscellaneous.

59.3.15 After the introduction of the Community Development (CD) Programmes in the country in 1952, it was realised that special development programmes were necessary to improve the economy of the tribals, who are among the weakest sections of the people socially, educationally and economically. Accordingly, a separate programme known as Special Multipurpose Tribal Development Blocks was taken up during the Second Plan. This was renamed as Tribal Development Blocks during the Third Plan. The blocks, which combined the extension method of community development with the concept of welfare, were more intensive in character than the CD blocks in terms of both financial outlay and population coverage. This outlay was raised to Rs. 22 lakhs for stage I and Rs. 10 lakhs each for stages II and III. The population coverage was limited to 25,000 per block which was less than that of a CD block (66,000). Although there was no rigid schematic pattern for the tribal development blocks, the State Governments were advised to allocate 60 per cent of the funds for economic development, 25 per cent for communications and 15 per cent for social services and other schemes. The high priority given to communications was because of the difficult terrain and inaccessibility of tribal areas.

59.3.16 The impact of the tribal development programmes undertaken during the First, Second and Third Plan periods has been studied by special committees from time to time. The last committee was the Study Team on Tribal Development Programmes (1969) which summed up the progress achieved till then in regard to tribal welfare and development. The Team categorically stated that although much had been done, it was difficult to precisely assess the socio-economic development of tribals in the absence of surveys done prior to the

implementation of the programmes. Further, in the absence of an evaluation machinery, the States had not been able to assess the impact of the development programme on the welfare of the tribals.

59.3.17 However, an assessment of the programme made by the Study Team on Tribal Development Programmes (1969) indicated that the programme had fallen short of expectations although it succeeded in bringing about a change in the outlook of the tribals, particularly in the fields of education and agriculture. The limitation of the programme lay in its coverage of small area and population which did not permit the execution of schemes like soil conservation, major and medium irrigation, etc. on a viable basis. Studies conducted by the Tribal Research Institutes indicate that the tribal development blocks succeeded in making only a limited impact due to certain basic problems such as subsistence level of living, underdeveloped infrastructure and high percentage of illiteracy among the tribal population. It was also observed that the problems of land alienation and shifting cultivation hindered development in these blocks. Among other problems noted were shortage of technical staff and their frequent transfers. Some of the general criticisms of the programmes related to the following:

(i) schemes drawn up for more developed regions were applied to the tribal areas without change;
(ii) preparatory steps were not taken to settle land disputes;
(iii) bulk of the developmental outlay was used up by construction programmes;
(iv) employment aspect of development was not given due consideration; and
(v) cooperatives were started without adequate preparation or orientation of the tribals.

Another problem highlighted was that the better-off among the tribal-appropriated bulk of the benefits flowing from the various programmes taken up for implementation. Added to this was the tendency of the block authorities to concentrate schemes in easily accessible areas and the needs of the people inhabiting the more inaccessible and backward areas remained unattended. The concentration of the programmes in a small area and the fragmented approach to development adopted in the tribal development blocks did not succeed in extending the full benefits of developmental programmes to the tribal population as a whole.

59.3.18 It was, therefore, proposed that while the tribal development blocks might be retained for purposes of local development the concept of developing a larger area might be adopted during the Fourth Plan. The experience of the functioning and impact of tribal

development blocks underscored the need for intensive development of the tribal areas all over the country and particularly the more backward among them. The tribal unrest added a new sense of urgency. Accordingly, the special programme of Tribal Development Agency was started on a pilot basis during the second half of the Fourth Plan in the States of Andhra Pradesh, Bihar, Madhya Pradesh and Orissa as a Central scheme. Six pilot tribal development projects were sanctioned for selected tribal areas by the Government of India during the latter part of 1971-72. These projects have been located in (a) Srikakulam District of Andhra Pradesh, (b) Singhbhum District of Bihar, (c) Dantewada and (d) Konta tehsils of Bastar District of Madhya Pradesh, and (e) Ganjam and (f) Koraput Districts of Orissa. Two more projects in Keonjhar and Phulbani districts in Orissa have been taken up during the Fifth Plan.

59.3.19 Each project has three components, *viz.*, economic programme, roads programme and law and order. The economic development programmes, constituting the core have been conceived on the lines of the small Farmers Development Agency (SFDA) suitably oriented to the special needs of the tribal areas. The projects emphasise the concept of investment and development and enlarge the scope from extension and welfare. Tribal agriculture which so far supported only a subsistence living of the tribal family is proposed to be developed on viable lines so that the productive activity may result in a definite improvement in the economy of the tribal family. Some of the salient features of these Projects are: (a) each project is being implemented through a society registered under the Societies Registration Act, 1860 called the tribal development agency with the District Collector as chairman and concerned district level officers and MPs/MLAs as members; (b) the outlay for each of these agencies for a full term of 5 years is Rs. 1.5 crores for the core programme of economic development consisting mainly of the development of crop production, minor irrigation, animal husbandry activities and other subsidiary occupations, control of shifting cultivation, re-organisation of cooperative institutions, updating of land records, debt redemption and restoration of land, encouragement to agro-and forest-based industries and the like. Ordinarily, the agency assists the tribal families up to 50 to 75 per cent of the cost of different economic programmes and the balance is expected to be met by the tribal beneficiaries from institutional and other sources; (c) the economic programme is supplemented by an additional programme for the construction of arterial and link roads for which each agency has an outlay of Rs. 0.5 crore. The construction of arterial roads is meant to link up the project areas with the State and National Highways; (d) the agency confines the identification

and participation in the programmes to tribal participants with less than 2 hectares of irrigated or 4 hectares of unirrigated holding. Each agency aims to cover about 10,000 tribal families or about 50,000 tribal population; and (e) the approach to the economic problems of the tribals is, as far as possible, comprehensive and integrated. For catering to the various needs of the tribals, multiplicity of agencies is to be avoided and the concept of a unified structure adopted. The programme in each project area is to be related to its specific needs and uniformity in programmes in different areas is not being insisted upon in view of the diverse socio-economic and physico-geographic conditions. The operational area of the tribal development agency is a few selected blocks within a single district: 9 blocks in Srikakulam, 4 blocks in Singhbhum, 4 blocks in Dantewada, 3 blocks in Konta, 8 blocks in Ganjam and 10 blocks in Koraput. Most of the areas selected have high tribal concentration and are already covered under the tribal development blocks.

59.3.20 The working of both the tribal development blocks and the tribal development agencies has shown that the programmes for the welfare and development of the tribal people so far have had a limited coverage. The programmes in the tribal development blocks became too rigid although different field conditions demanded a different approach. Like the tribal development blocks, the operational area of the tribal development agencies proved to be too small a unit for large investment in infrastructures, economic development and social services. A new pattern of integrated tribal development projects has, therefore, been evolved for the development of tribal areas during the Fifth Plan.

59.3.21 The Fifth Plan envisages the preparation of sub-plans for areas of tribal concentration. The long-term objectives of the sub-plan are to narrow the gap between the levels of development of tribal and other areas and to improve the quality of life of the tribal communities. The immediate objectives will be to eliminate exploitation in all forms, speed up the processes for social and economic development and improve the organisational capabilities. The sub-plan area in each State will comprise a number of viable project areas. For each project, an integrated area development programme focussing attention on the specific problems of the area and the people in that region will be formulated. The preparation of the sub-plan and the formulation of the projects for implementation will constitute two distinct exercises. The project approach adopted for the tribal development agency has thus been accepted for the proposed integrated tribal development projects with a greater socio-economic content. The elements of the new strategy are: (a) preven-

tion of exploitation, (b) development of tribal economy, (c) generation of employment opportunities, (d) provision of basic infrastructure and (e) special attention to groups facing specific problems. Each State having a sizable tribal population has been asked to prepare sub-plans for tribal areas specifically indicating the flow of resources to the tribal areas from different development sectors. The integrated tribal development projetcs will form an integral part of the regular developmental administration in tribal areas in the districts.

Approach to Tribal Development

59.3.22 It is now recognised by the planners that a comprehensive and integrated development plan involving different disciplines is required to tackle the problems of the tribal communities. The idea of preparing sub-plans for tribal areas and of the project approach to formulating and implementing integrated programmes on viable area basis is, therefore, basically sound and should be commended. There will be need to adopt the sub-plans to each specific project area varying the emphasis on different elements according to local problems and potentialities. In the following paragraphs we propose to bring together the broad elements of the development strategy and indicate our approach.

59.3.23 In tackling the problems of the tribals, it must be borne in mind that the different tribal communities are at different levels of socio-economic development. There are tribes which are still at the food gathering stage. There are others who practise shifting and primitive cultivation. Some tribals have taken to settle cultivation but use traditional methods and that too not efficiently. There are yet others who are closer to development around them and have been exposed to the ideas about improved methods of production. With such variety and considering the fact that the tribals are sensitive and attached to their heritage, they have to be brought to higher levels of technology and management only through a gradual process. They will require subtle and imaginative handling and have to be helped through the process of change by stages.

59.3.24 While the integration of the tribal economy with the economic life of the country will be the ultimate objective, adequate care has to be taken to see that the tribal communities retained their culture and traditions. Sudden uprooting from their cultural moorings will not only upset them psychologically but also retard the progress of development. Adjustments in their cultural and traditional life can be left to the process of gradual change as they become socially and economically more advanced and are exposed to education and modern technology.

59.3.25 The economy of tribals is based on crop production, livestock rearing, forests, fishing and hunting as well as handicrafts. The scope to develop each of these activities will have to be assessed in different project areas and the programmes developed accordingly. In developing the programmes, due attention needs to be given to the capacity of the tribals, at their present level of development, to absorb and practice improved methods of production and management. A distinction should also be made between the areas which are easily accessible and already exposed to a market economy and have market links and the areas which are not easily accessible, lack market economy and have yet to be opened up and linked with the country's markets. In the short period, the possibilities of development will be different in these two types of areas.

Preparation of Land Records

59.3.26 Highest priority has to be given to the land problem. The tribals have lost a considerable extent of land through alienation. Well-to-do non-tribals, moneylenders and traders have occupied tribal land through various means reducing the tribals to the status of agricultural labourers. Although there is legislation against the transfer of tribal land, various ingenious devices have been employed to circumvent the law. There are instances of non-tribals marrying tribal women to get over the legal restrictions. Before a meaningful programme of land development can be taken up, it is necessary that the lands belonging to the tribals are protected and the lands which have already passed from their hands are restored to them. The existing laws and rules need review to plug any loopholes and give adequate protection to the tribals. We understand that the State Governments are looking into the problem of land alienation and some States have made special provisions to ensure that the rights of the tribals are protected. For example, Andhra Pradesh Government has completely banned the transfer of land from tribals to non-tribals and has introduced a form of pre-emption in favour of tribals in case of transfer of land by non-tribals in the scheduled areas. The Government of Tripura has also provided for pre-emption in favour of the tribals in predominantly tribal areas.

59.3.27 There are no land records in most of the tribal areas. Immediate action should be taken to prepare reasonably authentic land records for these areas. In order to expedite the process some rough and ready method has to be applied. One way would be to start with a rough sketch of their relative position of the fields with their local names and approximate area by eye estimate. *Khatians*

could be prepared on this basis to give a general orientation of the plots for easy identification. Such simple records have been maintained in the past effectively. The next stage would be to have a simple system of map preparation based on triangulation. Cadastral survey and accurate locations can wait. In troubled areas a quick survey of the nature of settlement can help in giving rights to the tribals. The tenancy laws have given very little protection. The object should be to establish the position of the tribals in regard to the existing cultivable lands. Available culturable lands should also be settled preferably with the tribals.

59.3.28 Wherever the tribals have cultivable lands and their rights have been recognised, they should be helped with an intensive programme for crop production. As different areas have different rainfall pattern and irrigation potential, a judicious selection of crops suited to the soil-moisture combination in each area will be desirable. However, a complete change in the cropping pattern in any area, even if it is indicated for the optimum use of land and water, can come only through stages after the tribals are convinced and persuaded to accept the change and trained to take up crops new to them. In the initial stages, it would be preferable to emphasise the production of food crops, particularly in the interior areas, for local consumption as it would help improve nutrition and health. In areas which are near the markets and have already a market economy, the production of cash crops can be emphasised depending on the marketing possibilities. This approach can then be extended to interior areas as such areas are opened up and integrated with the market economy.

59.3.29 The production programme should be supported with supply of good seed and fertilisers and pest control operations as early as possible so that an immediate boost could be given to production. Where the tribals predominate and have got substantial lands in the area, irrigation support can be extended by undertaking minor irrigation works to the extent possible. Pumping water from streams and utilisation of the ground water can be organised, wherever appropriate. These measures should be an integral part of the production programme.

59.3.30 We have discussed in detail the problem of shifting cultivation in Chapter 42 on Production and Social Forestry. Considering its baneful effects, the tribals, wherever they are practising shifting cultivation, should be weaned away from it and permanently settled. In the past attempts were made under the land colonisation schemes for the permanent settlement of the tribals who practised

shifting cultivation. This scheme, however, failed because

(i) complete land reclamation was not done before handing over the land to the tribals;
(ii) irrigation facilities were not provided;
(iii) special customs were not taken into consideration; and
(iv) the tribals had not reached a stage of development making it possible for them to employ modern techniques of production.

The above deficiencies should be taken note of in developing the programme for settling the tribals in fixed agriculture.

59.3.31 In the lower reaches and valley lands, and on gentle slopes wherever possible, land should be terraced for settled cultivation. It should also be noted that to bring about a change from shifting to settled cultivation, it is necessary to see that land formation is properly done; adequate investment is made for providing facilities like irrigation, seed, fertiliser and other inputs are provided; and the land tenure system is set right. Adequate institutional arrangements supported by effective extension education, will be essential. Fair price shops should also be opened for assured supply, at reasonable rates, of essential commodities. However, it may not be possible to have suitable lands for settled agriculture for all the tribal families. Further, settling them in fixed agriculture would be a long-term process. Hence, a simultaneous programme would have to be taken up for providing full-time occupation to the tribals in programmes of agri-silviculture, raising plantation crops, development of livestock, etc. as elaborated in Chapter 42 on Production and Social Forestry.

59.3.32 In order that the benefits of the production programme are truly enjoyed by the tribals, they have to be freed of their debt to the moneylenders and traders. The Government of India appointed in 1971 a Study Group on relief of indebtedness, land alienation and restoration in the tribal development agency areas. The Group has recommended, among others,

(i) establishment of debt relief courts to scale down debts;
(ii) advancing debt relief loans;
(iii) post debt relief care;
(iv) assistance to sharecroppers to purchase ownership rights;
(v) review of land alienation cases and restoration of tribal lands illegally appropriated by non-tribals; and
(vi) taking up land record operations in tribal areas.

The problems of indebtedness, credit and marketing are linked to one another. Cooperatives have to play a significant role in this

programme. Debt redemption should be a priority programme in the project areas. States have recently declared a moratorium on past debts of the weaker sections. In our view, as a follow up, it should be the responsibility of the project authorities to set up debt relief courts which would call for claims against all the tribals in a particular village and put the claims to proof. The court can thus scale down or liquidate debt on the basis of the evidence and decide the extent of indebtedness of the tribal family. The project authorities should pay off from a suitable fund the money owed by the tribals and close the account with the moneylenders. The amount thus paid should be shown against the tribal family as an interest free loan to be recovered in kind over a reasonable period, the duration to be settled on the basis of the production programme envisaged in the area. In the meantime, the production programme should be able to increase the capacity of the tribal families and enable them to create the necessary surplus to pay off this loan in small amounts over a long period. The cooperatives, which would look after the credit-cum-marketing aspects, would be the agents to make the recoveries. Simultaneously with moratorium on the existing debts, there should be a new line of credit for both production and consumption purposes. The special courts should be utilised for both the debt relief operation and the preparation of land records. These should be itinerant courts and settle disputes regarding debts and land rights on the spot. Some such device is absolutely necessary to expedite the process and prepare the ground for investment and development.

59.3.33 The bonded labour system has been abolished by a recently promulgated Ordinance. Under this Ordinance every bonded labourer stands freed and discharged from any obligation to render any bonded labour. Further, there is no liability to repay debt. Arrangements including settling on land will have to be made for the rehabilitation of the labourers freed from their bonds, since otherwise they will again have to go back to the moneylenders.

59.3.34 The tribal economy is intimately linked with the forests. The forests provide fruit, fuelwood, timber and other products which the tribals consume as also sell. In Chapter 41 on Forest Policy, we have stressed the need for developing a symbiotic relationship between the forests and the tribals and acknowledged the responsibility of the Forest Departments in the matter of creating employment for the tribal people through forestry programmes. Some of the more important aspects of forest policy which have a direct bearing on tribal development are collection of minor forest produce,

harvesting of major forest produce, intensive forest management and fire protection.

59.3.35 Collection and marketing of minor forest produce gives employment to the tribals and supplements their income. The tribal economy has been disturbed where the right to collect minor forest produce has been changed into a concession and contractors have been introduced. Adequate steps are, therefore, necessary to prevent exploitation of the tribals by the contractors. As we have mentioned in Chapter 43, the minor forest produce need not be auctioned. Instead, forest labour cooperatives with the right to collect minor forest produce have to be established to maximise the income of the tribals from the sale of such produce. Some States like Madhya Pradesh, Maharashtra, Rajasthan, Orissa, Andhra Pradesh and Uttar Pradesh have taken over the trade in minor forest produce which would enable them to pay a fair price for the produce to the tribals. In Andhra Pradesh, the Girijan Cooperative Development Corporation has a monopoly right to purchase minor forest produce. The apex tribal cooperative corporations as well as the State Forest Departments should have a price policy for minor forest produce in terms of which the tribals are ensured not only a minimum support price but also a reasonable price which compares favourably with the ruling market price for such produce.

59.3.36 In many States the harvesting of major forest produce is done through contractors who exploit the tribals to their own advantage. The Study Team on Tribal Development Programmes as well as the Committee on Tribal Economy in Forest Areas recommended that the agency of forest contractors should be replaced by forest labourers' cooperative societies. This is also our view. Given adequate managerial support, this form of organisation can ensure not only better wages but also a sense of involvement in the management of forests with which the tribals are traditionally associated.

59.3.37 In Chapter 42 on Production and Social Forestry, we have highlighted the employment potential of intensive forest management. The forestry operations, which suit the temperament and life style of the tribals, enable them to earn a sizable portion of their income. In forest areas where intensive harvesting of forest resources is being undertaken, the socio-economic impact on the local tribal economy should invariably be kept in view. Various rules and regulations should be reviewed to facilitate harvesting of forest produce to the advantage of the local tribal economy.

59.3.38 The tribals undertake a certain amount of processing of minor forest produce collected by them. Assistance in this matter will improve processing and create employment. Processing units

for the major forest produce also, if located near the sources of forest materials, will provide employment to the tribals. Forest Departments should establish processing units or encourage cooperatives to do the same in the vicinity of forests. Skill development through training should be an important part of the programme so that the tribals can be employed in such units and the need for import of labour from outside is minimum.

59.3.39 In promoting livestock and poultry development programmes for the tribals, a distinction should be made between tribal areas which have a market economy and are near to the main marketing centres and areas which are inaccessible and where market economy is yet to develop sufficiently. In the former areas, commercialisation of livestock and poultry production and marketing can be attempted. This will require measures for breed improvement, health cover and adequate processing and marketing arrangements. Considerable effort will, however, be needed in educating and training the tribals in rearing and managing the livestock and poultry on modern and commercial lines. In interior areas, the difficulty of marketing reduces the scope for such commercialisation in the immediate future. There the tribals may be helped to maintain the livestock and poultry to meet the local consumption needs.

59.3.40 The project authorities should provide necessary technical and extension assistance to the tribals to utilise their indigenous skills for various handicrafts and village industries. The traditional skills of the tribals should be identified and there should be proper assessment of the development potential of village industries and handicrafts in tribal areas. Adequate assistance has to be provided to those cottage scale production units as hold out promise for development.

59.3.41 The construction of arterial roads and link roads and opening up interior forest areas should be an important programme for tribal development. Without this basic development, the marketisation of the tribal economy will not be possible.

59.3.42 An important element of the tribal development programme should be extension education as well as facilities for general education. Lack of knowledge has been a serious impediment to development and is one of the principal causes of backwardness in tribal areas. Programmes for education and training are, therefore, essential prerequisites for development as these increase the absorptive capacity of the tribals and prepare them for adopting and practising improved methods of production and marketing.

59.3.43 Reluctance of the personnel posted to the tribal areas to take up the assignments because of lack of medical and education facilities and other amenities hampered the working of the development projects. In order to ensure that the development and educational programmes are properly implemented, it is necessary that only those persons, who are fully committed to the welfare of the tribal population, should be adequately trained and posted to these areas. They should be given additional incentives for working in difficult areas.

59.3.44 Primary agricultural credit societies operating in the tribal areas are weak, both structurally and financially, and the credit provided by them has been far from adequate. A survey of the villages in tribal development blocks conducted by the Programme Evaluation Organisation of the Planning Commission (1966) revealed that the impact of cooperatives was weak. The societies lacked finance for handling large stocks and credit facilities were very meagre. Problems arose as tribals could not provide landed securities which continued to be in the names of elders. Sometimes non-tribals managed to get loans from these societies and lend them to poor tribals at higher rates of interest. The cooperatives did not recognise the social needs of the tribals and did not advance any loans for such items of expenditure. The tribals, therefore, had to approach the moneylenders. Similarly, the failure of the marketing societies to deal with the marketing of minor forest produce has resulted in continuing dependence on the traditional moneylenders. As a result the cooperatives, credit as well as marketing, have so far touched only the fringe of the problem of the credit needs of the tribals. One of the reasons for the limited impact of these societies in the tribal areas has been the hesitancy of central cooperative banks to finance the tribal cooperatives. The central banks are apprehensive about ending to the tribal societies for, among others, the following reasons:

(i) In the tribal areas, shifting cultivation is a feature of tribal agriculture and in the absence of a proper survey or settlement of land, the tribals are often not in a position to produce satisfactory evidence of ownership or occupancy over a given piece of land.

(ii) Lands owned by the tribals cannot be brought to sale due to statutory protection given to tribals. Alienation in favour of an institutional agency is permitted but not without restrictions.

(iii) Supervision and recovery of loans including effective control over borrowing in tribal areas is comparatively difficult because of the hilly terrain.

(iv) In some cases, tribal cooperatives consist of tribals and non-tribals and the interest of tribals has been generally subordinated to that of non-tribals.[1]

59.3.45 Similarly land development banks are not in a position to advance investment credit to the tribals for purposes of minor irrigation, land development and subsidiary occupations. In the case of credit for land improvement, security in the form of a charge on or mortgage of land is necessary. In most tribal areas, land surveys and settlements have yet to be completed. Expeditious completion of this work will remove a major impediment in the grant of term credit.

59.3.46 While a complete solution of the problems is closely linked to the socio-economic development of the tribal areas, a number of the existing impediments in the financing of tribal programmes could be removed if a strong base level structure is built up and the repaying capacity is ensured out of the sale proceeds of agricultural and minor forest produce. An effective solution lies in creating an agency which would be in a position to provide all the services presently required by the tribal, that is, credit for the entire production needs, distribution of agricultural inputs, marketing of the produce, providing them the necessaries of life at fair prices and giving them credit for meeting social obligations. For the effective implementation of the programmes for their economic development an integrated credit service covering their total needs will be essential.

59.3.47 A study Team was constituted by the Government of India in 1971 (Bawa Committee) on the Cooperative Credit Structure in Tribal Areas. The Team has recognised that the society at the primary level, which caters to the tribals, should provide a comprehensive range of services to them so as to ensure that they are not to approach a multiplicity of institutions for assistance. It has recommended the organisation of large-sized credit-cum-marketing societies on the pattern of the farmers' service societies recommended by the Commission in its Interim Report on Credit Services for Small and Marginal Farmers and Agricultural Labourers. This recommendation has been accepted by the Government of India and has been commended for implementation in all tribal areas by the State Governments.

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[1]Datey, C. D., 1974. 'Problem of Agricultural credits in tribal areas' Kurukshetra, 22nd Anniversary Number, Volume 23, Number-1:

59.3.48 The Study Team has suggested the unification of credit and marketing structure in the tribal areas generally upto the secondary level (*i.e.* one level above that which provides the tribals the various services). The unified structure should provide for all services including production credit (short, medium and long-term), supply of inputs and essential consumer commodities, marketing of agricultural and minor forest produce and credit for consumption needs and social purposes. It is also envisaged that necessary action will be taken for redemption of past debts and regulation of money lending activity. What is noteworthy is that whatever form the structural pattern at the higher levels may take, the base level structure which is the point of contact with the tribals should conform to the pattern of a multifunctional society providing integrated credit and other services to the tribals. In a recent Conference (April, 1975) the State Ministers in charge of tribal development have endorsed the recommendations of the Bawa Committee for a unified credit-*cum*-marketing structure.

59.3.49 Some of the State Governments have taken important policy decisions following up the recommendations of the Study Team on Cooperative Credit Structure in Tribal Areas. Andhra Pradesh had even before built up a credit structure for the tribal areas in the form of the Girijan Cooperative Development Corporation. The Corporation meets all the needs of the tribal through affiliated Girijan cooperatives and is also the central financing agency for the tribal area. The Government of Maharashtra has decided to set up a combined instrument of credit and marketing for an area having a population of about 12,500 with 3 to 5 branches depending on the density of population and the level of economic development of the area. The new institution will provide all the services needed by the tribal at one point (*i.e.* the branch level). Since the tribal areas in Maharashtra are dispersed, it has been decided that these primary institutions will be serviced:

(i) by the central cooperative banks for production (long and short term) and non-production credit;

(ii) by the Maharashtra State Marketing Federation in regard to the marketing of traditional agricultural commodities and supply of inputs; and

(iii) by the Maharashtra State Tribal Cooperative Development Corporation for marketing of minor forest produce and supply of essential consumer commodities.

Orissa has decided to establish large-sized multipurpose cooperative societies as recommended by the Study Team. It may have one society

for each tribal development block with adequate number of branches. The Government of Rajasthan is contemplating a unified credit-*cum*-marketing structure for the entire sub-plan area on the model of Girijan Cooperative Development Corporation of Andhra Pradesh for catering to all the requirements. It will also be a central financing agency. The primary level society is expected to serve one tribal development block. This primary unit will have adequate number of branches so that all the services are made available as near the village as possible.

59.3.50 We are in agreement with the present approach to the provision of credit, marketing and other services through multi-functional cooperatives except in the matter of redemption of past debt and regulation of money lending activities. As we have recommended in paragraph 59.3.32, this should be the responsibility of the project authorities and the cooperatives should only be their agents to recover the outstanding debts. While we commend expeditious coverage of the tribal areas under the cooperative structure described above, we would like to emphasise that for the time being the societies at the primary level should be officially sponsored and managed keeping in view the present level of development of the tribals.

59.3.51 The development of tribal areas will require multi-disciplinary support. Coordination among various departments, therefore, assumes special significance. It is understood that in the past the involvement of the Forest Department in various tribal development programmes and projects had not been sufficiently ensured. Keeping in view the importance of forestry in the tribal economy, the Forest Department should be fully involved in the planning and execution of tribal development programmes. Furthermore, in order to ensure adequate inter-departmental coordination in formulation and expeditious execution of the programmes, there should be a State level coordination committee under the chairmanship of the Development Commissioner and with the concerned departmental heads as members. Apart from coordinating the activities of various departments, it will also monitor and evaluate progress of the programmes. For this there should be an appropriate machinery for concurrent progress reporting and evaluation. A Committee on Bench Mark Survey (1971) set up by the Government of India recommended bench mark surveys in all the six tribal development agency areas. The Committee had also suggested the methodology and schedules for the conduct of the surveys. Based on this, it should be possible to build up the basic data for the project areas.

4 ARID AND SEMIARID AREAS

Drought Prone Areas

59.4.1 Extensive areas in the country receive low and erratic rainfall and are subject to frequent failure of crops. These are the hot arid, semiarid and dry sub-humid regions located in different parts of the country. The hot arid area comprises mainly the desert zone in western Rajasthan and parts of Gujarat and Haryana. A few districts of Andhra Pradesh and Karnataka are also arid and constitute the southern arid zone. While semiarid and dry sub-humid areas are found in several parts of the country, the bulk is in Andhra Pradesh, Maharashtra, Gujarat, Karnataka, Tamil Nadu and in the belt east of the hot desert.

59.4.2 These areas fall in three different rainfall categories which determine the degree of aridity. Rainfall below 375 mm creates conditions of extreme aridity which is prevalent in the desert area. The southern arid zone and other semiarid areas have rainfall between 375 mm and 750 mm. The dry sub-humid areas receive on the average a rainfall between 750 mm and 1,125 mm. There are 128 districts in the low to medium rainfall zones (375 mm to 1,125 mm) which account for about half the net sown area in the country. Some of these districts have developed irrigation facilities and, therefore, their problems are not acute. But most of the districts face great instability in production due to erratic and inadequate rainfall and other fatcors. In addition there are certain areas, which, although in the rainfall zone of above 1,125 mm, experience frequent failure of crops and scarcity due to variations and distribution of rainfall and to the terrain.

Problems of Development

59.4.3 Apart from scanty and erratic precipitation, the desert areas are characterised by high temperature and hot desiccating winds, shifting sand dunes and sand casting on cultivated fields, roads and railway tracks, lack of perennial streams and sweet water aquifers. Groundwater is available only in some pockets and that too, being saline, is not always fit for consumption or use in cultivation. Vegetation in these areas is poor and overexploited. Land available for cultivation is limited and there is preponderance of cultivation on unsuitable and marginal lands and denudation of tree growth for fuelwood. Coarse grains are generally produced but the returns from land are low. These areas have also a high con-

centration of livestock since the population prefers mixed farming to supplement their meagre returns from crop production. The pressure of the livestock population has led to overgrazing of the rangelands. All this has resulted in severe depletion of top soil cover, serious erosion problems and rapid deterioration of the desert. Thereby the echological balance has been disturbed. Frequent failure of crops and lack of water and vegetation compel migration of human and livestock population in large numbers in search of food and fodder. Nomadism is an important feature of the desert economy. These factors have made the desert area backward in development and increased regional imbalance.

59.4.4 The conditions in the southern arid zone and the semi-arid and dry sub-humid regions, though less harsh than in the desert, create difficult problems of development. In these areas rainfall is erratic and vegetative cover poor. The precipitation is limited to a short period and is mostly lost in excessive runoff giving rise to problems of soil erosion. In the absence of adequate groundwater recharge, there is little build up of irrigation potential. The areas have both black and red soils but productivity of land is very low. Crop production, mainly coarse foodgrains, is subsistence oriented. There are areas where commercial crops such as groundnut and cotton are important to the local economy. The percentage of the net sown area to total area is much higher than the all-India average as marginal lands are cultivated. The productivity of the animals is also very low. Forests do not occupy a large area and are denuded by human interference. These areas have a relatively high density of population and large number of agricultural labourers. Some of these areas have concentration of tribal population.

59.4.5 Erratic rainfall and continued dry spell result in frequent crop failure in these areas creating scarcity conditions. Not only does this involve heavy burden for drought relief, but it also causes instability in the entire economy due to the fluctuating levels of production of coarse grains which are widely cultivated in these areas. This, along with the low productivity, has kept these areas at a low level of development and contributes to regional imbalance.

Past Efforts at Development

59.4.6 During the Second Five Year Plan, 45 dry farming projects covering about 400 hectares each were taken up in different States with a view to demonstrating the benefits of improved dry farming practices in low and erratic rainfall areas. The scope of these projects, which were extended during the Third Five Year

Plan, included engineering measures like contour bunding and terracing and agronomic practices relating to water conservation, but, as the Fourth Plan document has noted, these projects could achieve only a limited success.

59.4.7 The concern at the deteriorating situation in these areas and the mounting burden of expenditure in drought relief measures led to the rethinking on the problems of development of these areas. It was apparent that during scarcity conditions relief funds were often spent on improvised schemes without yielding permanent benefits of value to the drought affected areas. It was realised that appropriate technologies had to be evolved and programmes put on the ground to improve and stabilise their economy. Without an all out effort in this direction, the instability of production in these areas would hamper the growth of the economy of the country as a whole. The Fourth Plan, therefore, laid considerable emphasis on research into improved dry farming technologies and application of such technologies in dry farming areas. The plan also envisaged programme of rural works and observed:

> "Apart from outlays included in the Plan, the Central Government annually provides about Rs. 25 crores from the budget as grant to famine affected areas. Over the Fourth Plan period nearly Rs. 100 crores are likely to be available from this source. The bulk of these amounts can be so deployed in the areas chronically affected by drought as to generate considerable employment related to pre-planned programme of rural works. Individual schemes of rural works thus drawn up should be integrated on the one hand with the general programme of agricultural development in the areas concerned and on the other, specific programmes of development for sub-marginal farmers and agricultural labourers. All these are aspects which require considerable attention and advance planning if the results obtained are to be commensurate with the outlay both in terms of rural employment generated and the development achieved."

The Rural Works Programme was undertaken in 54 districts (alongwith some contiguous areas of another 18 districts) in 13 States which were chronically affected by drought. The object was to create permanent works which would mitigate the effects of drought and also provide work to rural labour in such areas. A list of these districts is given in Appendix 59.11. The emphasis in the programme was on the construction of civil works of a permanent nature

on which further development of the area could be possible. Following the Fourth Plan mid-term appraisal in 1971, the programme was reoriented from purely employment generation to drought proofing of the areas covered. It was renamed as Drought Prone Areas Programme (DPAP) and its classification was changed from non-plan to Central plan scheme. The programme covers substantially the hot arid areas and about 50 per cent of the semi-arid areas which are considered drought prone.

59.4.8 The financing in the initial stages was restricted to schemes of minor and medium irrigation, afforestation and soil conservation, roads and drinking water supply. It was later appreciated that the development of cattle and dairying as well as sheep was highly relevant to the land and water resources situation in most of the drought prone areas and an area approach would be more effective in utilising the resource potential of the areas concerned. The experience of implementing the programme during the first few years brought out the fact that the emphasis on labour intensive schemes had resulted in the sanctioning of schemes by the States without a long term strategy. Many low priority and non-productive assets were created through the relief employment programmes which did not lead to an increase in overall productivity in the areas. Even after the State Governments were advised to reorient the programme, it was found that most of the resources had already been committed. The shift in emphasis, although conceived during the Fourth Plan, could not be brought to bear on the content of the programmes during the plan period. Area development had mostly been concerned with sectoral programmes and intersectoral linkages were not established to any significant extent.

59.4.9. During the Fourth Plan, a total outlay of about Rs. 112 crores was approved for implementation of the programmes. Of this, nearly 54 per cent was allocated for irrigation works and 24 per cent for road building. Soil conservation and afforestation accounted for about 17 per cent of the total outlay. The residual funds were devoted to drinking water and other miscellaneous works. Of the total expenditure reported till January, 1975, 55 per cent of the investment went to irrigation works, while 25.5 per cent on road building. About 14.5 per cent was accounted for soil conservation and afforestation and the balance for drinking water and a few other miscellaneous schemes. However, the pattern of investment was not uniform in all the States. While irrigation development was very prominent in the expenditure pattern in some States, road building accounted for large expenditure in certain others.

59.4.10 A comprehensive analysis of the problems of the

drought prone areas was made by the Task Force on Integrated Rural Development in 1973. This Task Force was constituted by the Planning Commission in connection with the formulation of the Fifth Five Year Plan. The drought prone areas programme in the Fifth Five Year Plan lays stress on the integrated area development to restore the ecological balance and to make the best use of the limited resources in the drought affected areas. The ultimate objective is to reduce, through appropriate investments and technology, the severity of drought and scarcity conditions and create a long term stable basis for production and employment. The programme lays emphasis not only on the reduction of regional imbalance but also on the amelioration of the condition of the lowest three deciles of the population. Special assistance is, therefore, intended for small and marginal farmers and agricultural labourers in these areas. While the geographical coverage of the DPAP remains the same, the various elements of the unified strategy of development emphasised by the Fifth Plan are as follows:

(i) development and management of irrigation resources;
(ii) soil and moisture conservation and afforestation;
(iii) restructuring of cropping pattern and pasture development;
(iv) changes in agronomic practices;
(v) livestock development; and
(vi) development of small and marginal farmers and agricultural labourers.

59.4.11 The Plan envisages that the Central Government will provide Rs. 3 crores from the Central plan to each drought prone district where 75 per cent or more of the area is characterised as drought prone, Rs. 2.5 crores to each district where the drought prone area ranges between 50 and 75 per cent and Rs. 2 crores to each district where the area is less than 50 per cent. The State Governments would be required to provide matching amounts from the State plans. Based on this, it has been estimated that a nucleus amount exceeding Rs. 300 crores would be made available to the programme districts during the Fifth Five Year Plan. In addition, institutional finance is also expected to be drawn upon for this programme.

59.4.12 The Fifth Plan has emphasised the need for coordination among various departments which would be involved in the programme. It envisages the setting up of a coordinating corporate body charged with the responsibility of the design, coordination and implementation of the integrated programme of development in each drought prone district. The coordinating corporate body, with

requisite finance and operational flexibility, would be able to raise institutional finance for direct investment. The Plan also highlights the need for drawing up the integrated plan of development in each district after a proper survey of the resources inventory there. Concurrent evaluation and monitoring of progress will be undertaken.

59.4.13 During the Fourth Plan, a Central sector desert development programme was initiated on pilot basis in four districts in Rajasthan, Gujarat and Haryana. The pilot projects included schemes of soil conservation, forestry and minor irrigation. An outlay of Rs. 2 crores was provided for the programme. The idea in taking up small compact areas was to demonstrate the impact of the programme, given the resources and appropriate strategy, on the local economy. The programme has been merged with DPAP during the Fifth Plan.

59.4.14 As we have observed, the Fourth Plan laid considerable emphasis on the research into dry farming technology and the application of research results to dry farming areas. An All-India Coordinated Research Project in Dryland Farming was initiated at 15 main centres and 9 sub-centres. In addition, a special centre was established at the Indian Agricultural Research Institute (IARI) in New Delhi. The research project is designed to evolve suitable techniques of dry land farming. Twenty-four pilot projects covering 3,200 to 4,000 hectares each were envisaged in the Fourth Plan for the application of a new package of technology in dry farming areas. These demonstration and training projects deal with the practical application of the dryland farming techniques relating to soil management, water harvesting, introduction of drought-resistant and drought-escaping varieties of crops and adoption of new agronomic practices such as foliar application of fertiliser.

59.4.15 The Central Arid Zone Research Institute (established in 1959 as Desert Afforestation Research Station) conducts basic and applied research on various desert development problems relating to afforestation, improvement of pastures, stabilisation of shifting dunes, etc. with a view to finding out appropriate solutions. The researches include basic resource surveys covering soils, landscape, water and vegetation. As a result of the research effort, indigenous and exotic species of plants have been identified which are suitable for afforestation. Techniques have been evolved for stabilisation of shifting dunes and silviculture in the desert areas. Studies have also been made in farming and water harvesting techniques.

Identification of Drought Prone Areas

59.4.16 The special economic programme for areas liable to recurring droughts was first announced in the brochure entitled "Towards Growth with Social Justice" which was laid before Parliament along with the Central Budget for 1970-71. The identification of chronically drought prone areas was initially undertaken by the Committee of Secretaries in the Government of India. Among the criteria for the selection of these areas, the Committee decided that factors like incidence of rainfall, environmental conditions like proximity to irrigated tracts providing superior employment, availability of other avenues of employment in the same area, existence of schemes amenable to long-term economic development but above all, chronic liability to drought should be taken into account.

59.4.17 In 1967, the Union Department of Agriculture, in consultation with the Planning Commission, asked the States to demarcate chronically drought affected areas on the basis of a total or almost total failure of crops in the relevant years once in every 3 years, 5 years or 10 years and other data. On the basis of the information received from the States and available data the Department prepared a list of drought prone districts.

59.4.18 In order to initiate the Rural Works Programme in 1970-71, it was decided to formulate schemes for 23 districts which were common to both the lists—one prepared by the Secretaries Committee and the other by the Department of Agriculture. The Central Committee for Coordination of Rural Development and Employment in the Planning Commission later considered the question of identifying additional districts. The Committee appointed a Sub-Committee (Gidwani Committee) to recommend the additional districts and indicated that the selection should be based on certain objective criteria like incidence of rainfall over a period of time, extent of irrigated area in the district, chronic liability to drought, etc. The Committee felt that since the main objective of Rural Works Programme was to organise works for banishing emergent scarcity relief after some years, the programme had necessarily to be restricted to areas as were liable to chronic drought.

59.4.19 While keeping in view the broad criteria indicated by the Central Coordination Committee, the Sub-Committee also took into account the criteria of revenue remissions and the frequency of famines or scarcity. After considering its recommendations, the Government of India eventually selected 54 districts in 13 States along with contiguous areas in another 18 districts for the Drought Prone Areas Programme.

59.4.20 The Irrigation Commission, which submitted its Report in 1972, also went into the question of identifying drought affected areas. The Commission considered the following criteria generally adopted by the States for determining drought prone areas:

(i) meteorological data;
(ii) revenue remission;
(iii) frequency of famine and scarcity; and
(iv) availability of irrigation facilities.

However, it suggested the adoption of the meteorological definition of drought and said:

> "Drought is the result of an imbalance between the soil moisture and evapo-transpiration needs of an area over a fairly long period, so as to cause damage to standing crops and a reduction in crop yield. The basic characteristics of drought is a steady rise in temperature, in addition to the absence, or the severe deficiency, of rainfall over a fairly long period. Several factors, such as precipitation, temperature, wind velocity, sunshine, soil texture, soil moisture and antecedent rainfall interact to produce this situation. However, the key role is played by rainfall and the crucial variables are its distribution, its variability and its capacity to meet evapo-transpiration needs."[6]

But it maintained that all the districts and taluks which comprised the drought zone were not equally vulnerable to crop failure. Protective irrigation to stabilise agriculture had been developed, or was being developed, in some districts or taluks and it considered that those districts which enjoyed a minimum percentage of irrigation should be excluded from the list of drought affected areas. According to it, the minimum criterion for identifying areas susceptible to drought is that the probability of critical rainfall shortage should be 20 per cent and that there should be an adverse water balance. Once the broad drought zone has been demarcated, it can be further examined from the point of view of availability of irrigation to identify those which required special attention. A list of the areas identified on the above basis by that Commission is given in Appendix 59.11.

59.4.21 Appendix 59.11 also shows that 34 districts are common to both the DPAP and the list of the Irrigation Commission. Although this compatibility is noticed, there are 20 DPAP districts which have not been considered drought prone by the Irrigation

[6] 1972. Report of the Irrigation Commission, Vol. 1: 162. New Delhi, Ministry of Irrigation and Power, Government of India.

Commission. On the other hand, the Irrigation Commission has identified 33 additional districts (fully or in part) as drought prone areas.

59.4.22 The Task Force on Integrated Rural Development, which considered the variations, felt that there were no compelling reasons for reopening the list of drought prone areas as given in the Fourth Plan and recommended that the same areas might continue to be so categorised during the Fifth Plan.

59.4.23 The Irrigation Commission has seen the problem from a particular angle, that is water balance, which is relevant from the point of view crop growth. The Central Coordination Committee, and other Government committees, on the other hand, have taken into consideration other factors including facilities in neighbouring areas and opportunities for employment in addition to rainfall and irrigation. In our view the various criteria are essential and it will not be proper to judge a particular area or district as drought prone, and hence requiring special assistance, unless all the fatcors have been duly considered.

59.4.24 We also notice that 18 out of 33 additional areas recommended by the Irrigation Commission have been brought under SFDA programme. There is already a Government decision not to have more than one special programme in one district. But since SFDA is also an area programme, it is possible to build into it the essential elements of DPAP as are appropriate to the local field conditions.

59.4.25 We would, however, like to emphasise that the list of areas for DPAP need not be regarded as rigid and final for all time to come. All the factors taken into consideration for selecting areas are continuously changing. There could be many developments which would obviate the necessity and remove the urgency of a special programme like DPAP. The possibility of development of local water resources and intra-basin transfer of surplus water is yet to be fully explored. We shall refer to this aspect in greater detail later in this section. Here we may point out that if our recommendations about giving priority to the completion of irrigation projects in the drought prone districts are followed and substantial areas could be brought under irrigation, some of the districts, now drought affected, will no more need the special programme. Again, industrial development may provide considerable and sustained employment in specific areas. For instance, in Jhabua district in Madhya Pradesh extensive deposits of phosphate have been located, thereby creating the possibility of labour employment on a large scale. The development of mining in this area will draw labour

from all parts of the district. Such developments may bring about profound changes in specific areas where, as a result, the economic necessity of a special programme for drought proofing and employment generation through agricultural development may lose much of its force. Normal programmes of agricultural development could then be undertaken in such areas. These kinds of development cannot be foreseen now with a reasonable degree of precision. What is needed, therefore, is to review, from time to time, the coverage of the special programme of DPAP in the light of future developments and changes in the circumstances obtaining in specific areas.

Strategy of Development

Hot desert

59.4.26 The problems of the desert area are different from those in the semi-arid and dry-sub-humid regions and even the southern arid zone. In order to improve the conditions of the desert economy, a different set of measures are necessary. We have considered the problems of development of the Indian desert in our Interim Report on Desert Development. In that Report, we have drawn attention to the urgent need to arrest the rapid deterioration of the desert area and have recommended a 15-year comprehensive and integrated programme for its improvement and economic development so that much of the hardship arising there out of drought and aridity can be mitigated permanently and lasting socio-economic improvements can be brought about in this underdeveloped region. In the following paragraphs we shall briefly summarise the development strategy recommended in that Report.

59.4.27 The integrated plan of development suggested by us is designed to pay simultaneous attention to the development of water resources, forestry, animal husbandry and pastures. In the strategy of development, water plays a pivotal role. Since there is paucity of local water resources, water has to be inducted from outside the arid zone. The Rajasthan Canal Project is an instance of such an effort. This canal is designed to irrigate areas along the western boundary of Rajasthan but the interior desert areas do not derive any benefit from it. We have recommended that the Project should be recast to exclude unsuitable areas, where the cost of land levelling and development will be high, and to construct five lift canals to take some water deeper into the desert with a view to bringing more areas under irrigation and extending the benefit to a larger section of the community. This can be accomplished

within the total outlay required for the Rajasthan Canal Project as the saving in development cost by excluding heavy dune areas will more than offset the additional cost of constructing the lift canals.

59.4.28 The limited quantity of groundwater available in pockets can be exploited mainly for domestic and industrial use, it being rather expensive for irrigation. Large parts of the desert will still have to depend on rain. For maximising the utilisation of the scanty rainwater, suitable water conservation techniques like khadins, bandhis and adbandhis will have to be adopted on a larger scale.

59.4.29 In the early stages of development of the canal command areas, there will be water to spare in the canals. This opportunity needs to be utilised. As water becomes available in an area, a large scale programme of tree plantation, raising of shelter-belts and wind-breaks and rejuvenation of vegetal cover will have to be undertaken. This programme will arrest wind erosion, sand blowing and sand casting on arable fields and also reduce the desiccating effect of hot winds on crops. Tree and grass cover on the unstable and new dunes in the canal commanded areas and on those which pose a threat to habitations, roads and railways should reduce the problem being faced now. The plantation programme is also intended to meet the requirements of fuelwood and small timber locally and to prevent overexploitation of the existing resources and digging of roots of *phog* bushes which is causing deterioration of the desert by loosening the soil and creating the foci of sand blowing.

59.4.30 The economy of the desert area should continue to be mainly animal husbandry oriented. The desert area has a natural endowment of several good breeds of cattle and sheep. A major thrust of the development programme has to be on the prevention, in a large measure, of the nomadism of the cattle breeders and sheep-owners. An organised programme of livestock development will have stabilising influence. An increase of animal population is, however, ruled out, since the vegetal resources even after development cannot sustain a larger number. While containing the number, the breeding programmes, through provision of facilities and services, will have to be designed to improve the quality and productivity of cattle and sheep. In canal command areas dairy development through the setting up of additional milk collection and milk chilling centres and milk products factories should be undertaken.

59.4.31 In the arid areas outside the canal command the major emphasis has to be on sheep development. The good breeds of sheep available in this region can be further improved both for wool and mutton. Apart from improving the quality of sheep, wool shearing

and grading centres have to be established and arrangements made for wool and meat marketing. Another dimension to this development is the possibility of creating more employment in the cottage industry by processing the wool locally. For this, adequate extension support will be necessary.

59.4.32 A vigorous programme of livestock development is possible if feed and fodder resources are substantially increased to ensure the supply of nutrition to the animals. Attention has, therefore, to be paid to large scale development of pastures, regulated grazing to prevent over-use and creation of grass reserves and fodder banks for supply of hay in scarcity years. In canal command areas, the cropping pattern has to be adjusted to bring 30 per cent of the area under fodder crops in mixed farming.

59.4.33 All this development is not easy to bring about without concerted effort. The programme of development suggested by us have to be properly phased over three Plan periods and would require adequate organisational support for timely and effective implementation.

Drought Prone Areas Outside the Desert

59.4.34 The economic backwardness of the drought prone districts outside the desert area is due not only to the limitation of natural advantages but also to the manner in which the existing endowments have been put to use by man. The climatic and environmental conditions in these areas are less harsh than in the desert region. But unplanned and over-utilisation of natural resources and the lack of their conservation are responsible for substantial imbalance in the ecology of these areas. Though less pronounced than in the desert, it is sufficiently acute to merit serious consideration. The imbalance has arisen because of factors like denudation of forest and tree growth, overgrazing of pastures, crop farming on marginal and sub-merginal lands, the resulting surface run-off of rain water and soil erosion. The result has been less and erratic rainfall, a precarious production base and low productivity. In attempting the development of these areas, therefore, the restoration of ecological balance among the water, the soils, the plants, the human and animal population should be a basic consideration and should underlie the development strategy. It indicates the need for bringing about an appropriate land use pattern which will be conducive to attaining the necessary balance in ecology. If a proper balance is achieved, it is possible that there would be better and more uniform precipitation

and retention of soil moisture vital for the growth of crops and other vegetation.

Development and Management of Irrigation

59.4.35 Since water is the most scarce commodity in drought prone areas, development and management of irrigation assumes special significance. Some areas have existing irrigation works to utilise surface and groundwater. But to derive maximum benefit from these works, most of them have to be improved. There are also certain ongoing irrigation projects in these areas. Improvement of the existing works and completion of the projects under construction have to be accorded high priority in the overall strategy of development.

59.4.36 Even the improvement of existing works and the completion of projects under construction, bulk of the drought prone area will continue to be dependent on rainfall. The Irrigation Commission has, therefore, rightly emphasised the need for investigations into further possibilities of increasing irrigation by both surface and groundwater. We fully endorse this view and are of the opinion that irrigation development in drought prone areas should be undertaken on a high priority basis.

59.4.37 An analysis of the status of irrigation in the districts selected for DPAP and identified by the Irrigation Commission (a total of 87 districts) shows that the average area irrigated as a percentage of gross cropped area is about 15 per cent. Preliminary information suggests that in some of the districts like Cuddapah in Andhra Pradesh, Ahmednagar in Maharashtra, Bellary in Karnataka, Coimbatore in Tamil Nadu or some districts in the Ganga basin, irrigation coverage could be raised to more than 30 per cent by utilising the surface and groundwater resources in the basins. No doubt further investigations will still be necessary even in these areas. But, if the preliminary data are any guide, one could expect to improve irrigation in these districts substantially by undertaking various types of irrigation projects on priority basis to develop the water potential. Once this is accomplished, such areas may not need the special programme.

59.4.38 Most of the districts identified as drought prone have, however, poor irrigation. According to our information, as many as 32 districts had 10 per cent or less of the cropped area under irrigation from various sources at the beginning of the Fourth Plan. In 12 of these districts some irrigation schemes were already in hand during the Fourth Plan. The remaining 20 districts are, therefore, still left with scanty irrigation, some of them having even less than 5 per

cent, and would require greater attention. The position in respect of cropped area, irrigation, etc. in these districts is indicated in Appendix 59.12. The four States in which the irrigation deficient districts are located, viz., Madhya Pradesh, Maharashtra, Gujarat and Rajasthan, would require special Central assistance for improving irrigation facilities. In the case of Rajasthan, in the four concerned districts there is very little water available for further exploitation either from surface or groundwater sources. Any further provision for irrigation would have to be by transfer from other areas. We have already touched on this aspect in paragraph 59.4.27. In the case of the other three States, the water resources are available in the basins themselves. A broad idea with regard to the type of irrigation schemes that can be investigated and taken up in the 16 districts in these three States is given in Appendix 59.13. The review discusses only medium surface schemes which could be taken up and completed within a short period.

59.4.39 While the drought prone districts with lowest irrigation support should undoubtedly receive preferential attention, the development of water resources in all the drought affected areas must necessarily be given high priority. However, it should be recognised that even after the local water resources are fully utilised through projects and schemes being constructed, investigated and planned, the gross area likely to be brought under irrigation in most of the drought prone areas would still be considerably less than 30 per cent of their cropped area and would continue to be acutely deficit in regard to their water needs. A long term solution of the problem, therefore, calls for additional measures.

59.4.40 The additional measures we have in view relate to the induction of water from outside the command area to supplement the availability of water, as we have emphasised for the hot desert. The Central Water Commission has been given funds (Rs. 2.45 crores) during the Fifth plan by the Planning Commission for carrying out basin studies and finding out, as first priority, sources of water for increasing the irrigation in drought prone areas. Under this scheme, apart from examining the scope for developing further irrigation potential by utilising locally available water resources, studies are proposed to quantitatively assess the water requirements of the drought prone areas which need to be met by import of surplus water from outside the river basin and to demarcate areas to be commanded by water so transferred. The scheme is also to assess the available surpluses, in both time and location, and to lay down the criteria and determine the quantum for distribution among deficit areas. Hydrological and hydrogeological surveys are proposed to be organised to faci-

litate planning for the conjunctive use of surface and groundwater resources in all the regions. We attach great importance to these studies which would provide the basis for a definite line of attack on the problem of drought. We recommend that the diversion of water from other parts of the basin or from other river basins to give a minimum support to such drought affected districts should be viewed as a national requirement.

59.4.41 In utilising the local water resources, due attention has to be paid to small tanks, *bhandaras* and dugwells. Where perennial streams are available, lift schemes could be considered if economically justified. In computing the economics, however, social returns should also be considered. Percolation tanks and check dams will be useful in many areas to hold up rain water flowing through small streams as they help in improving the groundwater table.

59.4.42 In some areas, the available groundwater has been overexploited. In most districts, however, the groundwater potential is yet to be fully assessed. Hydrological surveys by groundwater organisations need to be expedited in these areas for early harnessing of the potential. It should, however, be recognised that although some areas may have substantial untapped potential, by and large, the drought prone districts offer only limited possibility of groundwater. Its utilisation has, therefore, to be for the maximum good. This can be secured only through an equitable distribution of the available supplies. The Task Force on Integrated Rural Development has observed.[1]:

> "Firstly, water being a limited source, it will be desirable to have it owned and operated, as far as possible, on a co-operative or a community basis. It will be socially undesirable that one individual or a small number of individuals should come to own the limited number of tube-wells which may be found feasible in terms of identified groundwater resources. Such individuals can turn themselves into "water lords". Just as in conditions of irrigated farming, ceiling on land holdings is considered an essential element in agrarian policy, an appropriate ceiling on "water holdings" must be deemed necessary in a proper strategy for development in drought-prone districts."

We agree with this view.

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[1]1973. Integrated Agricultural Development in Drought Prone Areas. Report by the Task Force on Integrated Rural Development: 49. New Delhi, Planning Commission, Government of India.

59.4.43 For putting water to its optimum use suitable cropping pattern would have to be devised. High water requiring crops may need to be replaced by such crops which require much less water. In milkshed areas, where the possibility of cattle development exists available water could be utilised for growing fodder for the animals. These are matters of detailed planning in each area, but the broad approach needs to be kept in mind.

Soil and Moisture Conservation

59.4.44 Soil and moisture conservation, by reducing the intensity of rainfall runoff and increasing the moisture retention can substantially improve the chances of vegetative growth. In the past conservation programmes were carried out in small and arable areas and not on the basis of covering the entire catchment. The result has been that the benefits of these works have been lost by surface runoff from untreated slopes of the upper catchment. Lack of adequate soil conservation in the catchment of reservoirs has also led to the problem of silting in these irrigation works. Improvement of the vegetative cover in the entire catchment area including hill slopes and uplands is, therefore, an essential step for an integrated programme of soil and moisture conservation in the DPAP areas.

59.4.45 Planning on complete watershed basis should be an important strategy for the development of the DPAP areas. It will require, the identifiction of watersheds in each district for soil conservation, afforestation and minor irrigation. Soil conservation and water conservation have often to be taken up together. It will be necessary to encourage the farmers within a watershed area to adopt a new plan of land utilisation, part of the land being used for storage and moisture retention and the rest for actual cultivation. The adoption of such water harvesting techniques will bring about greater stability in production

59.4.46 Appropriate conservation programmes and land management practices should be formulated and implemented for each land category in the watershed. This approach to watershed planning needs land resource and land capability surveys in all the programme areas. Lands fit for conservation purposes only should not be allowed to be put under crop farming as is being done now. This underlines the importance of other land uses such as afforestation and pasture development. We have examined the needs of soil conservation and watershed planning in some greater detail in Chapter 18 on Soil and Moisture Conservation.

Social Forestry

59.4.47 The hills and uplands which were once rich in forest cover have been largely denuded of vegetation both by excessive exploitation over the years and by removal of trees for purposes of timber and fuel. The denudation has been extended to the low lands as well leading to severe soil and water erosion. Crop production, as a result, has been subject to serious moisture stress throughout the drought prone region. Intensive afforestation in these lands will help not only in conserving soil moisture but also meet the demand for fuelwood and fodder. In this connection, we reiterate the observations in our Interim Report on Social Forestry that stabilisation of production in drought prone areas is better assured from trees and grasses than from arable crops, and that wherever irrigation facilities do not exist, the problem merits a new approach in terms of adopting such land-use pattern as would essentially result in reducing the area of arable cropping and increasing the area under permanent vegetation. Such a measure would improve the water regime, moderate climatic excesses and reduce dependence of the people in drought prone areas on precarious crop production. We have also taken the view that providing fuelwood and small timber to the neighbouring villages from the forests should be considered as a service to the population and that a part of the existing forests would have to be managed so as to realise the objectives of social forestry. Few programmes can, therefore, have greater socio-economic impact on the rural community as well as on the management of forest resources than those relating to the raising of trees, grasses and fodder in the farmers' own lands, village commons, wastelands and degraded forests close to habitations. They provide the requirements of fuelwood, fodder and timber. We reiterate our recommendations on mixed forestry in the Interim Report on Social Forestry as a basis for planning an intensive programme of afforestation in the drought prone areas as a soil and moisture conservation measures.

Pasture Development

59.4.48 Pasture development in drought-prone areas would, apart from increasing fodder availability, confer the added benefit of providing grass cover on lands subject to soil and water erosion. A scheme to develop pastures should, therefore, be an essential component of an integrated soil and water conservation programme. Vast areas in the drought prone districts, Government wastelands as well as private fallow lands are ideally suited for being developed as grass

lands. Available pastures in the district are in a state of neglect because of overgrazing and lack of protection. Existing grass cover in these pastures consists of grass varieties which are of low quality and not nutritious. It is therefore necessary that in all areas where available lands are not fit for cultivation, an intensive programme of pasture development should be taken up apart from afforestation as explained in the previous paragraph. Since grazing and fodder are vital to the village economy, the development of fodder and grass should be made an important component of mixed forestry programme as recommended in the Commission's Interim Report on Social Forestry. Improved methods such as selection of nutritious varieties, seed multiplication, application of fertilisers, adoption of protection measures, etc. should be followed in the cultivation of grass and fodder.

Cropping Pattern and Agronomic Practices

59.4.49 Over extensive parts of the drought prone areas, farming will have to depend on rainfall. Appropriate cropping pattern and dryland farming practices are, therefore, important. The strategy for dryland farming should be based on a choice of appropriate varieties of crops, economical use of water, increase in the cropping intensity through inter-cropping and the adoption of suitable agronomic practices. These measures can reduce instability in production and thereby help the farmers through sustained income and employment.

59.4.50 The all India coordinated research projects for crops and the dryland farming are the base for formulating the cropping patterns appropriate for the various soils and rainfall patterns in the dry lands. The centres under these projects are located in different parts of the country. We have already referred to dryland farming and research in Chapter 20 on Reorientation of Cropping Systems and Chapter 52 on Research. Here we may point out that additional centres should be opened where the present centres do not cover all types of soils and rainfall patterns.

59.4.51 One of the main jobs of these centres is to analyse the meteorological pattern of rainfall in the zone. Based on this pattern the fitness of crops is decided. Where suitable varieties to fit the pattern of rainfall are not available, breeding work has to be done to evolve new types. A judicious use of the limited rainfall and available soil moisture is possible if crop varieties are evolved/selected which require relatively less water and less time for their growth. Meanwhile, available varieties, which can stand moisture stress,

could be taken in these areas. Castor as an important crop in the Andhra Pradesh region, where there is a drought for about a month between the first and the second rains, has proved effective. In certain areas a fodder economy has proved more efficient than a grain economy.

Animal Husbandry

59.4.52 In the drought prone areas livestock and poultry production provides a much more stable economic base than crop production. Further, these areas are suitable for fodder and grass development, which provides scope for livestock production. Due emphasis, therefore, needs to be placed on animal husbandry programmes in the development strategy.

59.4.53 The development of cattle has to be for both milk production and draught power. The dry farming areas require considerable power input for development. The efficiency of the cattle will have to be improved for this purpose. As we have emphasised in our Interim Report on Desert Development, where irrigation is available and fodder production possible, a planned cattle development programme should be undertaken for milk and dairying, if such area is within a milkshed. Those areas could then be linked to the milk supply schemes. Milk collection and chilling centres and dairy products units could be established as part of the infrastructure.

59.4.54 A number of DPAP districts have possibilities of sheep development for both wool and mutton. Poultry and pig production can also be undertaken in several areas. In our Interim Reports on milk production and poultry, sheep and pig production, we have identified a number of districts including DPAP districts where programmes should be taken up for milk, sheep, poultry and pig production by small and marginal farmers and agricultural labourers. As will be seen from Appendix 59.14, the DPAP districts identified for milk production are 21, for sheep production 53, for poultry production 33 and for pig production 9. Of these, the DPAP districts identified outside the desert area are 15 for milk production, 42 for sheep production, 27 for poultry and 8 for pig production. In all these areas, appropriate measures are required to be taken for the improvement of breed and yield, since the existing stock is mostly non-descript and has poor yield. In the relevant chapters on animal husbandry we have discussed in detail the various measures required for livestock and poultry development.

59.4.55 The critical supply situation in respect of grass and fodder in DPAP areas has affected the productivity of cattle and sheep. Adequate pasture lands is a pre-requisite to animal husbandry. We have already referred to the need for developing pastures in dry lands as a soil and water conservation measure. As the land use pattern is readjusted in these areas in response to the need for ecological balance, pastures can support the livestock of improved breed.

Processing and Marketing

59.4.56 As development takes place along the desired lines, many agricultural commodities for local processing and semi-processing will be available. Extraction of sunflower oil, milk processing, wool grading and preliminary processing are instances. The scope for such economic activity needs to be assessed in each area and processing units located, where feasible. Such types of activities generate opportunities for sustained employment and income. Alongside, adequate measures are required for the disposal of agricultural commodities, including the semi-processed or processed ones, at economic price. Without well-planned marketing arrangements, the producers are not likely to get the economic price for the produce.

Drinking Water Supply and Rural Communications

59.4.57 The provision of drinking water supply and rural communications are important elements in any programme of development in drought prone areas. These areas experience acute scarcity of drinking water, for both human population as well as livestock, because of low rainfall. In fact, no development of livestock is possible in potential areas without the facility of drinking water. Priority attention, therefore, needs to be given to locating sources of drinking water in these areas. Although these are two important elements, the Fifth Five Year Plan has not included these programmes in the DPAP, principally for two reasons. Firstly, substantial expenditure has already been incurred for the roads programme in the early years of operation of the programme. The Task Force, taking this into consideration, recommended that in view of the need for concentrating attention on the more vital elements of the programme, the scheme need not have roads programme during the Fifth Plan. Secondly, the Minimum Needs Programme in the Fifth Plan provides for drinking water supply

schemes and rural roads in rural areas. This programme is intended to be utilised for building up facilities for drinking water and communications in the drought prone districts also.

Cold Arid and Semiarid Areas

59.4.58 The cold desert in the country occurs in Ladakh Valley in Jammu & Kashmir. The Lahaul and Spiti Valleys and the Kinnaur region in Himachal Pradesh are considered as cold semiarid. The population in these areas is sparse. The extreme climatic conditions, lack of communication and the level of education make development of these areas a difficult task. All efforts made so far to develop these areas achieved little success.

59.4.59 The agricultural season in Ladakh is limited to a short period between May and October in view of the high altitude, extreme cold, deficiency of oxygen and humidity. There are some streams and glaciers but there are problems associated with the utilisation of this water at higher elevations. The possibility of tubewell irrigation has not yet been established. The main crop taken in this area is *crim* a kind of barley. This area has, however, a valuable resource in pashmina goat. In paragraph 59.2.57 we have stressed the need for special programmes to increase the production of pashmina.

59.4.60 The Field Research Laboratory of the Indian Army, we understand, is experimenting on the feasibility of growing vegetables, wheat and maize in this area. This laboratory has also tried poultry production in underground concrete houses specially built for the purpose, where the birds can be kept warm during freezing surface temperature. These are at the experimental stage and their economics need to be fully established. The Indian Council of Agricultural Research is also seized of the problem of development of Ladakh.

59.4.61 It has not been possible for us to study in detail the problems and growth prospects of Ladakh and the semiarid region in Himachal Pradesh. The available information is not sufficient for formulating the strategy of development and indicating the feasibility of different programmes. In our view, many more investigations and more extensive research based on local environmental conditions, physical and socio-economic, are required before a viable economic programme can be suggested for these areas. We recommend that a comprehensive research should be taken up early in these areas by the ICAR.

5 KUTCH AND SUNDARBAN

Rann of Kutch

59.5.1 The Drought Prone Areas Programme is already operating in the Kutch district in Gujarat. This programme is mainly concentrated in the areas not covered by the Rann of Kutch. A State level committee of the Government of Gujarat has prepared a Master Plan for the development of Kutch district in general and Kandla-Gandhidham in particular. It also concerns mainly with areas outside the Rann. We have already discussed the development approach in drought prone areas in the previous section.

59.5.2 A major portion of the area of Kutch district comprises the vast desiccated plain called the Rann of Kutch. It is divided into two distinct wings, namely, the Great Rann in the north and the Little Rann in the south-east. The saline incrustations due to the ingress of sea water, brought in by the tidal waves mainly during the monsoon, have rendered this vast expanse uncultivable and uninhabitable except for a couple of islands in the Great Rann. The presence of larger proportions of potassium, sodium and magnesium chlorides makes this swampy area unsuitable for life. The saline swampy soils will have to be reclaimed in order to make the region culturable. Since the area falls in the arid zone, rainfall is scanty and even erratic.

59.5.3 Studies conducted by the Indian Agricultural Research Institute in the Great and the Little Ranns have revealed that surface deposits of salts of appreciable thickness are present in this region in an area of more than four lakh hectares. Resources of sweet water for washing out salts from the soils of the Great Rann for reclamation purposes appear to be very meagre. However, since a good portion of the Little Rann gets inundated by river waters, possibilities of reclamation are more in this sector provided fresh or low saline waters are available in sufficient quantity and suitable arrangements for drainage can be made. However, the chemical composition of the low saline water should be in accordance with the proportion of different constituents of the sea water; for, any deviation will be highly detrimental to fish culture. It is expected that around two hundred thousand hectares of land can be reclaimed from the Little Rann. Soil conservation measures such as contour bunding, terracing, etc. also assume importance in this context.

59.5.4 Earlier several agencies as well as the Irrigation Commission had considered the feasibility of reclaiming the Rann of

Kutch. The broad conclusion which has emerged is that the Kutch area can be agriculturally improved if part of the Narmada flows could be diverted to this area. Such a measure would not only substantially mitigate the acute problem of drinking water but also create conditions for reclaiming substantial areas of the Rann for agricultural purposes. In this context the feasibility of bringing water to the Little Rann to control salinity for brackishwater fish culture could be considered.

59.5.5 During the monsoons rain and river waters tend to reduce the salinity of the Little Rann. Depending upon the rainfall, varieties of fishes like hilsa and prawns enter the tidal backwaters of the creeks in the Little Rann for breeding purposes. But cultural practices are by and large non-existent. So far, no systematic attempts have been made to study the hydro-biological aspects in the region even though it is believed that in the shallow tidal backwaters fish culture could be a possibility. A study in depth of the possibility of fish culture in the Little Rann may be taken up beginning with a pre-investment survey in a selected area.

Sundarban

59.5.6 The Sundarban area is a delta which has been formed mainly by the continuous deposition of silt carried down by the Ganga river through the Bhagirathi-Hooghly. This process has also been assisted by tides from the sea face. The Indian portion of this deltaic region lies between the river Hooghly in the west and the Ichamati-Kalindi-Raimangal river system in the east. In the north, the Dampier-Hodges Line demarcates the area from the rest of the district of 24 Parganas in West Bengal. The entire area is criss-crossed by rivers, channels and creeks.

59.5.7 The area of Sundarban is about 8 lakh hectares. Of this, about 4.2 lakh hectares are under reserve forests including areas under water. The water spread accounts for 45 per cent of the forest area. Out of the remaining 3.8 lakh hectares, about 2.5 lakh hectares are under cultivation. These reclaimed areas are at present protected by marginal embankments of a total length of 3,500 km. With the acquisition of estates in 1955, the responsibility for maintaining these embankments devolved on the Government. However, mere maintenance of these embankments will not provide a satisfactory solution on a long term basis, because of the inherent defects like improper alignment, insufficiency in height and cross sections, etc. as well as the infertile soil. Keeping a constant watch over the entire length of the embankments is also

a problem. Lack of funds has been one of the principal constraints in the proper maintenance and improvement of the embankments.

59.5.8 The entire area faces the problem of salinity, water-logging and drainage. In the absence of upland water supplies, the area is exposed to tidal action making the water highly brackish. Under the existing practice, drainage is effected through a large number of sluices located along the embankments to serve small blocks into which the area is divided by innumerable creeks. These are, however, not adequate for proper drainage resulting in water-logging of the land and making it saline and unable to bear more than one crop.

59.5.9 The availability of fresh water for both domestic and agricultural uses is a major problem of the Sundarban area. The groundwater resources are said to be available at a depth of 200 to 300 metres below the ground level. Thus the real problems in the Sundarban area are inadequate security against tides and waves resulting in occasional loss of crop, life and property, difficulties in the maintenance of large embankments, lack of proper drainage facilities and absence of reasonable sources of fresh water. These deficiencies along with lack of communication and education have prevented the development of the area of its potentialities.

59.5.10 In 1973, the Government of West Bengal set up the Sundarban Development Board for ensuring comprehensive, functional and integrated multilevel planning and accelerated development of the region. The Board has adopted a comprehensive Rs. 86 crore interim plan of development of the Sundarban area prepared by the Calcutta Metropolitan Planning Organisation (CMPO) largely based on the Sundarban Delta Project drawn up earlier by the River Research Institute of the Government of West Bengal. The interim plan highlights the following strategy of development:

"Remove basic development constraints *i.e.*, flood hazard and saline intrusion by adequate control measures.

Massive programme for agricultural productivity and crop diversification. Utilisation of production potential of commercial crops.

Organised and efficient utilisation of natural resources of the region, *viz.*, fisheries and forest, scenic beauty of natural landscape, sanctuaries, etc. for promotion of tourism.

Development of focal points of the region which would act as growth-poles in the region supporting economic and social development programmes for the region. These

growth-poles would initiate in an organised way industrial-urbanisation of the region. Provide adequate infrastructure to support the development programmes, *viz.*, construction of arterial transportation linkages cover the existing gaps and improve the operational efficiency of existing network and supply of power to the centres of growth on priority basis. Provide basic utilities *viz.*, health, education etc.

Education programme should be related to specific requirements of the region.

Organisation of suitable institutions which would be capable of implementing massive and comprehensive development programmes."[1]

The interim plan recognises that the economic development of the region depends substantially on the improvement and growth of agriculture as the scope for industrialisation is limited. The efforts of the State Government have so far been directed towards implementing small schemes of immediate nature. The substantive part of the long term plan of development has not yet been taken up for lack of funds.

Approach to Development

59.5.11 The basic resources in the Sundarban area are land and water. These resources are to be improved to lay the foundations of a programme of crop production and fisheries on scientific basis. Production and improvement of livestock need to be planned. Forests have also to be improved to yield better returns. However, to utilise the potential, it will be necessary to improve the communications and other amenities including the supply of potable water. An integrated development programme, covering all these aspects is, therefore, called for.

59.5.12 Land has to be suitably raised and protected from the ingress of saline water through tidal waves and has to be properly drained so that it does not remain saline or waterlogged. The availability of fresh water can be improved by impounding rainwater, diversion from the main Hooghly river, development of ground water and utilisation of treated sewage water from urban areas. All these sources would have to be suitably developed and the water stored and efficiently utilised for agricultural and drinking

[1] 1973. Sundarban Region Interim Development Plan: 7. Calcutta. Sundarban Development Board, Development and Planning Department, Government of West Bengal.

purposes. In view of the limitation of fresh water, industrial development has to be restricted to such agro-based industries which do not aggravate the problem.

59.5.13 The River Research Institute of the Government of West Bengal in collaboration with the Netherlands Engineering Consultants (NEDECO) prepared a feasibility report which envisaged the construction of closure dams across the main river channels in three phases, namely, closure of Saptamukhi river in Phase I, closure of Gobadia and Calchara in Phase II and closure of the Thakuran system in Phase III. The River Research Institute has prepared a detailed project report, namely, Sundarban Delta Project, for the first phase. According to this project, which has been adopted by the Sundarban Development Board in its interim Plan, three major closure dams have been proposed to be built along with the construction of minor closures, marginal dykes and master sluices. This project shows how the area could be protected and developed in a phased manner. The basic strategy adopted in the plan is to construct a barrage across the main river channel so that the intrusion of sea water and silt with the tidal flow can be controlled. The barrage would enable the formation of a reservoir upstream and would allow storing fresh water during the monsoon The embankments would have to be scientifically realigned so as to reduce their length. They would have to be constructed with proper design so that they could withstand and contain the impact of tidal waves and the flooding due to heavy rainfall.

59.5.14 The drainage of the land which would be earmarked for cultivation should be provided adequately with sluices. The sluices could be so designed as to act as inlets for allowing silt laden water into the agricultural land for raising its level and letting out the silt free water after some time. This process will gradually raise the agricultural land and has to be carried out in a phased manner over a number of years so that there is minimum loss of crops to the farmers

59.5.15 There is an urgent need to improve the embankments for the protection of the agricultural lands. The embankments should be wide enough to allow plantation of coconut and also small huts for the people to stay who could look after the coconut plantations. Such a practice is being followed in Kerala. Coconut plantations while providing strength to the embankments also give good income to the grower. The coconut plantations could best be looked after by individuals who can be allotted certain reaches of the embankments and will be responsible for maintenance of the same and also derive benefit therefrom.

59.5.16 Sundarban is a high rainfall area and the main crop taken is aman paddy. On relatively high patches of the land area, pulses, cotton, tobacco and vegetables are also grown. The productivity in paddy lands is high but it can be further improved if crucial inputs like fertiliser and improved seeds are used, proper agronomic practices are employed and the fields are properly drained and protected. Once the agricultural lands are protected and developed as envisaged in the project report, it should be possible to significantly raise the production of salt resistant varieties of crops in this area.

59.5.17 Some low lands within the project area could be earmarked for fresh water fishery. The land use pattern, defining separately areas for raising crops and developing fisheries, will have to be determined after a proper survey. The pattern, once determined, should be adhered to so that litigation and uncertainty, which hamper production, are avoided.

Fisheries

59.5.18 The estuarine system comprising a complex of Hooghly, Thakuran, Saptamukhi and Matla constitutes an important source of brackishwater capture fishery. In addition, the brackishwater culture (*bhasabhada*) fishery is undertaken in reclaimed impoundments (*bheris*) occupying an area of about 8,000 ha. Since out of the reclaimed area, a large proportion has been devoted to cultivation, the brackishwater culture occupies a small area in the land utilisation pattern in the Sundarban.

59.5.19 With such rich water resources in the proximity of Calcutta, which is the biggest fish market in the country and which experiences continued short supplies, the Sundarban has been the subject of considerable study for finding out the potential of fishery development. For expanding the base of production of capture fishery, an FAO expert, after making a special study of the Sundarban in 1954, recommended the use of mechanised boats worthy enough to permit continued fishing operations throughout the monsoon season, with new and improved types of fishing gear, after conducting experimental fishing. The State Government, in implementing the recommendations, had made repeated attempts directly, and indirectly through the fisheries cooperative and private organisations by giving necessary assistance under its fishery development schemes. But these had not yielded satisfactory results mainly due to the non-availability of adequate quantities of fish which made the expansion of the capture fishery uneconomical. It has been reported that the estuarine resources in the Sundarban has progress-

ively declined in their fisheries due to indiscriminate fishing which has brought about a gradual destruction of the brood fish as well as the recruitment of the young ones. This, along with the fact that most of the estuaries had been rendered moribund or semi-moribund because of continuous siltation, has substantially reduced the ingress of fish, both adult and young ones. Consequently, even the *bhasa-bhada* fishery which had merely involved trapping-cum-holding of young fish and prawns has become unproductive in most of the *bheris*. However, the experimental cultures of prawns and mullets by selective stocking undertaken by Central Inland Fisheries Research Institute (CIFRI) at Kakdwip brackishwater fish farms in the Sundarban have demonstrated the economic feasibility of making use of credit facilities from financial institutions for expanding the base of brackishwater culture in this region. The returns from fish culture can be supplemented with an additional income from coconut plantations on the embankments. We have referred to this aspect in Chapter 37 on Inland Fisheries and Aquaculture.

59.5.20 The future developments in the brackishwater fishery of Sundarban, both capture and culture, have to be considered in the light of the implementation of the proposed Sundarban Delta Project in Phases I, II and III which would considerably affect these fisheries. However, the Project could lead to increased production of freshwater fish by profitably utilising the proposed freshwater reservoirs and by converting the existing beels, tanks and low lying areas into more productive units. Due importance should, therefore, be given to the utilisation of suitable portions of land in the command area of the reservoirs for the development of freshwater fisheries to compensate the loss of brackishwater fishery in the area. If need be, there should be appropriate legislation to ensure the utilisation of the earmarked land area for fishery development.

59.5.21 The CIFRI had undertaken detailed studies of the availability of the seedfish and seedprawn in the complex of the estuaries of the Sundarban. The studies had indicated the possibility of expanding the base of brackishwater culture in suitable areas of Sundarban and utilising the natural resources for seedfish and seedprawns. There are also possibilities of increasing brackishwater seed supplies in the near future by undertaking artificial breeding and producing the seed under captivity conditions. However, considering that almost the entire area of Sundarban outside the Sundarban Delta Project area would be vested with the Forest Department as reserved forests, there would be no other alternative but to make use of some of the suitable forest swamps for brackishwater farming units. The

extent of forest area to be so utilised will depend upon the availability of brackishwater seed from the estuaries. The success of this programme may enable the expansion of brackishwater culture based on seed fish production under captivity conditions.

Forestry

59.5.22 The forests in the Sundarban are now confined to the extreme south-eastern part of the delta. These tidal forests are criss-crossed by innumerable waterways some of them like big rivers and others small creeks. Characteristic genera of the mangroves found in the forests are *Bruguiera, Rhizophora, Ceriops, Excoecaria, Carapa, Sonneratia* and *Avicenna. Sundri* (*Heritiera minor*) is almost rare, though the tract owes its name to this species. The main products from the forests are *goran* (*Cerops roxburghii*) used extensively as fuel in the Calcutta market. Tannin is also extracted from its barks in a few factories near Calcutta. It is used partly in the footwear industry and partly for dyeing fishing nets, etc. The other important species are *genwa* (*E. agallocha*) used extensively for making pencil slats. Construction timber like passur (*Carapa sp.*) and Keora (*S. apetala*) are also found in small quantities. The other important economic products extensively marketed in Calcutta are honey, wax and fish.

59.5.23 Due to the high salinity of the water, regeneration of the desired species does not occur to any appreciable extent. The *goran* area, after felling, generally turns into a bushy type, locally known as *jhampti goran.* Because of the tidal action, the seeds are carried over long distances, and many of the species regenerate themselves in new *chars,* which are constantly under formation. In the new *chars,* all the stages of succession starts over again, but it found that *genwa* is an early coloniser. Apart from the natural causes, demand in comparatively more accessible areas is resulting in the overexploitation and relative scarcity of some economic species like *genwa.*

59.5.24 Some of the species have got better economic possibilities. For instance, *genwa* is suitable for pulping. Recent studies in Japan have shown that *jhampi goran* would also be suitable for pulping. Another small tree, *hantal* (*Phoenix sp.*) can produce good fibre from its leaves, and the stalks can be utilised for pulping. The main difficulties would be an assured supply at an economic rate. Investigations are required in this respect. Extensive industrial research and proper feasibility studies for the establishment of industries in urban centres are called for.

59.5.25 So far, no satisfactory technique has been evolved for

ensuring natural or artificial regeneration. Research in this direction should be intensified. Production of forest materials may perhaps increase, if works according to the prescriptions of the prevalent working schemes is enforced in the relatively inaccessible areas towards the sea face. There is already an extensive organisation of the Forest Department to collect and market honey after filtration. The Bengal Tiger which is also found in the Sundarban is in danger of extinction and needs immediate measures for its preservation. Sundarban is one of the nine areas in this country where 'Project Tiger' has been initiated since 1973-74 to ensure the maintenance of a viable population of the tiger in India and to preserve, for all times, these areas for the benefit, education and enjoyment of future generation. The Project would also help in promoting tourism in the Sundarban and earn foreign exchange.

Animal Husbandry

59.5.26 According to the livestock data of 1955-56, there were more than 5 lakh cattle and over 6.5 lakh poultry in the Sundarban region. Improvement of cattle for both milk and draught power is necessary. The clay content of the soil being high, considerable draught power is required for cultivation. The area also offers scope for development of poultry and ducks. Production of milk, eggs and birds can find ready market in the metropolitan area of Calcutta while improving the intake of these products within the region itself. For this, arrangements will have to be made for transportation to the Greater Calcutta area. The Department of Animal Husbandry of West Bengal has prepared certain schemes for the development of poultry and is organising animal welfare activities.

Communications and Transport

59.5.27 An overall development of the region would need considerable improvement in communications and transport facilities. River transport has to be an integral part of the economy of the area. Improvement of waterways and navigation facilities, construction of jetties and augmentation of the river fleet are measures which will have to be taken along with the development of the region. The West Bengal Government has also prepared proposals for the extension of the rail link further south to connect important centres of growth. In assessing the feasibility of this proposal it is necessary not only to consider the economic aspects but also the social returns. Improvement of major roads and construction of link roads would be

required to support the development of the area

Electrification

59.5.28 The West Bengal State Electricity Board formulated a scheme for electrification in the Sundarban region. The extension of the State grid to this region would be justified as electricity will be required to run irrigation as well as drainage pumps, milk chilling and processing centres, ice plant, cold storages, etc. In addition, it can support the development of industries based on local raw materials. The State Government is exploring the possibilities of utilising the tidal waves for generating electricity. The feasibility of this project has, however, not yet been firmly established.

6 SMALL AND MARGINAL FARMERS AND AGRICULTURAL LABOURERS

59.6.1 We have discussed the problems of small farmers and agricultural labourers in several of our Interim Reports as well as in this Report. In Chapter 6 on Growth with Social Justice, we have stressed that considerations of both social, justice and sustained growth require special attention to the vast numbers of small and marginal farmers and agricultural labourers. We have dealt with the basic principles for the development of small and marginal farmers and agricultural labourers in our Interim Report on Reorientation of Programmes of Small Farmers and Marginal Farmers and Agricultural Labourers Development Agencies.* We have given our recommendations on credit structure and subsidiary occupations for small and marginal farmers and agricultural labourers in other Interim Reports. In the following paragraphs we shall only refer to the basic principles.

59.6.2 In the Interim Report on SMFDA we have suggested that in the programme areas, an area development approach should be adopted. Both small farmer and marginal farmer and agricultural labour groups should be covered in each programme area. In order to adopt this approach, it would be necessary to do away with the distinction between the two programmes of Small Farmers Development Agency (SFDA) and Marginal Farmers and Agricultural Labourers Development Agency (MFALDA). The main accent of the programme should be on improving the capability of the farmers for increasing crop production and thereby improving their income. For this extension of irrigation, wherever possible, land development and

*referred to hereafter in this Section as Interim Report on SMFDA.

the adoption of the improved agronomic practices have been suggested by us. The coverage of the programme should be extended as much as possible to rainfed areas where the State should take up substantial works of water harvesting, soil conservation and land shaping on an area basis. Since the farmers with very small land holdings, particularly in rainfed areas, may not be able to derive sufficient income from crop production, which would take them above the poverty level, we have suggested the superimposition of subsidiary occupation programmes in those programme districts which coincide with those suggested for special subsidiary occupation programmes in our Interim Reports on the subjects.

59.6.3 During the Fourth Five Year Plan, 46 SFDA projects and 41 MFALDA projects were started. Each SFDA is expected to cover 50,000 small and marginal farmers and each MFALDA about 15,000 marginal farmers and 5,000 agricultural labourers. In our Interim Report, we have recommended that the programme should be extended to 160 agency units in all, each unit covering preferably the area of a district and an average of 70,000 families. This way about 11 million families can be covered through the special programme of SFDA.

59.6.4 Our recommendations have since been accepted by the Government of India and the distinction between the SFDA and MFALDA has been abolished. All programme districts now have a combined programme. We understand that additional SFDA districts have also been finalised in consultation with the State Governments to take the total to 160 units.

59.6.5 We have recommended that the special assistance programme for small farmers should be limited to those having land holdings up to two hectares and for marginal farmers to those having land holdings up to one hectare, so that the programme is concentrated among the weakest and is not allowed to get diluted by raising the limits, as has been done in some States. In irrigated areas it would be reasonable to adopt lower limits as holdings of smaller size can be made viable and can yield substantial income. This recommendation has been accepted by the Government of India, and the beneficiaries of the programme are being identified on the basis of this definition. In its instructions to the States, it has indicated that in the case of Class I irrigated lands as defined in the land ceiling legislations, the limit will be one hectare for small farmers and half hectare for marginal farmers.

59.6.6 We have also indicated that in extending the SFDA programme, emphasis should be on the selection of areas having fairly assured rainfall. We have felt that in such areas appropriate mea-

sures can result in substantial improvement in the income levels. We have suggested that the programme need not be extended to drought affected districts in which a separate programme (DPAP) has been taken up. We have seen in Section 4 of this chapter that the programme and priorities necessary for drought affected areas are of a different nature. At present, the definition adopted for identifying participant small and marginal farmers in DPAP areas for purposes of special assistance is the same as that in SFDA areas. Some State Governments, however, have mentioned to us that this definition is not appropriate for DPAP areas. It has been pointed out that in these areas holdings of even larger size do not assure sufficient income and the condition of the farmers with these holdings is no better. It has, therefore, been suggested that for the purpose of special assistance, the definition of small and marginal farmers in these areas should be modified to include farmers with larger holdings.

59.6.7 The problem arises particularly in those districts in Rajasthan and Gujarat which are in the desert area. In these areas the average size of holding is larger and the number of households having holdings below 2 hectares may be relatively small. The purpose of providing special assistance is to help develop the poorer among the rural society. The objective will not be served, if by adopting a definition a large number of farmers in these areas, who are poor but have land holdings higher than the defined limit, are kept out of the purview of the special treatment. It is, therefore, necessary to adopt a different principle which would take into account the special circumstances in these areas. We recommend that the principle should be to cover a certain minimum number of relatively poor cultivators for special assistance. Where the number of cultivating households having holdings of two hectares and below is less than the minimum, the limit of land holdings should be raised to bring sufficient number up to the minimum under the programme of special assistance. Where the number of such households having holdings of two hectares and below is larger than the minimum, as is the case with many DPAP districts the present definition should apply.

59.6.8 In our Interim Report, we have suggested that 70,000 families should be covered in each project area, and resources were to be made available for their development. But the situation is different in DPAP areas where the resources placed at the disposal of each project are for the development of the entire area and the special assistance programme is only a part of the project's budget. With the funds available it may not be possible for the project to

accommodate a very large number for special help. But it is necessary to cover at least a minimum number in each project. In our view, this minimum could be 20,000 cultivating and agricultural labour households in each project area.

7 SUMMARY OF RECOMMENDATIONS

59.7.1 The following is a summary of the important recommendations made in this chapter:

1. An integrated area development should be the basic approach to be adopted for the development of backward and underdeveloped regions in the country.

(Paragraph 59.1.4)

Hill Areas—Himalayan Region

2. Resource development programmes in the hill areas should be adequately supported by essential infrastructural facilities and minimum social development programmes. Generation of indoor employment opportunities during winter months should receive high priority.

(Paragraph 59.2.12)

3. Due note should be taken of the economic constraints of the environments and productivity should be maximised directly by crop production and supplemented by suitable subsidiary occupations which the environment can support.

(Paragraph 59.2.13)

4. A change in the pattern of production to optimise economic return should be followed by arrangements to provide foodgrains through controlled channels from other parts of the country as a national responsibility.

(Paragraph 59.2.14)

5. Soil and moisture conservation measures should be an important strategy of development and include complete land management to ensure efficient use of soil. Production of field crops should preferably be confined to such areas where soil erosion is minimum and can be checked effectively.

(Paragraph 59.2.17)

6. Shifting cultivation in the north eastern region should be controlled and ecological balance restored by encouraging permanent cultivation and tree growth.

(Paragraph 59.2.19)

7. Irrigation should be developed through minor lift schemes and groundwater utilisation, wherever feasible. Steps should be taken to ensure that all the farmers within the command of a kulh receive a share of its water.

(Paragraphs 59.2.20, 59.2.21 and 59.2.22)

8. Power development should be an integral part of the hill area development programme.

(Paragraph 59.2.24)

9. Production in the north eastern region should preferably be planned for food self-sufficiency because of transport and communication difficulties.

(Paragraph 59.2.28)

10. In order to improve the hill economy as well as for soil conservation, greater emphasis on horticultural development is necessary.

(Paragraph 59.2.35)

11. Production of many types of cash crops like soyabean, sunflower, mushroom, hop, many temperate climate vegetables and the production of seed of many temperate vegetables like cauliflower, beetroot and sugarbeet which do not produce seed in the plains need to be popularised in the northern hills.

(Paragraph 59.2.38)

12. In the north eastern region plantation crops like tea, coffee and rubber should be encouraged in suitable areas.

(Paragraph 59.2.44)

13. Production and marketing of floriculture should be organised and expanded. Research needs to be strengthened for the improvement of indigenous flowers including orchids on the lines indicated in Chapter 23. Orchid senctuaries should be created in all the natural habitats and the exploitation regulated. Hill areas can specialise in aromatic and medicinal plants.

(Paragraph 59.2.45)

14. The strategy of development in the hill areas should include a well-laid out livestock programme and measures should be taken for the improvement of livestock for better yields and higher income to the farmers.

(Paragraph 59.2.46)

15. The productive animals of Gujjars should be provided grazing facilities in the forests but under strict control as explained in the text. The milk plants at Almora and Haldwani should make suitable arrangements for the collection of milk from them.

(Paragraph 59.2.49)

16. Milk production programme should be organised in selected

hill districts by taking up intensive programmes of crossbreeding of local cattle with exotic breeds. The crossbreeding programme should be supported by animal health cover to ensure its success. In the Himalayan region even purebred exotic cattle can be raised provided adequate nutrition and health cover are ensured.

(Paragraphs 59.2.50 and 59.2.52)

17. A programme of development of pastures with promising varieties of grasses and fodder should be taken up in each of the hill States simultaneously with the introduction of measures to improve the cattle.

(Paragraphs 59.2.50 and 59.2.52)

18. Sheep development, for which there is scope in the western and central Himalayas, should be organised in selected hill districts on the lines recommended in the Interim Report on sheep, poultry and pig production.

(Paragraph 59.2.54)

19. For the maintenance of sheep, pastures should be developed and grazing controlled according to their carrying capacity. More grazing areas in the hills should be identified, seeded fertilised and brought in rotation.

(Paragraphs 59.2.55 and 59.2.56)

20. While the number of goats in the hills should be contained, their quality must be improved to get more milk and meat.

(Paragraph 59.2.57)

21. Special programmes should be taken up for increasing the production of pashmina in Ladakh and mohair in the hilly areas of Uttar Pradesh and Himachal Pradesh.

(Paragraph 59.2.57)

22. An integral development of piggery should be undertaken in the north eastern region as recommended in the Interim Report on Some Aspects of Livestock Production in the North Eastern States. In other regions of the Himalayan hills piggery development should be on the lines recommended in the Interim Report on poultry, sheep and pig production.

(Paragraph 59.2.59)

23. Poultry in the hill areas should be improved through crossbreeding.

(Paragraph 59.2.60)

24. In high altitudes cold water fisheries should be developed both for commercial and sport purposes. In low regions of the hills, many ponds, tanks and *beels* will have to be suitable reclaimed for developing culture fisheries of major carps with emphasis on better pisciculture practices. The collection of data in respect of

ecological and biological conditions, hydrographic surveys of water areas suitable for pisciculture and the training of officers and fishermen in the techniques of cold water fisheries should be organised.

(Paragraphs 59.2.61 and 59.2.62)

25. There is need for an aggressive programme of production forestry in the hill regions and opening up inaccessible forests as recommended in the Interim Report on Production Forestry—Man-made Forests.

(Paragraph 59.2.64)

26. In improving the quality of the forests, the improvement of natural meadows should become a specific objective of the working plan of the Forest Departments and it should be linked integrally with the requirements of an intensive livestock development in the hill areas.

(Paragraph 59.2.64)

27. The scope for developing different kinds of sericulture like mulbery silk, *tasar* and *muga* in the hill areas should be exploited on the lines indicated in Chapter 26 on Sericulture. The possibilities of taking up *tasar* culture throughout the oak belt of the Himalayas should be explored.

(Paragraph 59.2.65)

28. The scope for improving honey yields in the hills through organised apiculture as recommended in Chapter 27 on Apiculture should be exploited and a detailed survey of the vegetation of forests with regard to the floristic composition undertaken in all the hill areas.

(Paragraph 59.2.66)

29. The production of fruits and vegetables should be in line with the pattern of internal and export demands. A systematic changeover to different varieties which will be best for marketing will require continuous assesment for planning production and marketing in future.

(Paragraphs 59.2.67, 59.2.68 and 59.2.69)

30. Detailed studies should be made of the problems of cold storages at the producing and consumer centres. The development of refrigerated transportation facilities should be given attention.

(Paragraph 59.2.71)

31. There should be an integrated approach linking up production and processing and the processing facilities developed accordingly.

(Paragraph 59.2.72)

32. As livestock production improves, appropriate arrangements for collection, storage, processing and marketing of the products

should be organised.

(Paragraph 59.2.73)

33. The development of cottage wool industry should receive encouragement. Special attention should be paid to the development of home industries including rural crafts to provide indoor employment especially in high altitude area where in winter months no outdoor work is possible.

(Paragraph 59.2.73)

34. Apart from locating wood-based industries, arrangements should be made for the processing of various minor forest produce near the sources of raw material and their proper storage and timely transportation for marketing.

(Paragraph 59.2.73)

35. Construction of feeder roads linking production centres and villages with the main roads should be given a high priority. The possibilities of ropeways should be explored in difficult areas.

(Paragraph 59.2.74)

36. Extension education should form part of the integrated programme of development and the technical staff of all categories should be trained and oriented to the special problems of hill areas.

(Paragraph 59.2.78)

Hill Areas—Southern Hills

37. In the strategy of development of hill areas in the Western Ghats, the order of priority should be forestry, plantation and livestock development.

(Paragraph 59.2.86)

38. An aggressive programme of production forestry should be taken up in these areas on the lines recommended in the Interim Report on Production Forestry—Man-made Forests, Intensive fodder development should also be undertaken to support a commercially viable animal husbandry programme.

(Paragraphs 59.2.87 and 59.2.88)

39. In the upper reaches of the southern hills, the accent should be on plantation crops and wherever irrigation is available, the area under plantation should be extended in preference to other crops.

(Paragraph 59.2.89)

40. Intensive work should be done to improve land utilisation under plantations, wherever possible. Low yielding plantation crops, particularly in small plantations, should be replaced by plantation crops with higher yield potential. The anomalies resulting from

raising unsuitable varieties or from wrong siting of plantations should be rectified. In Malnad of Karnataka, an area programme could be developed for coffee cultivation. The possibility of extending pepper and rubber cultivation to suitable areas should be explored. The area under cashew plantations should be increased; cashew plantations in Kerala should be shifted from unproductive to more promising areas.

(Paragraphs 59.2.90 and 59.2.91)

41. Suitable programmes should be taken up for developing milksheds in selected hill districts on the lines recommended in our Interim Report on Milk Production. Production and rearing of crossbred heifers upto the age of weaning for supply to the milkshed areas in the plains should be encouraged.

(Paragraph 59.2.94)

42. Sheep development should be taken up only in selected districts where rainfall is not heavy. In the identified districts, pasture development at appropriate locations should be undertaken for promoting sheep development. Poultry and pig production should also be developed in the districts identified for the purpose.

(Paragraphs 59.2.95 and 59.2.96)

Tribal Areas

43. In designing programmes, due note should be taken of the capacity of the tribals at their present level of development to absorb and practise improved methods of production and management. Adjustments in their cultural and traditional life should be gradual.

(Paragraphs 59.3.24 and 59.3.25)

44. In formulating programmes for tribal development a distinction should be made between areas which are easily accessible and already exposed to market economy and areas which are not easily accessible, lack market economy and have yet to be opened up.

(Paragraph 59.3.25)

45. The existing laws and rules should be reviewed to give adequate protection to the tribals against land alienation. Immediate action should be taken to prepare reasonably authentic land records and give rights to the tribals.

(Paragraphs 59.3.26 and 59.3.27)

46. Tribals having cultivable lands should be helped with an intensive programme of crop production. In the initial stages, production of food crops should be emphasised particularly in the interior areas. In areas which are close to the markets, production of cash crops could be emphasised depending on marketing possibilities.

(Paragraph 59.3.28)

47. The tribals practising shiftng cultivation should be weaned away from it and permanently settled. Past deficiencies in land colonisation should be taken note of in developing the settlement programme.

(Paragraph 59.3.30)

48. Debt redemption should be a priority programme. As a follow-up of the moratorium declared on existing debts of the weaker sections, the project authorities should set up itinerant courts for settling disputes regarding both debts and land rights on the spot. Debts which are not liquidated should be paid off by the project authorities from a suitable fund and treated as an interest free loan to be recovered from the tribal family over a reasonable period. The recovery should be through the agency of cooperatives.

(Paragraph 59.3.32)

49. Arrangements should be made for the rehabilitation of labourers freed from their bondage including settling them on land.

(Paragraph 59.3.33)

50. As stressed in Chapter 41 on Forest Policy, there is need for developing a symbiotic relationship between the forest and the tribals.

(Paragraph 59.3.34)

51. In forest areas where intensive harvesting of forest resources is being undertaken, the socio-economic impact on the tribal economy should be kept in view.

(Paragraph 59.3.37)

52. The Forest Department should be fully involved in the planning and execution of tribal development programmes. The Forest Department should establish processing units or encourage cooperatives to do the same in the vicinity of forests. The tribals should be trained for employment in these units.

(Paragraphs 59.3.38 and 59.3.51)

53. In areas which have a market economy, commercialisation of livestock production can be attempted based on adequate measures for breed improvement, health cover and adequate processing and marketing arrangements.

(Paragraph 59.3.39)

54. Tribal skills in traditional handicrafts and village industries should be identified and developed through necessary training.

(Paragraph 59.3.40)

55. Construction of arterial roads and link roads and opening up interior forest areas should constitute an important programme for tribal area development.

(Paragraph 59.3.41)

56. Officers fully committed to the welfare of tribal population should be posted to these areas and adequately trained for work by giving additional incentives for working in difficult areas. There should be a State level committee to ensure multi-disciplinary support and to monitor and evaluate programme performance.

(Paragraphs 59.3.43 and 59.3.51)

57. While the present approach to the provision of credit, marketing and other services through a unified credit-*cum*-marketing organisation is commended, the societies at the primary level should, for the time being, be officially sponsored and managed.

(Paragraph 59.3.50)

Drought Prone Areas

58. All the factors taken into account and those recommended by the Irrigation Commission need to be considered before an area is regarded as drought prone and hence requiring special assistance. Since the factors are continuously changing, the existing coverage of the special programme of DPAP should be reviewed from time to time.

(Paragraphs 59.4 23 and 59.4.25)

59. There should be comprehensive 15 year integrated programme for the economic development of the desert area paying simultaneous attention to the development of water resources, forestry, animal husbandry and pastures.

(Paragraphs 59.4.26 and 59.4.27)

60. The Rajasthan Canal Project should be recast to take water deeper into the desert with a view to bringing in more areas under irrigation and extending the benefit to a larger section of the community.

(Paragraph 59.4.27)

61. To maximise the utilisation of the scanty rain water, suitable water conservation techniques should be adopted on a larger scale.

(Paragraph 59.4.28)

62. As water becomes available in the command area of a canal, a large-scale programme of tree plantation, raising of shelter-belts and-wind-breaks and rejuvenation of vegetal cover should be undertaken.

(Paragraph 59.4.29)

63. The economy of the desert area should continue to be mainly animal husbandry oriented. A major thrust of the programme should be to reduce the nomadism among cattle breeders and sheep owners.

(Paragraph 59.4.30)

64. The number of animals in the resert area should be contained and breeding programmes, through provision of facilities and services, should be designed to improve the quality and productivity of cattle and sheep.

(Paragraph 59.4.30)

65. In the canal command areas, dairy development through setting up of additional milk collection and milk chilling centres and milk products factories should be undertaken.

(Paragraph 59.4.30)

66. In the arid areas outside the canal command, the major emphasis should be on sheep development. Apart from improving the quality of sheep, wool shearing and grading centres should be established and arrangements made for wool and meat marketing. Processing of the wool locally should be encouraged to create more employment.

(Paragraph 59.4.31)

67. Attention should be paid to large-scale development of pastures, regulated grazing to prevent over-use and creation of grass reserves and fodder banks for supply of hay in scarcity years. In canal command areas, the cropping pattern should be adjusted to bring 30 per cent of the area under fodder crops in mixed farming.

(Paragraph 59.4.32)

68. The entire programme should be phased over three Plan periods and adequate organisational support arranged for timely and effective implementation.

(Paragraph 59.4.33)

69. In drought prone areas, improvement of existing irrigation works and completion of the projects under consideration should be accorded high priority.

(Paragraph 59.4.35)

70. Investigations shoud be made into further possibilities of irrigation in these areas by both surface and ground water and irrigation developed, wherever feasible, on a priority basis. The special programme of DPAP need not be continued in areas where irrigation improves substantially.

(Paragraphs 59.4.36 and 59.4.37)

71. The diversion of water from other parts of the basin or other river basins to supplement local availability and give a minimum support to drought affected districts should be viewed as a national requirement.

(Paragraph 59.4.40)

72. The limited quantity of available groundwater should be

equitably distributed by operating the irrigation source on cooperative or community basis.

(Paragraph 59.4.42)

73. Water being scarce, the approach should be to maximise the return per unit quantity of water used by taking crops requiring less water or by growing fodder in milkshed areas.

(Paragraph 59.4.43)

74. Land management should be on complete watershed basis; and the vegetative cover should be improved in the entire catchment area including hill slopes and uplands for soil and moisture conservation

(Paragraphs 59.4.44 and 59.4.45)

75. Wherever irrigation facilities do not exist, the land use pattern should aim at reducing the area under arable cropping and increasing it under permanent vegetation.

(Paragraph 59.4.47)

76. An intensive programme of mixed forestry should be undertaken in the drought prone areas as a soil and moisture conservation measure and for providing fuelwood, timber and fodder. Where available lands are not fit for cultivation, pasture development should be taken up.

(Paragraphs 59.4.47 and 59.4.48)

77. Where the present centres set up under the All India Coordinated Research Projects for Dryland Farming do not cover some types of soils and pattern of rainfall, additional centres should be opened for formulating the cropping patterns appropriate to such areas.

(Paragraph 59.4.50)

78. Since the rearing of livestock provides a much more stable economic base than crop production in the drought prone areas, due emphasis should be placed on animal husbandry programme in the development strategy.

(Paragraph 59.4.52)

79. Where irrigation is available and fodder production possible, a planned cattle development programme should be undertaken for milk and dairying if such area is within a milkshed.

(Paragraph 59.4.53)

80. Programmes for the development of sheep, poultry and pig production should be undertaken in the identified districts.

(Paragraph 59.4.54)

81. The scope for processing acivity should be assessed in each area and processing units located where appropriate. Marketing

arrangements should be planned for processed and semi-processed products.

(Paragraph 59.4.56)

Cold arid and semiarid areas

82. A comprehensive research should be taken up early in the cold arid and semiarid areas by the ICAR to provide the basis for formulating a viable economic development programme for these areas.

(Paragraph 59.4.61)

Rann of Kutch

83. The feasibility of bringing the Narmada waters to the Little Rann to control salinity for brackishwater fish culture should be considered.

(Paragraph 59.5.4)

84. A study in depth should be made of the possibility of fish culture in the Little Rann. To start with, pre-investment survey in selected areas should be undertaken.

(Paragraph 59.5.5)

Sundarban

85. An integrated development programme simultaneously covering scientific crop production, fisheries, animal husbandry and forestry and providing for improvements in infrastructural facilities including communications and supply of potable water will be necessary for the development of the Sundarban area.

(Paragraph 59.5.11)

86. For the protection and development of land and for increasing the availability of fresh water for agricultural and drinking purposes, engineering and other measures, as envisaged both in the Interim Plan of Development of the Sundarban and in the Sundarban Delta Project and as explained in the text of this Chapter should be taken. In view of the limitation of fresh water, industrial development should be restricted to such agro-based industries as do not aggravate the problem.

(Paragraphs 59.5.12 to 59.5.15)

87. The land use pattern defining areas for raising crops and developing fisheries should be determined after a proper survey and adhered to.

(Paragraph 57.5.17)

88. Due importance should be given to the utilisation of suitable portions of land in the command areas of the proposed reservoirs for the development of freshwater fisheries to compensate the loss of brackishwater fishery in the Delta Project area. If need be, there should be appropriate legislation to ensure the utilisation of earmarked land area for fishery development. Brackishwater fish farming units should be located in some of the suitable forest swamps outside the Project area.

(Paragraph 59.5.20)

89. Investigations should be made into the problem of an assured supply, at an economic rate, of wood suitable for pulping. Extensive industrial research and feasibility studies for the establishment of industries in urban areas should be made.

(Paragraph 59.5.24)

90. Research to evolve techniques for ensuring natural or artificial regeneration of forests should be intensified.

(Paragraph 59.5.25)

91. The development of livestock leading to increased production of milk, egg and meat should be supported by adequate transport and marketing arrangements.

(Paragraph 59.5.26)

92. As an integral part of the overall development of the region, river, road and rail transport facilities should be considerably improved. Electrification should be extended to the area to support development.

(Paragraphs 59.5.27 and 59.5.28)

Small and Marginal Farmers
and Agricultural Labourers

93. An area development approach should be adopted by covering both small farmers and marginal farmers in each programme area and the distinction between the two programmes of SFDA and MFALDA should be done away with.

(Paragraph 59.6.2)

94. The main accent of the SFDA programme should be on improving the capability of the farmers for increasing crop production.

(Paragraph 59.6.2)

95. The coverage of the programme should be extended as much as possible to rainfed areas having fairly assured rainfall, where the State should take up substantial works of water harvesting, soil conservation and land shaping on area basis.

(Paragraph 59.6.2)

96. Since farmers with very small land holdings may not be able to derive sufficient income from crop production, subsidiary occupation programmes should be superimposed as separate programmes in those programme districts which coincide with the districts identified for special subsidiary occupation programme in different Interim Reports on the subjects.

(Paragraph 59.6.2)

97. The SFDA programme should be extended to 160 agency units in all, each unit covering preferably the area of a district and an average of 70,000 families.

(Paragraph 59.6.3)

98. Small farmers and marginal farmers with landholdings below 2 hectares and one hectare respectively should be eligible for special assistance under the SFDA programme. In irrigated areas, a lower limit could be set.

(Paragraph 59.6.5)

99. The SFDA programme need not be extended to drought affected districts in which a separate programme (DPAP) has been taken up.

(Paragraph 59.6.6)

100. In view of the special circumstances in the desert districts, the limit of land holding for eligibility for special assistance should be kept flexible in order to bring a certain number under the special assistance programme. The minimum should be 20,000 cultivating and agricultural labour households. Where the number of cultivating households having holdings of 2 hectares and below is more, the existing definition should apply.

(Paragraphs 59.6.7 and 59.6.8)

APPENDIX 59.1

(Paragraph 59.2.15)

Percentage Distribution of Reporting Area according to Land Use Classification in the Himalayan Region, 1970-71*

Region	Percentage distribution of reporting area					Reporting area ('000 ha)
	Forests	Area not available for cultivation (a)	Other uncultivated area excluding fallows (b)	Fallows (including current fallows)	Net area sown	
Jammu & Kashmir	61·4 (c)	11·7	9·1	2·2	15·6	[4,523
Himachal Pradesh	54·8 (c)	5·7	27·5	1·2	10·8	[5,076
Uttar Pradesh hill districts (d)	46·7	30·6	4·6	1·0	17·1	[4,880
West Bengal hill districts (e)	38·1	23·5	5·1	1·2	32.1	311
Assam hill districts (f)	22·1	74·4	nil (g)	nil	3·5	1,522
Arunachal Pradesh (h)	91·3	0·7	3·0	3·0	2·0	[5,644
Nagaland (i)	19·7	75·9	nil	nil	4·4	1,351
Manipur (j)	27·2	65·4	1·1	nil	6·3	2,211
Mizoram (k)	62·0	36·1	nil	nil	1·9	[2,092
Tripura	60·1	4·9	11·6	0·5	22·9	1,048
Meghalaya (l)	8·3	84·5	nil	nil	7·2	2,249
Total	53·2	28·2	7·6	1·3	9·7	30,907

*Directorate of Economics and Statistics, Ministry of Agriculture and Irrigation (Department of Agriculture): (i) Classification of Area and Irrigated Area 1971-72—Statewise (Provisional), and (ii) Indian Agricultural Statistics, 1961-62 and 1962-63 (Vol.-II). The percentages are based on the data available from these publications.

NOTES: Data in respect of Uttar Pradesh, Assam and West Bengal hill districts pertain to the year 1962-63. The rest of the data, unless otherwise specified, refer to 1970-71.

(a) Includes—(i) Area put to non-agricultural uses,
(ii) Barren and unculturable land.

(b) Includes—(i) Permanent pastures and other grazing lands,
(ii) Land under miscellaneous tree crops and groves not included in net area sown, and
(iii) Culturable waste land.

(c) Includes forest area under the control of Forest Department also.

(d) Comprising Uttar Kashi, Chamoli, Pithoragarh, Tehri Garhwal, Garhwal, Almora, Nainital and Dehra Dun districts.

(e) Darjeeling district only.

(f) Mikir Hills and North Cachar Hills districts.

(g) Data not separately available, having been included in the area not available for cultivation.

(h) Data based on the Agricultural Census figures for 1970-71 except for forest area which is based on figures given in Forest Statistics Bulletin No. 11.

(i) Data relate to Naga Hills district of Assam State for the year 1956-57.

(j) *Ad-hoc* estimates.

(k) Data relate to Mizo Hills district of Assm State for the year 1969-70.

(l) Data relate to the year 1969-70.

APPENDIX 59·2

(Paragraph 59·2·25)

Percentage Distribution of Area under Crops in the Himalayan Region, 1970-71.*

Region	Percentage distribution of area under						Area under all crops ('000 ha)
	Cereals and millets	Total food-grains	Fruits and vegetables	Total food crops	Plantation crops	Total non-food-crops	
Jammu & Kashmir	83·9	89·4	2·8	92·5	neg.	7·5	866
Himachal Pradesh	83·8	91·7	3·6	96·1	0·4	3·9	912
Uttar Pradesh hill districts (a)	84·6	89·6	1·4	95·4	0·2	4·6	1,004
West Bengal hill districts (b)	61·7	62·6	4·4	70·4	23·5	29·6	115
Assam hill districts (c)	60·4	63·8	10·3	79·3	1·7	20·7	58
Arunachal Pradesh	86·9	87·7	6·9	95·4	..	4·6	130
Nagaland	100·0	100·0	neg.	100·0	nil	neg.	61
Manipur	98·0	98·0	0·7	99·3	nil	0·7	147
Mizoram	82·5	82·5	7·5	95·0	neg.	5·0	40
Tripura	78·0	78·8	10·2	90·4	1·7	9·6	345
Meghalaya	58·6	59·2	19·9	83·3	nil	16·7	191
Total	82·4	86·7	4·3	93·1	1·0	6·9	3,869

*Directorate of Economics and Statistics, Ministry of Agriculture and Irrigation (Department of Agriculture): (i) Area under crops, 1971-72 and (ii) Indian Agricultural Statistics, 1961-62 and 1962-63 (Vol. II). The percentages are based on data contained in these publications.

NOTES: Data are provisional. In respect of U.P., West Bengal and Assam they pertain to the year 1962-63.

(a) Comprising Uttar Kashi, Chamoli, Pithoragarh, Tehri Garhwal, Garhwal, Almora, Nainital and Dehra Dun districts.

(b) Darjeeling district.

(c) Mikir Hills and North Cachar Hills districts.

APPENDIX 59·3

(Paragraph 59.2.46)

Livestock Population in the Himalayan Region, 1972.*

('000)

	Cattle	Buffaloes	Sheep	Goats	Pigs	Poultry
Jammu & Kashmir . .	2,057	493	1,072	569	1	1,654
Himachal Pradesh . .	2,176	544	1,040	906	3	189
Uttar Pradesh hill districts‡	2,066	633	413	889	4	269
West Bengal hill districts† .	206	20	5	95	11	289
Assam hill districts† .	131	53	@	53	56	407
Nagaland .	93	10	@	18	184	703
Manipur . .	294	52	2	16	134	938
Mizoram . .	25	2	1	8	48	603
Tripura . .	525	20	2	147	44	518
Meghalaya .	468	46	18	96	127	975

*Livestock Census 1972 (Provisional figures).

†Livestock Census figures relating to the year 1966.

@Below 500 in numbers.

NOTE: Data for Arunachal Pradesh are not available.

APPENDIX 59·4

(Paragraphs 59.2.50, 59.2.54 and 59.2.59)

Districts in the Himalayan Region recommended for Milk, Sheep, Poultry and Pig Development

State	Districts recommended for development of			
	milk	sheep	poultry	pig
Jammu & Kashmir	1. Jammu 2. Kathua 3. Poonch 4. Rajauri	1. Jammu 2. Kathua 3. Anantnag 4. Baramula 5. Srinagar 6. Ladakh 7. Udhampur 8. Doda	1. Jammu 2. Kathua 3. Anantnag 4. Baramula 5. Srinagar	
Himachal Pradesh . . .	1. Sirmur	1. Sirmur 2. Simla 3. Chamba 4. Kangra 5. Kulu 6. Kinnaur 7. Mahasu 8. Mandi	1. Sirmur 2. Simla	1. Sirmur 2. Simla
Uttar Pradesh . . .		1. Dehra Dun 2. Uttar Kashi 3. Chamoli 4. Garhwal	1. Dehra Dun	
West Bengal . . .	1. Darjeeling		1. Darjeeling	1. Darjeeling

APPENDIX 59·4 (Contd.)

State	Districts recommended for development of			
	milk	sheep	poultry	pig
Arunachal Pradesh				1. Kameng 2. Subansiri 3. Siang 4. Lohit 5. Tirap
Assam	1. Mikir Hills			1. Mikir Hills 2. North Cachar Hills
Manipur	1. Manipur North 2. Manipur South 3. Manipur East 4. Manipur Central		1. Manipur North 2. Manipur South 3. Manipur East 4. Manipur Central	1. Manipur North 2. Manipur South 3. Manipur East 4. Manipur Central
Meghalaya	1. Khasi and Jaintia Hills 2. Garo Hills		1. Khasi and Jaintia Hills 2. Garo Hills	1. Khasi and Jaintia Hills 2. Garo Hills
Mizoram				1. Mizoram
Nagaland	1. Kohima 2. Mukokchung 3. Tuensang		1. Kohima 2. Mukokchung 3. Tuensang	1. Kohima 2. Mukokchung 3. Tuensang
Tripura	1. West Tripura		1. West Tripura	

APPENDIX 59·5

(Paragraph 59·2·80)

Western Ghat Areas in the Southern States identified on the basis of Elevation and Rainfall.

State/District	Taluk	Elevation* (Metres)		Total annual rainfall (cm.)
		Maximum	Minimum	
Maharashtra				
Poona				
	Khed	1,293	600	67
	Mawal	900	600	112
	Haveli	900	600	66
	Bhor	1,200	600	96
	Velha	1,404	600	@
Satara				
	Mahabaleshwar	1,438	900	623
	Jaoli	1,200	600	@
	Satara	900	666	66
	Patan	1,050	547	183
Kolhapur				
	Shahuwadi	1,038	900	@
	Panhala	900	600	@
	Radhanagari	991	600	383
	Ajara	979	600	@
	Chandgade	1,030	600	270
Ratnagiri				
	Kankawali	900	150	362
Goa		1,166	@	250
Karnataka				
Belgaum				
	Khanapur	915	600	168
Shimoga				
	Hosnagar	1,343	600	288
	Tirthahalli	932	600	298
Chikmagalur				
	Koppa	1,200	900	300
	Mudigere	1,892	1,200	234
Hassan				
	Sakaleshpur	1,200	900	235
Coorg				
	Somvarpet	1,143	900	218
	Mercara	1,745	900	327
	Virarajendrapet	1,224	450	267
Tamil Nadu				
Nilgiris †				
	Gudalur	..	..	233
	Ootacamund	..	..	138
	Coonoor	..	..	157

APPENDIX 59·5 (Contd.)

State/District	Taluk	Elevation* (Metres)		Total annual rainfall (cm.)
		Maximum	Minimum	
Madurai				
	Kodaikanal	2,505	450	167
Kerala				
Cannanore				
	Hosdrug	900	150	356
	Tilapparamba	1,200	289	356
	Tellicherry	900	s.l.	330
	North Wynad	2,060	900	@
Kozhikode				
	Calicut	1,200	150	318
	South Wynad	988	450	@
	Badagara	1,368	s.l.	351
	Quilandy	600	s.l.	336
Malappuram				
	Ernad	2,554	50	299
Palghat				
	Mannarghat	2,383	50	289
	Palaghat	1,996	144	212
	Alathur	900	100	225
	Chittur	1,527	150	179
Trichur				
	Mukundapuram	900	10	330
Ernakulam				
	Thodupuzha	1,194	50	@
Kottayam				
	Devikolam	2,695	600	292
	Udambanchola	1,463	600	@
	Peermade	2,019	300	516
	Meenachil	900	100	399
Quilon				
	Pathanamthitta	1,200	100	316
	Pathanapuram	1,922	100	331
Trivandrum				
	Nedumangad	1,869	100	224

NOTE:—*Only areas at elevation above 900 metres (m.s.l.) in Maharashtra, Karnataka and Tamil Nadu and above 600 metres (m.s.l.) in Kerala have been considered.

@Data not available.

†Maximum and minimum elevations for these taluks are not available. The average height of Ootacamund taluk is 2,249 metres and of Coonoor taluk 1,745 metres.

s.l. sea level.

APPENDIX 59·6

(Paragraph 59·2·81)

Percentage Distribution of Reporting Area according to Land Use Classification in the Western Ghat Hill Areas, 1969-70*

Hill areas	Percentage distribution of reporting area					Reporting area ('000 ha)
	Forests	Area not available for cultivation	Other uncultivated area excluding fallows	Fallows (including current fallows)	Net area sown	
Karnataka .	29·6	9·4	27·3	6·0	27·7	896·0
Kerala . .	29·3	7·2	6·7	1·0	55·8	3,604·0
Maharashtra .	23·8	12·1	8·4	11·4	44·3	1,143·3
Tamil Nadu .	48·2	18·0	11·3	3·4	19·1	354·4
Total . .	29·4	9·1	10·4	3·9	47·2	6,002·7

*Based on data supplied by the State Governments. The figures pertain to the region identified in Appendix 59·5 except for Kerala where they cover the districts rather than the taluks identified and Tamil Nadu where data for Gudalur and Kodai kanal only were available. Data for Goa are not available.

APPENDIX 59·7

(Paragraph 59.2·81)

Percentag Distribution of Area under Crops in the Western Ghat Hill Region, 1969-70

Hill areas	Percentage distribution of area under					Area under all crops ('000 ha)
	Cereals and millets	Total food-grains	Planta-tion crops	Other non-food crops	Total non-food crops	
Karnataka .	46·2	48·9	39·5	6·9	46·4	259·5
Kerala** .	29·7	31·2	43·9	1·8	45·7	2,700·6
Maharashtra@	73·3	78·8	£	17·9	17·9	396·1
Tamil Nadu† .	11·1	11·7	46·6	6·0	52·6	70·1
Total . .	35·6	37·7	38·5	4·1	42·7	3,426·3

*Based on data supplied by the State Governments. Unless otherwise specified they relate to the region identified in Appendix 59·5. Data for Goa are not available.

**Data pertain to the districts rather than the taluks identified. Tapioca accounts for 10·1 per cent of the area in addition to the above distribution of area under crops.

@Pertains to 12 of the 15 taluks identified.

£ nil.

†Pertain to Gudalur and Kodiakanal only.

APPENDIX 59.8

(*Paragraph 59.2·92*)

Livestock Population in the Western Ghat Hill Region, 1966*.

(in '000)

Hill areas	Cattle	Buffaloes	Sheep	Goats	Pigs	Poultry
Karnataka .	566	108	11	25	41	383
Kerala . .	2,105	455	10	1,108	112	8,769
Maharashtra .	544	330	52	171	1	790
Tamil Nadu .	62	18	7	8	@	45

*Based on data supplied by the State Governments. Data for Goa are not available.

@Below 500.

APPENDIX 59.9

(Paragraph 59·2·96)

Districts in the Western Ghat *Hill Region* recommend for Milk, Sheep, Poultry and Pig Development

State	Districts recommended for development of			
	milk	sheep	poultry	pig
Maharashtra	1. Poona	1. Poona	1. Poona	
	2. Satara	2. Satara	2. Satara	
	3. Kolhapur	3. Kolhapur	3. Kolhapur	
	4. Ratnagiri		4. Ratnagiri	
Karnataka . . .		1. Belgaum	1. Belgaum	1. Chikmagalur
		2. Hassan	2. Shimoga	2. Coorg
Kerala	1. Cannanore		1. Cannanore	1. Cannanore
	2. Quilon		2. Koznikode	2. Quilon
			3. Palghat	3. Ernakulam
			4. Trichur	4. Kottayam
			5. Ernakulam	
			6. Quilon	
			7. Trivandrum	

APPENDIX 59·10

(Paragraph 59·3·1)

Tribal Population in India, 1971*.

State/Union Territory	Tribal population	Tribal population as percentage of total population
State		
Andhra Pradesh	1,657,657	3·81
Assam**	1,919,947	12·84
Bihar	4,932,767	8·75
Gujarat	3,734,422	13·99
Haryana	nil	nil
Himachal Pradesh	141,610	4·09
Jammu and Kashmir	nil	nil
Karnataka	231,268	0·79
Kerala	269,356	1·26
Madhya Pradesh	8,387,403	20·14
Maharashtra	2,954,249	5·86
Manipur	334,466	31·18
Meghalaya	814,230	80·48
Nagaland	457,602	88·61
Orissa	5,071,937	23·11
Punjab	nil	nil
Rajasthan	3,125,506	12·13
Tamil Nadu	311,515	0·76
Tripura	450,544	28·95
Uttar Pradesh	198,565	0·22
West Bengal	2,532,969	5·72

*1974. Census of India 1971, Series I—India, Part II—A(ii): Union Census Primary Abstract: xxii, xxx & xxxi. New Delhi, Registrar General and Census Commissioner, India.

**Includes Union Territory of Mizoram.

APPENDIX 59·10 (Contd.)

State/Union Territory	Tribal population	Tribal population as percentage of total population
Union Territory		
Andaman and Nicobar Islands	18,102	15·72
Arunachal Pradesh	369,408	79·02
Chandigarh	nil	nil
Dadra and Nagar Haveli	64,445	86·89
Delhi	nil	nil
Goa, Daman and Diu	7,654	0·89
Lakshadweep	29,540	92·86
Pondicherry	nil	nil
India†	38,015,162	6·94

†The population figures exclude population of areas under unlawful occupation of Pakistan and China, where census could not be taken.

APPENDIX 59.11

(Paragraphs 59.4.7. 20 & 21)

Drought Prone Districts as Identified by Irrigation Commission and those covered under DPAP

State	Districts under DPAP and also identified by the Irrigation Commission	Districts not identified by the Irrigation Commission but already covered under DPAP	New districts identified by Irrigation Commission
Andhra Pradesh	Anantapur, Kurnool, Cuddapah, Chittoor, Mahboobnagar.	—	Hyderabad, Nalgonda*.
Bihar	—	Palamau, Monghyr, Gaya-cum-Sahabad.	—
Gujarat	Kutch, Jamnagar, Rajkot, Amereli, Banaskantha, Surendranagar.	Panchmahals.	Mehsana*, Ahmedabad*, Kaira, Broach, Bhavnagar*.
Haryana	Mahendragarh.	—	Gurgaon, Rohtak*.
Jammu & Kashmir	—	Doda.	—
Karnataka	Bijapur, Chitradurga, Kolar, Dharwar.	Belgaum	Bangalore, Hassan, Gulbarga*, Raichur*, Tumkur*, Bellary*, Mysore, Mandya.
Madhya Pradesh	Jhabua, Dhar, Betul.	Sidhi	Dewas, Ujjain, Khargaon*, Khandwa, Datia, Shajapur.
Maharashtra	Ahmednagar, Sholapur, Nasik, Poona, Satara, Sangli.	—	Aurangabad, Bhir, Osmanabad.
Orissa	—	Kalahandi, Phulbani	—

*Parts of these districts are covered under DPAP as contiguous areas.

APPENDIX 59.11 (Contd.)

State	Districts under DPAP and also identified by the Irrigation Commission	Districts not identified by the Irrigation Commission but already covered under DPAP	New districts identified by Irrigation Commission
Rajasthan	Dungarpur. Jaisalmer, Barmer, Bikaner, Jodhpur, Churu, Banswara.	Pali, Jalore, Nagaur.	Ajmer*, Udaipur*.
Tamil Nadu . . .	Ramanathapuram, Dharmapuri.	—	Salem, Coimbatore, Tiruchirapally, Madurai. Tirunelveli.
Uttar Pradesh . . .	—	Mirzapur, Banda. Allahabad, Varanasi, Hamirpur, Jalaun.	—
West Bengal . . .	—	Purulia, Midnapur-cum-Bankura.	
Total	34	20	33

*Parts of these districts are covered under DPAP as contiguous areas.

APPENDIX 59·12

(Paragraph 59·4·38)

Statement showing Average Annual Rainfall, Geographical Area, Population, Gross Cropped Area and Gross Irrigated Area in Drought Affected Districts of States of Madhya Pradesh, Maharashtra, Rajasthan and Gujarat with less than 10 Per cent of the Cropped Area under Irrigation

State/District	Annual rainfall* (in mm)	Monsoon* rainfall (in mm)	Geographical area** ('000 sq km)	Population** ('000 Persons)	Density of Population (Persons per sq km)	Gross*** cropped area ('000 ha)	Gross*** irrigated area ('000 ha)	Percentage of col (8) to col (7)
1	2	3	4	5	6	7	8	9
Madhya Pradesh (below 5% irrigation)								
Jhabua (DPAP) . . .	776·8	728·9	6·8	667·8	98	345·3	7·2	2·08
Ujjain	894·9	820·5	6·1	862·5	141	470·5	10·6	2·25
Dewas	1047·3	995·1	7·0	594·3	85	347·8	7·5	2·15
Khandwa (East Nimar) . .	818·6	716·6	10·7	879·3	82	434·9	17·6	4·04
Sidhi (DPAP) . . .	1387·8	1238·0	10·5	776·8	74	370·0	1·7	0·45
Madhya Pradesh (between 5—10% irrigation)								
Datia	793·8	717·6	2·0	255·3	128	130·8	9·8	7·49
Khargaon (West Nimar) . .	886·3	789·5	13·4	1284·8	96	645·4	31·9	4·94
Betul (DPAP) . . .	1192·8	1033·1	10·0	736·2	74	416·1	26·1	6·27

APPENDIX 59·12 (Contd.)

1	2	3	4	5	6	7	8	9
Shajapur	1047·6	966·4	6·2	678·4	109	364·3	18·0	4·94
Dhar (DPAP) . . .	929·7	847·0	8·1	842·4	104	520·7	23·1	4·43
Maharashtra (between 5—10% irrigation)								
Sangli (DPAP). . . .	568·5	359·2	8·6	1539·8	179	652·8	65·6	10·04
Bhir	685·0	553·2	11·2	1286·1	115	807·5	57·3	7·09
Osmanabad	809·9	669·0	14·1	1896·7	135	1118·9	86·3	7·71
Rajasthan (below 5% irrigation)								
Barmer (DPAP) . . .	314·0	281·6	28·4	774·8	27	1021·4	20·1	1·96
Jodhpur (DPAP) . . .	366·0	327·6	22·9	1152·7	50	972·8	33·0	3·39
Nagaur (DPAP) . . .	309·9	264·7	17·7	1262·2	71	1140·4	26·2	2·29
Churu (DPAP) . . .	367·6	314·2	16·8	874·4	52	1131·0	0·4	0·35
Gujarat (Between 5—10% irrigation)								
Jamnagar (DPAP) . . .	466·1	443·7	14·1	1111·3	79	615·5	54·7	8·88
Kutch (DPAP) . . .	322·2	303·2	45·6	849·8	19	506·3	65·5	12·93
Surendranagar (DPAP) . .	506·8	479·0	10·5	845·5	81	694·1	40·9	5·89

*Memoirs of the Indian Meteorological Department, Vol. XXI, Part III.
**Census of India, 1971.
***Directorate of Economics & Statistics, Ministry of Agriculture, for the year 1968-69.

APPENDIX 59.13

(Paragraph 59.4.38)

A Note on Increasing Irrigation Facilities in the Drought Prone Districts of Madhya Pradesh, Maharashtra and Gujarat

There are water resources in the basins in the drought prone districts in Madhya Pradesh, Maharashtra and Gujarat, having less than 10 per cent cropped area under irrigation. The scope for harnessing these resources through medium surface schemes is discussed below:

1. Madhya Pradesh:

Although the average annual rainfall in the undermentioned districts of Madhya Pradesh is not low but the variation from the normal from year to year is quite high. These districts have also been neglected in being provided with irrigation facilities. Even the investigation of projects has not been taken up. One reason for this may have been the low density of population and thus lesser political weight. The other reason could be that these areas are comparatively more difficult for taking up irrigation scheme.

(1) Jhabua district: The upper portion of the Mahi basin and the upper portion of Haini river (a tributary of the Narmada) lies in this district. One small medium irrigation project, viz., Pumpavati, already exists and similar type of other medium schemes could certainly be framed to utilise the surface water in the upper reach of these two basins. The groundwater possibilities have not been investigated in this region but appear to be rather low.

(2) Ujjain district: The district covers the upper region of the Chambal river and its tributaries and small medium schemes could be located on these rivers. One medium project, viz., Bhainsa Khedi already exists. The possibility of groundwater has not been investigated in this district but seems to be rather low.

(3) Dewas district: This district is adjoining Ujjain and also lies in the upper reaches of Kalisind river, a tributary of Chambal. Here also, minor and medium surface irrigation schemes could be taken up. The possibility of groundwater seems to be rather low. Since these rivers are only monsoon fed, it would be desirable to ensure at least one crop for most of the cultivated area and try and develop more of animal husbandry and less of the grain crops which require more water.

(4) Khandwa district: This district is in the Narmada basin and also covers certain portion of the upper Tapi. Two major projects, viz., Onkeshwar project and Narmada Sagar are proposed but it may take a long time to provide irrigation in this district from these projects. There is a possibility of taking up certain minor and medium surface irrigation schemes on the smaller tributaries of the Narmada in this district. There are certain possibilities of groundwater also in the portions nearer the main Narmada river. These could be developed in a shorter time.

(5) Sidhi district : This district lies in the Sone basin. There is a possibility of some minor and medium lift irrigation schemes from the main river or some of its tributaries and from Rihand reservoir, and also the possibility of some minor and medium storage projects. This would need to be explored. The possibility of groundwater seems to be rather low. No investigations have, however, been done so far.

(6) Datia district : This district lies in the Chambal basin and a canal, called the Bhandar Canal taking off from the Betwa Canal System has already been constructed, but this new canal system, which lies in Madhya Pradesh, constructed by Uttar Pradesh and recently transferred to Madhya Pradesh, has not been functioning well. As such, a better development of this canal system could increase the irrigated area in this district. A project on the Sindh river (along the boundary between Datis and Gwalior) has been taken up recently for supplementing water supplies to Harsha project in Gwalior district. The possibility of diverting some water for use in Datia district even for Kharif may be examined.

(7) Khargaon district : This district lies in the Narmada basin. Some minor and medium surface irrigation projects could be taken up on some of the Tributaries like Bela, Kundi and Deb. There is a possibility of groundwater development also in this district, but no investigations have been done so far.

(8) Betul district : Some portion of this district is in the upper reaches of the Narmada basin and some in the upper reaches of the Tapi basin. Minor and medium surface irrigation projects are possible and should be investigated One of the projects, known as Bichhua Canal Project, has already been prepared and is with the Central Water Commission (CWC) under examination. The estimated cost of this is about Rs. 1.7 crores, to irrigate about 10,000 hectares. There is also a small project known as Latia Tank, which is estimated to cost Rs. 25 lakhs and would feed the same area as the Bichhua Canal Project. Although there is a dispute with regard to the distribution of water in the Narmada basin, this project would utilise a small amount compared to the total availability. So, it could be approved and construction started without prejudice to the case of the States involved in the Narmada basin.

(9) Shajapur district : This district is also adjacent to Ujjain and Dewas districts and lies in the Chambal basin, covering the upper reaches of some of its tributaries like the Kalisind and Newaj. There is a possibility of minor and medium surface irrigation schemes which need early investigation.

(10) Dhar district : This is a hilly area and lies in the upper reaches of the Chambal river and some of the tributaries of Narmada. The only possibility seems to be some minor and medium surface irrigation schemes and also some lift schemes from these rivers.

2. Maharashtra :

(1) Sangli district : This district lies in the Krishna basin and two projects, viz., the Krishna and Warna projects, have already been approved and are under construction. What is needed is to expedite the construction of these two projects, so that the benefit could accrue at an early date. This is

mostly a black cotton soil area and a proper cropping pattern along with a good drainage system is absolutely necessary to get the optimum economic benefits. Another medium project known as the Siddewedi project, to cost about Rs. 76 lakhs and to irrigate about 700 hectares, has also been prepared and is under examination with the CWC. There is also Yerulwadi project costing about Rs. 75 lakhs to benefit 1,320 hectares.

(2) Bhir district: This district lies in the Godavari basin and the Jayakawadi project, which could benefit this district, is already under construction. The benefits would come from the Right Bank Canal only which has not been approved in the original project, where in only the reservoir and the left bank canal have been approved. It is understood that some work on the Right Bank Canal had been taken up during the drought relief works done last year. A way must be found to expedite its approval and construction, so as to benefit this district during the Fifth Plan. Two medium projects in this district, viz., Bodhegaon and Pangaon, costing about Rs. 49 and 83 lakhs and benefitting, 11,000 and 19,000 hectares respectively, have also been prepared and are under examination with the CWC. Since these lie in the Godavari basin, it has not been possible to sanction them so far, but a way must be found to expedite the work on them. Other projects are listed below :

Project	Estimated cost in Rs. lakhs	Hectares
Saraswati	73	1,050
elpara	50	610
Kundalike	75	2,000
Manjra	173	5,230

(3) Osmanabad district: This lies in the basin of Tirna, Tiru and Manjra rivers; the tributaries of the Godavari. There is some portion of Krishna basin also included in this district. The estimated cost and benefits of some of the projects already prepared are indicated below :

Projcet	Estimated cost in Rs. lakhs	Hectares
Tiru	135	3,200
Tawarja	162	4,600
Whati	77	1,400
Irrigation Scheme		
Khandala	74	1,900
Manjra	120	3,630
Kajla	71	1,740
Whatophal	81	2,110
Ulup	45	960

Although all these projects lie in the disputed river basin, yet it would be desirable to give them a priority in order to help the district which has one of the lowest irrigation facilities.

3. Gujarat :

(1) Kutch district : A number of medium projects exist and some more are possible in this district. The projects are ready for the following:

Project	Rs. lakhs	Hectares
Kaswati	56	610
Nara	78	1,100
Jangadia	29	760
Bhukhi	55	NA
Bitavolodia	35	500
Godathad	5	660
Mitti	48	1,160

Explanatory boreholes have been made in Jamnagar, Kutch and Surendranagar. Production wells have been constructed in Kutch district only, to a depth range of 152 metres (500 ft.) below ground level and the discharge ranges from 19 to 44 litres/sec (15,000 to 35,000 IGPH) for a pumping level of 30 metres below ground level. The State groundwater organisation has also carried out investigations in Kutch district. In eastern areas of Kutch, groundwater is already being used upto the annual recharge. In certain other areas like Wada and Nagal, Matinga irrigated tract and Ratnal tract, the groundwater can be further exploited. The quality of water in the Kutch district varies from fresh to saline (to a degree unsuitable for irrigation), so only suitable water could be used.

(2) Jamnagar district : Some medium projects are possible in this district and need investigation. Some minor and medium irrigation projects are possible. Jivapur project costing Rs. 166 lakhs could benefit 2,710 ha.

(3) Surendranagar district : This district would benefit from the Narmada project which would take a long time, but some medium projects on small tributaries could be investigated.

APPENDIX 59.14

(Paragraph 59·4·54)

Statement showing DPAP districts in which programmes for Milk, Poultry, Sheep and Pig production through Small and Marginal Farmers and Agricultural Labourers are recommended*

State	Milk	Poultry	Sheep	Pig
Andhra Pradesh	..	Kurnool	Kurnool	..
	..	..	Anantapur	..
	..	Cuddapah	Cuddapah	..
	..	..	Chittoor	..
	..	..	Mahboobnagar	..
	Nalgonda	Nalgonda	Nalgonda	..
Bihar	..	..	Palamau	Palamau
	..	Monghyr	..	..
	Nawadah**	Nawadah	Nawadah	Nawadah
	Rohtas**	Rohtas	Rohtas	..
Gujarat	Ahmedabad	Ahmedabad	..	..
	Banaskantha	..	..	..
	Mehsana	Mehsana	..	..
	..	..	Amreli	..
	..	..	Bhavnagar	..
	..	Jamnagar	Jamnagar	..
	..	..	Kutch	..
	..	Rajkot	Rajkot	..
	..	..	Surendranagar	..
Haryana	Bhiwani**	Bhiwani	Bhiwani	..
	Hissar	Hisar	Hissar	..
	Rohtak	Rohtak	..	Rohtak
	..	..	Mahendragarh	..

APPENDIX 59·14 (Contd.)

State	Milk	Poultry	Sheep	Pig
Jammu & Kashmir	..	..	Udhampur	..
	..	..	Doda	..
Karnataka	..	Belgaum	Belgaum	..
	..	..	..	Chikmagalur
	..	Bellary	Bellary	..
	..	Bijapur	Bijapur	..
	..	Chitradurga	Chitradurga	..
	..	Dharwar	Dharwar	..
	..	..	Gulbarga	..
	..	..	Kolar	Kolar
	..	..	Raichur	..
	Tumkur	Tumkur	Tumkur	Tumkur
Maharashtra	Nasik	Nasik	Nasik	Nasik
	..	Ahmednagar	Ahmednagar	..
	Poona	Poona	Poona	..
	Satara	Satara	Satara	..
	Sangli	Sangli	Sangli	..
	..	Sholapur	Sholapur	..
Orissa	..	..	Kalahandi	..
	..	..	..	Phulbani
Rajasthan	Bikaner	Bikaner	Bikaner	..
	Ajmer	Ammer	Ajmer	..
	..	..	Barmer	..
	..	..	Churu	..
	..	..	Dungarpur	..
	..	..	Jaiselmer	..

	..	..	Jalore ..
	..	..	Jhunjhunu ..
	..	Jodhpur	Jodhpur ..
	..	..	Nagaur ..
	..	..	Pali ..
	Udaipur	Udaipur	Udaipur ..
Tamil Nadu	..	..	Dharmapuri ..
	..	..	Ramanathapuram ..
Uttar Pradesh	..	Allahabad	Allahabad Allahabad
	Varanasi	Varanasi	Varanasi ..
	Mirzapur	Mirzapur	.. ..
West Bengal	Bankura	Bankura	Bankura Bankura
	Midnapur	..	.. ..
	Purulia	Purulia	Purlulia ..

*1973. Interim Report on Poultry, Sheep and Pig Production through Small and Marginal Farmers and Agricultural Labourers for Supplementing their Income, New Delhi. National Commission on Agriculture.

**Nawadah is a new district carved out of Gaya; Rohtas from Shahabad, Bhiwani from Hissar. The Interim Report refers to the Programmes in Gaya, Shahabad and Hissar.

GMGIPND—Job III—2 Agri.—22-11-76—5,000

ERRATA

Part XIII—Rural Employment and Special Area Programmes.

Page No.	Paragraph/Rec. No. Appendix/Table No.	Line	As printed	As desired
1	2	3	4	5
3	58.1.5	1	he	the
4	58.2.2	18	workers.	workers,
6	footnote		Draft	[1]Draft
6	Table 58. 1	Col. 1	[1]1986	*1986*
7	58.2.6	1	adequate *to*	adequate
7	58.2.7	3	prportion	proportion
9	58.3.3	17	employment." [4]	employment". [8]
9	footnote 2	2	[2]Ibid. (p. 4) : 31	[2]Ibid (p. 3) : 31
9	footnote 4		[4]Ibid. 2 (p. 14) page 430	Delete
11	58.3.7	14	57:3	57.3
14	footnote 1		[1]*Ibid.* 1 (p. 8) : 31	[1]*Ibid.* 1 (p. 5) : 31
15	58.4.9	15	2000 AD	*in* 2000 AD
15	footnote 1		[1]Ibid. 1 (p. 22) : 23	[1]Ibid. 1 (p. 14) : 23
21	58.4.23	3	*paticularly*	particularly
22	58.4.25	6	1980	1980 and
22	Do.	19	chapters	chapters[1]
22	footnote	1	Chapter 28	[1]Chapter 28
25	table 58.2	Heading Col. 3	Man-year	Man-years
26	58.4.30	2	200	2000
26	Do.	12	7·0 million	1·0 million
34	58.4.46	9	pur-v ew	purview
39	footnote	1	[1]Ibid. 2 (p. 13) : 224	[1]Ibid. 1 (p.9) : 224
44	58.5.2	4	2000 AD	2000 AD.
45		1	*quantitative*	Quantitative

1	2	3	4	5
45		12	in order	In order
45		13	diversted	diverted
46	footnote		[1]Ibid. 2 (p. 15) : 5	[1]Ibid. 1 (p. 10) : 5
47	58.5.8	13	amogst	amongst
48	footnote		[1]Ibid. 1 (p. 45) : 8	[1]Ibid. 1 (p. 31): 8
49		1	tre	are
52	58.5.20	15	agricutural	agricultural
59	Appendix 58.3	Row 8 Col. 5	12.5	12.9
62		3	paticipation	participation
72		7	impariring	impairing
74		7	revise	devise
82	59.2.49	1	*Guijars*	*Gujjars*
84	59.2.52	4	Palampur.	Palampur,
87	59.2.60	3	crossbreed	crossbred
105		18	programmes".	programmes". [1]
128	59.4.20	23	...needs".[8]	...needs" [1]
132	59.4.34	12	sub-merginal	sub-marginal
149	59.5.22	8	(*Cerops roxburghii*)	(*Ceriops roxburghii*)
151	59.6.1	4	social, justice	social justice
155	Rec. 13	4	senctuaries	sanctuaries
156	Rec. 17		Paragraphs 59.2.50 & 59.2.52	Paragraph 59.2.52
156	Rec. 22	1	integral	integrated
157	Rec. 29	4	assesment	assessment
162	Rec. 64	1	resert	desert
162	Rec. 70	1	shoud	should
163	Rec. 81	1	acivity	activity
176	App. 59.7	Title	1969-70	1969-70*
176	Do.	Do.	Percentag	Percentage
186	Paragraph 6	7	Datis	Datia

1	2	3	4	5
187	Paragraph 2 Table	Col. 1	elpara	Belpara
188	3(1) table	Row 6 Col. 2	5	50
188		1st word just below the Table	Explanatory	Exploratory
189	Appendix 59.14	Col. 3 Row 21	Hisar	Hissar