PART THREE

SYNTHESIS
Chapter VIII

LAND-USE PLANNING

Problem:

An attempt has been made in the foregoing chapters to analyse the existing land-use pattern of the Manipur Valley and the changes that have taken place in it since a century ago. Detailed studies on the changing trend have been made since 1951. Various limitations and impediments in the utilization of the available land resources of the valley are inherent in its physiography, soil conditions, climatic characteristics and socio-cultural milieu. Besides, the increasing pressure of population on the agricultural land, excessive subdivision and fragmentation of the holdings have reduced the per capita available land for agriculture in the valley to very small parcels. This situation has reflected itself in the very low intensity in respect of agricultural land-use and cropping, low production and insignificant land-use development. On the other hand, population growth of the valley is creating a serious problem of unemployment among the peasants.

The increasing population needing more and more land for both agricultural and non-agricultural uses has posed a serious problem in the land-use planning of the valley. There are two ways by which agricultural output can be raised, firstly, by extending the area under cultivation and secondly by raising the
output per hectare.

The increase and absorption of cultivated area of the valley after 1951 can be divided into two distinct phases, namely, pre-1970 and post-1970 periods. Most of the additional arable land reclaimed between 1951 and 1971 was in Serou, Saiton, Kwakte, Moirang Kmuncu, Keirenphabi, Komla Khong, Mayang Imphal, Kanglatombi, etc. where the new settlements of the Meiteis, Manipuri Muslims, and immigrants from Bangladesh and Nepal grew up. There was again a substantial addition to the cultivated hectarage after 1971 as a result of extension of the irrigational facilities. Thus, during 25 years from 1952 to 1977, there was an increase of 18.7 per cent of the net area sown (from 82,089 hectares in 1952 to 97,447.06 hectares in 1977). Correspondingly, the increase in the output of paddy in the valley was from 1,45,138 quintals to 21,22,52 quintals. However, productivity analysis shows that the average yield per hectare in the valley decreased from 2,026 kg/hectare in 1952-53 to 1,625 kg/hectare in 1977-78. Thus it is clear that the increase in output came from expansion of the cultivated area rather than from any increase in the yield. The prospect of further increasing the net sown area is extremely limited, for almost all the arable land of the valley has already been brought under the plough. The areas under both forest and permanent pasture are decreasing fast. It has been mentioned that the per
capita cultivated land decreased from 0.325 hectare in 1951 to 0.125 hectare in 1971. It has further decreased to 0.08 hectare in the year 1976.

It has also mentioned that a higher increase of population (39.92 per cent) is recorded during the decade 1961-71, while it was only 19.9 per cent during 1941-51. Based on the F.A.O.'s recommendation of 0.5 hectares of cultivable land per person the present population of the valley requires 3,70,519.43 hectares of extra arable land over and above the existing arable area 72,306.072 hectares (1976). If it is calculated for the projected population of 2001 A.D. the required extra arable land will be 9,41,998 hectares. It is obvious that no expansion of arable land is feasible. In fact, the scarcity of land has been further aggravated by the sprawling of towns and associated infrastructural developments which have been eating up 0.13 per cent of the arable land annually. However, the only possible way of increasing the area under plough to some extent, is to reclaim the cultivable waste, utilize the area left fallow and practise double and multiple cropping. The cost of reclaiming new land is hardly justifiable socially, however economically desirable may it be. Nor does the expansion of the cultivated hectaresage, as such, contributes to agricultural productivity. Thus, new plans for agricultural development should concentrate on intensifying the output within the existing arable area of the valley.
It is found that more than 98.5 per cent of the total cultivated area of the valley depends on rain for water supply. Most of the rain water during the monsoon goes away as run-off and is not preserved. Only a little portion of the rain water could be used by the peasants in the main paddy season. During the droughts, as also in the dry seasons, most of the area under plough is seriously affected, hindering double cropping. In fact, only 2.3 per cent of the total cultivated area of the valley was under more than one crop in the year 1976-77. It is, thus, obvious that lack of assured water supply poses an acute problem to cultivation.

At present (1978) more than 85.9 per cent of the agricultural output of the valley comes from kharif crops. Out of the total area under kharif crops about 99 per cent is covered by paddy. It is to be noted that 97 per cent of the paddy fields was used only for six months. The land-use intensity of the valley was only 0.045 in the year 1977. Application of modern agricultural techniques including bio-chemical fertilizers, without assured water, is of little avail. Thus lack of irrigational facilities turns out to be a hindrance in the agricultural development of the Manipur Valley.

Nearly 99 per cent of the peasants of the valley work on their land with a pair of bullocks and a wooden plough. Thus agriculture in the valley is carried out at a level even below the bed rock of the present-day mechanization of agriculture.
Traditional implements and animal power are still widely used in the valley. Poverty and ignorance, coupled with poor extension services have served to keep modern agricultural implements out of the farmer's reach. The peasant has often to borrow or hire even the implements which he knows how to use. During 1971-72, 26 power tillers and 69 tractors were distributed at subsidised rates to initiate mechanization in the agriculture of the valley. But oxen and buffaloes have still remained as the main means of drought. Thus it is essential to preserve adequate grazing land. But acute population pressure accounts for the low hectarage devoted to fodder crops. Nor do the livestock have any satisfactory alternative source for proper feeding. Thus, so long as animals remain the source of drought power, the progress of double cropping in the valley will remain insignificant.

However, there are certain factors which can substantially increase the agricultural output of the valley. Among them, land reclamation (after Loktak Multipurpose Project and Land Development Project of Shallow Lakes) is one important measure. It is already noted that most of the southern portion of the valley is gagged with lakes and swamps. Thus, an approximate area of 24,000 hectares of culturable area in and around the lakes and swamps can be reclaimed for agricultural activities. More than 58 per cent

1 UBI. Credit Plans for Manipur State, Calcutta, 1978, pp.29-50.

or 14,000 hectares of the total reclaimable area will be available when Loktak Multipurpose Project is completed. The remaining 42 per cent or 10,000 hectares of reclaimable land can be obtained from the shallow lakes like Pumlen, Laushi, Ikop, Khoidum, etc. In this context the potential cultivable land in the valley has been worked out with the help of the formula 3 shown below the table (811).

Table 811
Potential Cultivable Land in the Valley

(Based on 1977-78 Figure)

<table>
<thead>
<tr>
<th>Sub-Divisions</th>
<th>P.C.L. in Percentage of the Total Arable Land</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Imphal East</td>
<td>6.9</td>
</tr>
<tr>
<td>Imphal West</td>
<td>21.9</td>
</tr>
<tr>
<td>Thoubal</td>
<td>24.0</td>
</tr>
<tr>
<td>Bishenpur</td>
<td>31.7</td>
</tr>
<tr>
<td>Manipur Valley Average</td>
<td>21.88</td>
</tr>
</tbody>
</table>

\[
P.C.L. = (1 - \frac{A.C.L.}{G.C.L.}) \times 100,\text{ where } P.C.L. = \text{Potential Cultivable Land, G.C.L. = Gross Land Cultivable and A.C.L. = Actual Cultivable Land.}\]

The above table shows that the potential cultivable land varies from region to region. While there is scope for expansion

of cultivable land in Imphal West, Thoubal and Bishenpur Sub-
Divisions, land utilization, with the existing technology has
reached the maximum stage in Imphal East.

Planning: No rational land-use planning has so far been taken
up in the valley. The increasing pressure of population
necessitates a careful planning of land resources. In doing so
it is necessary to minimize the problems and take such measures
as would curb misuse of the land resources in the valley. The
plan should be able to determine an optimum use of every piece
of land which must be elastic and subject to changes from time
to time, as the situation demands, to adopt to the prevailing
economic conditions.4

An increase in the production of food as also new opportu-
nities for employment can be brought about by conservation of
good agricultural land, and development of poor land. It is the
land again that has to satisfy the needs of roads and other lines
for communications, canals, parks, play-grounds, gardens,
markets, community halls, offices and so on. Virtually it is
the land which we have to procure, protect, preserve, plan and
pass on to prosperity.

While working out a land-use plan for Manipur Valley,
three aspects should be taken care of. Firstly, agriculture

4 Stemp, L.D., The Land of Britain: Its Use and Misuse, London,
1930, p. 426.
being the mainstay of the economy of the State, agricultural land-use must get priority. Secondly, in order to boost-up the declining rural economy, the agro-forest based industries must be located in the rural areas. Thirdly, rural areas must be developed socio-economically to make them attractive to, and stop the flight of, the rural youths.

It is noticed that the national government has been since independence, trying to introduce some legal measures to consolidate the plots of land and stop their further fragmentation. Intensive propaganda is being made to popularise improved types of implements and methods. Seeds are supplied to cultivators, subsidies and loans granted. Technical guidance is also made available to farmers for rationalising agriculture. It is now necessary to take up land-use planning so that the facilities extended can be geared up to generate economic progress of the valley and the State as well. Based on the capability of various types of land of the valley a land-use plan is suggested below. It is based mainly on four objectives.

1. Possible change in the general land-use to obtain optimum productivity.
2. Choice of proper crops and methods.
3. Proper management of soil.
4. Introduction of rural industries.
1. Possible Changes in General Land-use:

The existing land-use pattern of the valley is complex. So the first task of a planner is to map out such areas as could be available for cultivation or some other uses, determine the most profitable uses and ascertain the measures to be taken for such uses. This should be immediately followed by assessment of the expenditure required for the purpose. The government will be required to provide the peasants necessary inputs for intensification of land-use adapted to local conditions. Case studies have revealed that only 5.1 per cent of the area is under the practice of double cropping. However, it is obvious that there is ample scope for the extension of double cropped area. In fact almost all the single cropped areas could be brought under two crops. In 1977-78, 97,447.06 hectares of land in the valley was under single crop. More than 51 per cent of this land i.e. 79,850 hectares may be transformed into double cropped land. This area is fertile enough even to yield three crops a year. It is estimated that more than 25,400 hectares of land may be brought under triple cropping. It will be possible only when water supply by canal and lift irrigation is assured, land properly manured and HYV seed distributed timely. The possible area under double and triple cropping may be increased as and when the irrigation projects like Thoubal Multipurpose Project, Iril Pilot-Project, Sinda Dam, Imphal Barrage, Ithai Barrage, Loktak Lift Irrigation Project, etc. are completed.
While planning, a balance between various categories and sub-categories of land utilization should be maintained. Such an approach only shall provide a sound agro-climatic condition and a balanced eco-system.

2. Choice of Proper Crops and Methods:

The low yielding varieties of crops should be replaced by improved and HYV seeds. The available arable land can produce a spectacular output with the introduction of HYV seeds. The whole of the arable land of the valley should be intensively irrigated and paddy should be further extended here. The rice land usually kept fallow for a considerable period after harvesting, should be readjusted by growing pea, mustard, pulses, potato, wheat, maize, etc. which have proved much more profitable than rice as a single predominant crop. It is found that when these legumes are dressed with phosphate while sowing a crop, more yield is turned out. The Japanese method of rice cultivation should be widely introduced as it has proved profitable in several villages of the valley.

It is found that the area on which paddy can be grown is fully given to it. There is no scope of extending the paddy area. Then again, all the paddy areas, as such, are not suitable for cultivation of HYV as there is no irrigation and drainage facilities everywhere. Low-lying areas behave as rainfed lakes during the monsoon. If suitable HYV of low-lying paddy are
available the hectareage under these could be increased resulting in additional production. This is one stratagem for increasing food production in the valley. Fortunately, one paddy variety called 'Masuri', well tested in the low-lying areas, is coming up.\(^5\) This is yet to be probed for final release in wider areas of the valley. If it is proves successful, the traditional low-yielding varieties, 'Tauthabi and Ereiya' can be replaced and paddy production increased by bringing about 21,610 hectares i.e. 21.2 per cent of the gross cropped area, located in and around the lakes and swamps with frequent flood, under them.

The introduction of irrigation by diverting water from rivers and rivulets and by constructing temporary dams across them accompanied by cultivation of cold resistant paddy like Ch. 988 and Ch. 1039 have helped in raising two crops of paddy within the period from March to November. This programme, introduced in a fairly large scale in 1973 was readily accepted by the peasants. The area brought under these varieties of paddy has been increasing.\(^6\) It is found that average yield of Ch. 988 is higher than that of the traditional paddy (Tauthabi and Ereiya). The impact of China paddy (988 and 1039), though raised in a smaller scale, was very remarkable as it kept the

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6 loc. cit.
price of rice down during the period from August to September when normally it soars up. To get maximum yield per unit area, multiple cropping has to be adopted, for which farmers are to be reoriented and cropping pattern changed. A new cropping pattern as indicated below may be recommended for this end (table 8:2).

Table 8:2

Manipur Valley

Cropping Season and Land Type.

<table>
<thead>
<tr>
<th></th>
<th>Spring</th>
<th>Summer</th>
<th>Mid Summer</th>
<th>Winter</th>
<th>Land Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Rice</td>
<td>Rice</td>
<td>Rice</td>
<td>-</td>
<td>-</td>
<td>Good quality land with adequate facilities.</td>
</tr>
<tr>
<td>b) Rice</td>
<td>-</td>
<td>Rice</td>
<td>Mustard</td>
<td>-</td>
<td>Good quality land with lack of facilities.</td>
</tr>
<tr>
<td>c) Pulses</td>
<td>-</td>
<td>Rice</td>
<td>Potato/Wheat/Pea/Mustard.</td>
<td>-</td>
<td>Medium quality land with water facilities.</td>
</tr>
<tr>
<td>d) Pulses</td>
<td>-</td>
<td>Maize</td>
<td>Pea/Mustard/Wheat.</td>
<td>-</td>
<td>Higher ground.</td>
</tr>
<tr>
<td>e) Rice</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Potato/Pea/Mustard.</td>
<td>Low-lying areas.</td>
</tr>
</tbody>
</table>

The cultivation of HYV maize is very suitable in the area near the foot-hill zone. Thus, the unirrigated area of this zone can be given to maize. Some of this area, during the kharif
season are left fallow. Such fallow lands could be used for growing pulses and maize. Cultivators generally use open pollinated seeds. There is ample scope for increasing maize production if high yielding hybrids are introduced. If the whole of the present maize area of the valley is brought under hybrid seeds, its production may be doubled. In this context the 'Ganga Safed-2' variety of maize may be suggested.

The amount of wheat cultivation in the valley is insignificant at present. However, the area under it has been increasing with a yield of 3,000 kg per hectare. This has been generally achieved without any irrigation. With the availability of better technology and irrigation more area can be brought under wheat. In the meantime suitable short duration wheat crop that can follow paddy should be introduced. 'Somalika' and 'Kalyansona' varieties are suitable for the valley.

Potato is a kharif crop in the foot-hills while it is a rabi crop in the central plain. It grows well in the valley. But the common problem with it is that due to lack of proper storage facilities, its selling price becomes low in the harvesting season while at the time of planting the seeds become costly. If the farmers are assured of good selling price and cheap availability of seeds there will be more areas under potato. 'Kufrijoyoti', 'Kufri chandramukhi' are popular varieties suited for the valley.
yield. The quick growing HYV, viz., 'M-27' and 'Appressed Mutant' may be recommended for the valley. The first variety is recommended for sowing in September in the foot-hill areas and the second, for sowing in late December - early January.

The extension of rabi crop in the valley depends much on the use of mechanical power because of the short time available for field operation after the harvest of main crop i.e. paddy. However, to increase food production, timely supply of inputs like seeds, fertilizers and pesticides must be assured as the want of these continues to be a vexing problem in the State.

The soils and climate of Manipur are suitable for cultivation of both tea and coffee. Most of the foot-hill areas of the valley can be used for growing these two crops. Black pepper can also be grown in some parts of the foot-hills of the valley. Some of the hillocks islands like Thanga, Karang, etc. can be given to cytrus fruits like orange, lemon, etc. Other isolated hillocks of the foot-hills are suitable for plantation of pine-apple and plantain while those in and around Imphal town are generally used to set up water reservoirs and plantation of pine trees. The cash crops, suggested above, are the essential raw materials for the establishment of agro-industries like fruit preservation and canning, tea and coffee processing, pine-apple fibre manufacture, etc. Some of the unemployed
persons can be employed in these units.

It is to be noted that land-use planning must be associated with government patronage in the form of loans to the poor subsistence peasants, extension services to teach, train and guide them in using the innovative methods and to provide them with favourable marketing facilities.

The co-operative movement can also play a great role in bringing about a suitable land-use pattern. At the base there are the 'Primary Agricultural Credit Societies' (PACS) which function at the village level through funds provided by the Manipur State Co-operative Bank. Both the 4th and the 5th Five Year Plans laid considerable stress on extension and strengthening of the co-operative structure for the purpose of agricultural development. Agricultural credit is provided mainly for short term purposes. Although a land development section has been opened within the organisation of the State Co-operative Bank, the flow of long term credit is yet to pick-up. The State Government have, however, started a revitalization programme and organised 35 PACS at Gram Panchayat (Village Council) level in the valley. Besides, other co-operative societies associated with marketing, storage, processing, etc. are playing an important role in arranging supply of agricultural inputs and sale of surplus agricultural production, which are likely to help in the agricultural development of the valley.
J. Proper Management of Soil

It has been mentioned earlier that there has been a progressive deforestation in the catchment areas of the rivers of the Manipur Valley. The problem of soil erosion, soil-wash and siltation is a direct result of deforestation in the valley and its environs. Thus any plan envisaged for soil management must be an integrated one to include both the valley and the hills. Apart from reckless felling of trees for firewood, timber supply and permanent cultivation, the practice of shifting cultivation has posed a serious problem to soil conservation. It is to be noted that as the population pressure in the hills has increased, the periodicity of Jhumming has decreased from 10-15 years to 5-7 years resulting in an increased rate of deforestation. Consequently the frequency of flash-floods and droughts has increased causing not only soil erosion, but also heavy siltation of the river beds and swamps. Suggestions have been made for speedy progress of afforestation and development of pastures in the areas where the problem of soil wash and soil erosion is acute. Social forestry programmes should be taken up on massive scale. With the adoption of these measures the problem of soil erosion and soil wash is likely to be, at least partly, solved, particularly in the foot-hill zones of the valley.

Land-use planning can be successful if only it is based on a scientific knowledge of the physical and chemical properties of the soils. No proper identification of the soils has so far been made in the valley. It is, therefore, suggested that soil testing centres, with modern equipments, be set up in different physiographic situations to ascertain the properties of their soils for application of necessary measures as also for suitable choice of the crops.

4. Introduction of Rural Industries:

It is now well realised that all round agricultural development is not feasible without a corresponding development in the industrial sector of the economy. Transformation of agriculture should not be considered as an isolated phenomenon. It needs support from industry which can provide the requirements for higher productivity, such as fertilizers, agricultural implements, power pumps, etc. Rapid agricultural growth would lead to a corresponding demand for the technological inputs from the industrial units.

The integration of agriculture, industry and services is of great importance in ensuring an economic prosperity of the valley. Almost all sorts of manufactured materials are imported to the State, many market oriented, light-foot and agro-based industries may be established in the valley. This will not only relieve pressure on agriculture but also give incentive to increase and modernize agriculture. The establishment of
Khandesari Sugar factories at Wangbal and Kabaw Wakching and the Glucose factory at Milakuthi, for example, has been giving incentive to sugar-cane and maize growers of the valley.

Taking into account the features and trends indicated by block level economic data, and against the back-drop of the needs of the different areas, sectors and social milieux, the following agro-based industries may be suggested for the valley: (i) Rice milling, (ii) Wheat and Pulse grinding, (iii) Vegetable processing, (iv) Fruit canning, (v) Oil pressing, (vi) Saw milling-cum-furniture making, (vii) Falsa-apple fibre processing, (viii) Diary farming, etc.

(i) *Rice Milling*: Paddy is the only principal food crop of the valley and 2,52,005.7 tonnes of it is produced annually. The greater part of the paddy grain in the valley is either pounded manually by hand in millers for consumption. A large number of rice mills, therefore, can be established in the valley. Such mills will, apart from processing rice, turn out useful by-products like chaff and husks in large quantities and ease transport difficulties now faced by both rice growers and consumers. Kakching, Wangoi, Nambol, Noirang, Yairipok, etc., are some of the best areas where rice mills can flourish. During the lean season these mills can be used for processing other produce like chilli and turmeric powder, with minor modifications of the machinery.
(ii) Wheat and Pulse Grinding: The area under pulse and wheat has been growing steadily. Most of the pulses and wheat produced in the valley have to be transported over large distances for processing. It is expected that the area under wheat and pulse are likely to increase. If arrangements for processing can be made near the producing centres, the peasants may be able to obtain a more remunerative price.

(iii) Vegetable Processing: The valley produces a large quantity of vegetables. A unit for dehydration and processing of tomato, pea and cabbage can be set up at Imphal.

(iv) Fruit Canning: Pine-apple, orange, and various other fruits grow abundantly in different parts of the valley and the hills of the State, but because of the inaccessibility of transport and limited local market, the farmers do not get a fair price for their produce. Fruit processing and canning units, therefore, can be profitably established at a suitable centres like Thoubal and Bishenpur.

(v) Oil Milling: In order to meet the local demand for edible oil and in view of the increasing area under oil seeds, there is ample scope for locating oil mills at Thoubal, Moirang and Imphal area, while a ginger distillation plant can be established near Churachandpur for processing ginger oil.

(vi) Saw Milling-Cum-Furniture Making: At present most of the saw
mills of the valley are located at Imphal and its peri-urban areas. Taking into consideration the exploitation of forest resources in and around the valley, there are ample scope for setting up of saw mills at Sugma, and Churachandpur.

(vii) Pine-apple Fibre: There is possibility to establish small units for processing pine-apple at Thoubal, Bishenpur and Churachandpur, where it is abundantly grown. Thus, the establishment of such small scale industries will help the villagers to make more profit from the production of pine-apple.

(viii) Dairy Farming: The development of pasture in the valley can easily help the development of well maintained dairy farms. A plan for six dairy farms, each with 1,000 cattle, might successfully be implemented on collective co-operative basis at Kongpokpi, Moirang and Mayang Imphal areas of the valley. More grasses can easily be obtained from the hill slopes and marshy areas of the valley. These centres are situated on the State and National Highways. The other dairy centres can be located at Lenlai, Saiton and Makching. They are not far away from the main transport lines of the State. Cattle may be kept in these centres with more care by the individual farming families and processing of milk and milk products can be done at their collective centres.