CHAPTER II

CHANGES IN LAND-USE PATTERNS

With 76.3 per cent of its area under net cultivation (as against the national average of 44.4) in 1966, Punjab ranked first in the country in this regard (Table 1). This distinctive position of the state is largely the outcome of (i) early settlement going back at least to 2500 years before Christ\(^1\) which furnished enough of time for the expansion of land occupancy; (ii) intense pressure on land impelling the cultivation of every possible culturable waste land; (iii) fertile alluvial soils, sufficiently high temperatures the year round, a well developed system of irrigation and use of improved farm husbandry practices which enabled not only the colonization of new lands but also the extension of cultivation on otherwise marginal lands; and (iv) energetic men folk of the state who put untiring efforts in extending the domain of the plough. Out of the remaining 23.7 per cent area of the state, nearly one-half (i.e. 12.3 per cent) was under settlements, roads, canals, railroads, water bodies, hills, drainage lines etc., and thus was not available for cultivation. The other one-half was jointly shared by the culturable waste land (6.0 per cent) and fallow land (5.0 per cent). Forests covered only 0.3 per

Table 1

INDIA

Land Utilization in Different States
1965-66
(Figures in percentage)

<table>
<thead>
<tr>
<th>India/State/Union Territory</th>
<th>Net Area Sown</th>
<th>Fallow Land</th>
<th>Land Not Available for Cultivation</th>
<th>Culturable Waste Land</th>
<th>Culturable Waste Land for Cultivation</th>
<th>Forests</th>
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DNA: Stands for Data Not Available.
cent. These have been cleared long since as settlement extended. With the concerted efforts of the people and the government, culturable waste land and fallow land in Punjab came down from 10.1 to 6.0 per cent and from 11.5 to 5.0 per cent respectively during 1951-66. As a consequence, net area sown in the state increased from 67.5 to 76.3 per cent (from 8,651,932 to 9,457,634 acres) during the same period. This positive change is largely connected with the extension of irrigation, mounting population pressure on land, enactment of a few land reforms aiming at the extermination of the feudal system of land occupancy and the increase in mechanization (number of tractors increased by about 10 times during 1951-66).

However, to have a comprehensive view of land-use patterns and changes therein, each land-use category will be subjected to a detailed discussion below.

Net Area Sown

Net area sown is the area on which crops have been sown at least once a year. It is exclusive of area sown more than once. As already mentioned, Punjab had

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2 a) The Punjab Occupancy Tenants Act, 1952;
b) The Punjab Security of Land Tenures Act, 1953;
c) The Pepsu Occupancy Tenants Act, 1952; and
Punjab
Net Area Sown as Percentage of Total Area
1951
DATA BY ASSESSMENT CIRCLES

Source of Data: Unpublished Revenue Records (Lal Kitobs)
Punjab
Net Area Sown as Percentage of Total Area 1966
DATA BY ASSESSMENT CIRCLES

Source of Data: Unpublished Revenue Records (Lal Kitabs)
76.3 per cent of its area under this category (Maps 23 and 24). However, such a high proportion of net area sown is not true for all parts of the state. Rather it shows striking regional variations within the state, ranging from 14.7 per cent in Kandi assessment circle of Hoshiarpur tahsil to 91.8 per cent in Faridkot tahsil (Map 24). The sub-montane zone (the Siwalik hills and upper parts of the foothill plain) is the least cultivated part of the state. In this tract the proportion of net area sown ranges from 14.7 per cent in Kandi circle of Hoshiarpur tahsil to 59.8 per cent in Kandi circle of Pathankot tahsil. However, majority of the units here have less than 30 per cent of their area under this category. 

Hilly and dissected terrain, extensive soil erosion, limited irrigation and acquisition of large chunks of land by the government for afforestation schemes mainly account for this phenomenon. The proportion of net area sown is also low in the urban circle of Amritsar and city circle of Jullundur tahsils due to the predominance of urban land-use.

The flood plains of the Sutlej, the Beas and the Ravi, where rivers occupy a considerable proportion of the land under their beds, show 50 to 70 per cent of the area under net cultivation. Apart from a large part of area under river beds, recurring floods and consequent waterlogging also kept some parts of the flood plains out of cultivation. Similarly, the proportion of net area sown is moderate
(50 to 70 per cent) in Ajnala tahsil and its adjoining Miran Kot assessment circle of Amritsar tahsil where waterlogging is a serious problem. Parts of the foothill plain and the whole of Phagwara tahsil, where substantial amount of land has been damaged by seasonal streams, also fall in this category.

By comparison, the flat, fertile and extensively irrigated upland plains, jointly covering about four-fifth of the state's area, are distinguished by their very high (70 to 92 per cent) proportion of net area sown. The extent of cultivation has achieved its near saturation level in these tracts. However, intra-regional variations within the upland plains are largely related to the differences in the area under non-agricultural uses.

In sum, flat, fertile, abundantly irrigated and hence ideally suited for farming, the upland plains of Punjab are much more cultivated than the flood plains and the sub-montane zone. As a matter of fact, present patterns of net area sown are the ultimate outcome of the changes which it had experienced in the past. These changes have been dealt with as follows:

Changes in Patterns of Net Area Sown

Net area sown in Punjab increased from 67.5 per cent in 1951 to 76.3 per cent in 1966, giving a positive change
Punjab
Change in the Percentage of Net Area Sown 1951-1966
DATA BY ASSESSMENT CIRCLES

Difference in Percentages of 1951 and 1966

Source of Data: Unpublished Revenue Records (Lai Kitabs)
The magnitude of change, however, differs markedly in different parts of the state (Map 25). Out of a total of 120 assessment circles in Punjab, as many as 99 recorded increase and the remaining 21 suffered decline. For detailed investigation into the spatial variations in changes in this category, Punjab may be divided into the following three types of areas:

A: Areas where increase in the proportion of net area sown was more than 10 per cent;

B: Areas where increase in the proportion of net area sown was less than 10 per cent;

C: Areas where the proportion of net area sown suffered decline.

A. The southeastern Punjab, comprising Patiala, Sangrur, Nabha, Rajpura, and Mansa tahsils formed the most extensive tract recording an increase ranging from 11.3 to 41.6 per cent in net area sown during the period under review. This increase was largely at the cost of

3 The difference in percentage of 1951 and 1966, i.e. percentage for 1966 minus percentage for 1951, is taken as an index of change in this chapter. For example, if net area sown as percentage of total area in 1951 in any enumeration unit is 70 and the corresponding figure for 1966 is 80, the change is +10. Similarly, if such a percentage for 1951 is 60 and that for 1966 is 50, the change is -10. In other words, the change is expressed in terms of absolute difference in percentages of both the years.
culturable waste land and fallow land. The whole of this area was under the rule of local princes before Independence. Under the prevailing feudal system of land occupancy, the landlords used to stay in their luxurious urban homes with no interest in the development of their rural landholdings. The flood affected areas in the flood plain of the Gharaggar and its tributaries in southwestern parts of Patiala tahsil were kept under forests and grasses by the princes for game. After Independence, the princely states were merged into the Indian Republic and a planned development was initiated through the five year plans. Land reforms, including imposition of ceiling at 30 standard acres on landholdings were enforced through legislation. Such reforms signalled the danger of confiscation of surplus lands lying waste with land owners. As a result, the landlords started disposing of their land in haste at low prices. This stimulated large scale in-migration to this part of the state from the over-crowded but relatively more progressive northern Punjab. Many new lands in this tract were reclaimed by these in-migrants who cleared forests, levelled the area and brought it under the plough. At places, the task of reclamation of culturable waste lands was expedited with the help of heavy machinery provided by the government on credit basis. In addition to the reclamation of new lands, a substantial amount of fallow land was also pressed under regular cultivation. This
development was largely facilitated by the extension of irrigation. Formerly a part of the princely state, the Kapurthala tahsil with an increase of 30.8 per cent (from 40.2 per cent to 71.0 per cent during 1951-66) in its net area sown also falls in the same category. Western half of this tahsil forms a part of the flood plain of the Beas. Feudal system of land occupancy in the past, and floods and resultant waterlogging in its western half kept large tracts of land in this tahsil out of cultivation. The construction of a bundh (an artificial levee) along the left bank of this river reduced the incidence of floods and diminished waterlogging. This permitted the extension of area under cultivation to a large extent.

The flood plain of the Sutlej is another tract of Punjab where proportion of net area sown increased from 15.8 to 37.9 per cent during 1951-66. The construction of Bhakra and Nangal Dams on the river Sutlej reduced the frequency as well as the extent and intensity of floods in this zone. Consequently, the incidence of waterlogging was also reduced. As a result, large pockets of new lands were made available for reclamation. The government allotted most of such lands either to ex-servicemen or to landless scheduled caste people who developed them for intensive cultivation. The check on floods also permitted the native farmers to bring their marginal lands under regular cultivation, thereby reducing the extent of fallow land. It follows that the damming of the
Sutlej river not only freed this tract from floods but also enabled the expansion of its agricultural frontiers.

Bet Ravi and Miran Kiran assessment circles of Gurdaspur tahsil, and Miran Kiran and Nehri assessment circles of Batala tahsil, forming a contiguous tract in the Upper Bari Doab also recorded an increase by 10.6 to 15.6 per cent in the proportion of net area sown. Reclamation of large tracts of waterlogged and saline lands by draining out sub-soil water accounts for this development. The increasing emphasis on tubewell irrigation which reduced waterlogging and provided water for the reclamation of saline lands on one hand and extension of regular cultivation on fallow lands on the other also was partly responsible for this gain. Likewise, another tract comprising Dona and Manjaki circles of Nakodar tahsil and Dona Lehnda circle of Jullundur tahsil registered an increase ranging from 11.6 to 15.4 per cent in net area sown mainly due to the increase in irrigation. An increase by 12.8 per cent in net area sown in Rohi circle of Fazilka tahsil is attributable mainly to the growing mechanization with which even some of the marginal lands, especially on large farms, could also be brought under the plough.

It follows that larger increase in net area sown was a characteristic of three types of areas: (i) erstwhile princely states; (ii) flood plains and (iii) where irrigation
has been recently introduced or augmented. In the first case abolition of Zamindari system (absentee landlordism) and the enactment of land reforms (including the fixation of ceiling on landholdings) enabled extension of cultivation on large tracts of land lying waste; in the second case control on floods permitted regular cultivation on flood affected and marginal lands; and in the third case increase in irrigation reduced the fallow land thereby giving a fillip to net area sown. Underlying this entire process was the rapid growth of population, especially since Independence, and consequent demand for cultivable land.

B. Out of 120 assessment circles in the state, as many as 70 recorded an increase varying from less than 1 to 10 per cent in net area sown. Most of these units are located in the upland plains, the chol-infested foothill zone and the Siwalik hills. Practically, the whole of the cultivable area in the upland plains of the Upper Bari Doab, Bist Doab and the Malwa (except the southeast) was already brought under the plough by 1951 (Map 23). The plain topography, fertile soils and long introduced irrigation were instrumental in extending the frontiers of cultivation to their near limits at an early date in these tracts, thereby offering little scope for further expansion. Whatever small increase in net area sown was observed in these plains was largely related to the decline in fallow land rather than the reclamation of new areas. The
oho-infested foothill zone and the Siwalik hills jointly form another tract where the increase in the proportion of net area sown was small (0.6 to 8.0 per cent). Hilly and dissected terrain, soil erosion and limited irrigation were the major factors which did not permit any notable expansion of net area sown here.

Thus, small increase in net area sown was characteristic of two contrasting types of areas; (i) upland plains, already under effective occupation for long, offering limited scope for further expansion and (ii) hills and foothill zone where physiography obstructed its expansion.

C. Though Punjab as a whole registered an increase in the percentage of net area sown, yet as many as 21 assessment circles recorded decline in this regard. By and large, areas under persisting menace of severe floods, waterlogging and soil erosion have suffered loss in the percentage of net area sown.

Parts of the Siwalik hills and oho-infested foothill plain comprising Seoti II circle of Kharar tahsil, Ghar circle of Ropar tahsil, Changer circle of Anandpur Tahsil, Kandi and Rakar circles of Dasuya tahsil and Andhar circle of Pathankot tahsil have registered decrease (0.7 to 6.6 per cent) in the percentage of net area sown. Some of the agricultural lands in these areas have gone out of cultivation due to continued
soil erosion associated with lateral shift of some seasonal streams. A part of the decrease in Andhar circle of Pathankot tahsil (bordering with Pakistan) was also due to the acquisition of land for defence purposes.

A few assessment circles in the Upper Bari Doab recorded decline ranging from 2 to 29 per cent. Worsening of waterlogging conditions in these areas is mainly responsible for such a high decline. As a matter of fact, a considerable part of the Upper Bari Doab has remained under waterlogging conditions of differing degrees in the recent past. Less severely affected areas, however, have been reclaimed while those damaged seriously went out of cultivation. The exceptionally large decline of 28.9 per cent in net area sown in Bet Beas circle of Gurdaspur tahsil was largely due to the severity of recurring floods and consequent waterlogging, particularly during the mid-fifties, which rendered a large part of its land unfit for cultivation. In this assessment circle, the proportion of land not available for cultivation increased by 17.7 per cent and culturable waste land by 10.1 per cent during 1951-66.

A few assessment circles in southern Ferozepur district also recorded a marginal decline in percentage of net area sown. This trend was partly related to the loss of some cultivated land due to the construction of Rajasthan canal and Sirhind Feeder passing through this tract and
partly to the abandonment of inferior barani (unirrigated) lands, especially on large farms, due to the improvement in irrigation. Under increased and assured irrigation, fertile and irrigated lands were given greater attention while unirrigated dune infested fields especially if located distantly from the village settlement were sown only during climatically favourable years or were abandoned altogether.

It follows that although Punjab was a widely cultivated state even in 1951, yet it recorded a considerable increase in its net area sown during 1951-66, by way of extension of regular cultivation on cultivable waste land and fallow land. Such a development, however, was more a phenomenon of the erstwhile princely states, flood plains and the areas where the increase in irrigation was substantial. By contrast, the upland plains, where the cultivation had already reached its near ultimate limits and the sub-montane zone where physiography is adverse have registered small change in their net area sown. Nevertheless, the all-out effort to increase the net area sown testify the growing hunger for additional land in the wake of fast increasing population.

Fallow Land

'Fallow land' refers to all those cultivated lands which remain temporarily out of cultivation for a period of at least one crop season to a maximum of four consecutive
Punjab
Fallow Land as Percentage of Total Area
1951
DATA BY ASSESSMENT CIRCLES

Source of Data: Unpublished Revenue Records (Lai Kitabs)
Punjab
Fallow Land as Percentage of Total Area 1966
DATA BY ASSESSMENT CIRCLES
Source of Data: Unpublished Revenue Records (Lal Kitabs)
years. If the land remains uncropped for more than four years in succession, it is included in the category of 'culturable waste land'. Fallow land is further classified into two categories - (i) current fallow and (ii) fallow land other than current fallow. In case a piece of land is left uncropped for one crop season of the year, it is termed as 'current fallow' but if it is not sown for a minimum of one to a maximum of four consecutive years, it is classified as 'fallow land other than current fallow'. Since the state revenue records maintain data for only the 'fallow land other than current fallow', the present discussion is confined only to this type.

In 1966, Punjab had only 5 per cent (as against the national average of 7.4 per cent) of its area under this category. In addition to the universal exigency of more intensive use of land in the wake of rapid population growth, the greater facility of irrigation in Punjab explains the lower percentage of fallow land in the state (Maps 26 and 27). There are, however, significant areal variations in the proportion of fallow land as is evident from Map 27.

The southwestern Punjab is marked with relatively high (5 to 18 per cent) proportion of fallow land. Semi-dry climate (annual rainfall ranging from 9 to 20 inches with variability as high as 35 to 50 per cent), inadequate irrigation and large landholdings (averaging 14 to 23 acres)
are mainly responsible for the larger amount of fallow land in this region. Under the prevailing climatic situation, marginally productive lands, especially on large landholdings, remain uncropped during bad rainfall years. Ajnala tahsil of Amritsar district, central Bist Doab and parts of the flood plains of the Sutlej and the Beas constitute another group of areas where fallow land ranges between 5 to 12.5 per cent. Waterlogging is the underlying factor for larger amount of fallow land in these tracts. This land-use category accounts for 7 to 9 per cent of the total area in southeastern Punjab where hard clayey soils in parts are cultivated only during better rainfall years. The continuance of large landholdings for one reason or the other in this region has also permitted greater fallowing. In the remaining areas of the state, fallow land nowhere exceeds 5 per cent.

Thus, fallow land is more a characteristic of dry areas with inadequate irrigation facilities and having large landholdings. It is relatively high in waterlogged areas as well.

Changes in Patterns of Fallow Land

Fallow land in Punjab recorded a significant decline ranging from 1,400,094 acres in 1951 to 624,735 acres in 1966. As a result, its proportion to the total area came down from 11.5 to 5 per cent. This is a manifest expression
Punjab
Change in the Percentage of Fallow Land 1951-1966
DATA BY ASSESSMENT CIRCLES

Difference in Percentages of 1951 and 1966

Source of Data: Unpublished Revenue Records (Lali Kios)
of increasing pressure of population on the cultivated land. The extension of regular cultivation to fallow lands was facilitated mainly by the extension and intensification of irrigation, increasing tempo of mechanization, improving agronomic practices, declining incidence of floods, and draining out of sub-soil water in waterlogged areas. As many as 96 assessment circles of Punjab out of a total of 120 recorded decline in the proportion of fallow land. The rate of decrease, however, was not uniform in all the areas (Map 28).

The flood plains of the Sutlej, the Beas and the Ravi recorded notable decline (ranging from 7.3 to 30.2 per cent) in the percentage of fallow land during 1951-66. This is associated largely with the adoption of flood control measures and channelization of the rivers. Many parts of the Upper Bari Doab and Maira circle of Dasuya tahsil also recorded a considerable decline (6.4 to 17.0 per cent) in the extent of fallow land. Draining out of sub-soil water by way of digging additional drains and developing tubewell irrigation, enabled the extension of regular cultivation on lands left as fallow in these areas. The decrease in fallow land in Phagwara and Hoshiarpur tahsils by 5.6 and 5.1 per cent, 4 Extension services aiming at educating the farmers concerning better methods of cultivation, such as dry farming, green manuring, use of better implements etc., played a significant role in bringing a change in farming techniques in Punjab.
respectively, is due to the extension of irrigation and channelization of local seasonal streams.

A wide irregular belt spreading along the southern boundary of the state constitutes another tract of considerable decrease ranging from 5.6 to 18.3 per cent in the proportion of fallow land. The extension of irrigation from Bhakra canal system, augmentation of water supply in the Sirhind canal system and increase in mechanization of agriculture have facilitated the regular ploughing of most of the fallow lands in this tract. Extension of irrigation was again responsible for effecting a decrease by 8.4 to 16.7 per cent in the proportion of fallow land in Manjaki and Dona circles of Nakodar tahsil, Dona Charda circle of Jullundur tahsil and the old flood plain of the Sutlej in Ludhiana district.

Though most of the state recorded a decline in the proportion of fallow land, yet 21 of its assessment circles registered a reverse trend in this regard. The increase in most of these assessment circles was marginal (less than one per cent). The only area with some notable increase in fallow land was the southern part of the Ferozepur district where neglect of some unirrigated marginal lands, especially on large landholdings, led to this development.

It follows that fallow land in Punjab shrank to less than half during 1951-66. This decrease was more typical of those flood plains which had been made flood free, of those dry areas which had been provided with irrigation and of those
Punjab
Culturable Waste Land as Percentage of Total Area
1951
DATA BY ASSESSMENT CIRCLES

Source of Data: Unpublished Revenue Records (Lai Kitabs)
Punjab
Culturable Waste Land as Percentage of Total Area
1966
DATA BY ASSESSMENT CIRCLES

Source of Data: Unpublished Revenue Records (Lal Kitabs)
waterlogged areas which had been reclaimed by draining out of excessive sub-soil water.

Culturable Waste Land

All the cultivable areas which are either awaiting cultivation or have gone out of cultivation for a period of at least four successive years are classified as 'culturable wastes'. Included in this category are the pastures and grazing grounds, rough tree and bush vegetation lands, swampy flood plains, waterlogged or soil-eroded areas, village commons, etc. Only 6.0 per cent of Punjab's area was lying as culturable waste in 1966 (Maps 29 and 30). Such a low proportion of area under this category is not surprising if viewed in the context of heavy population pressure, long history of settlement and considerably developed irrigation system in the state. There are, however, striking intra-state variations in the proportion of culturable waste land, ranging from 0.2 per cent in Mansa tahsil to 53.6 per cent in Rakar circle of Dasuya tahsil (Map 30).

The Siwalik hills and their foothill zone constitute the most extensive tract with a high proportion of culturable waste land ranging from 10.2 to 53.6 per cent of the total area. This tract suffers from acute soil erosion due to indiscriminate deforestation during the last hundred years or so. As a result, a lot of land was rendered marginal.
Some land in this tract could not be put to cultivation due to the absence of irrigation, while some could not be tilled because of susceptibility to erosion. In addition, many such areas have been declared 'protected' by the state government under soil conservation programme over which only a controlled form of grazing is permitted.

Flood plains of the Ravi, the Beas and the Sutlej, are the other areas which recorded relatively high proportion (10.3 to 38.3 per cent of total area) of culturable wastes. Though the menace of floods has been greatly checked here, yet the new flood-free areas which were severely waterlogged require considerable time, money and effort for complete reclamation. Likewise, a considerable amount of marshy land along the upper course of White Bein (seasonal stream) in Phagwara tahsil remains as culturable waste. In addition, some cultivated land in the Upper Bari Doab has been rendered as culturable waste due to excessive waterlogging.

By contrast, the fertile flat and intensively irrigated parts of the upland plains in the Upper Bari Doab, Bist Doab and the Malwa region show only a small percentage of their area under culturable wastes. Practically all cultivable lands in these areas had already been brought under the plough.

Thus, the culturable waste lands are confined generally to the severely exposed sub-montane zone, low lying flood plains, and waterlogged tracts in the upland plains. All of
these areas are suffering from one or the other physical handicap in relation to agriculture.

Changes in Patterns of Culturable Waste Land

As already stated, culturable waste lands in Punjab have been shrinking over the years. They decreased from 1,314,088 acres in 1961 to 741,717 acres in 1966, which brought down their proportion in the total area from 10.1 to 6.0 per cent. This development was necessitated by intensifying pressure of population on land, was facilitated by extension of irrigation, and was speeded up by enforcement of land reform acts. There were, however, strong areal variations in the reclamation of culturable wastes, depending largely upon their availability (Map 31). In some areas there was a marginal increase in culturable waste land also.

The greater decline in the extent of culturable waste land took place in the southeastern part of the state. This was the area which was previously under the rule of local princes and had considerable land lying waste as a legacy of the prevailing feudal system. As stated before, this land was purchased, reclaimed and brought under cultivation by the hard-pressed-for land migrant cultivators from the crowded areas of northern Punjab. The flood plains of the Sutlej and the Beas also recorded a decline of 6 to 10 per cent in their culturable wastes. Reduction in the incidence of floods enabled the reclamation of such lands here. Some of these
lands were allotted to displaced persons from West Pakistan and some to scheduled castes, and the remaining were purchased by the local population. The Dhak circle of Nawanshehr tahsil and Sirwal circle of Hoshiarpur tahsil, where irrigation has substantially increased and a few seasonal streams have been channelized, also experienced a decline in the extent of culturable waste land. In the rest of Punjab the decrease in culturable waste land was nominal since the cultivated land had already stretched to its near limits. Rather, there was some increase in this type of land in waterlogged areas.

Thus, the spatial picture of decrease in culturable waste land during 1951-66 is the reverse of that of the increase in net area sown during the same period. As a result, regional variations in the proportion of net area sown to total area, as also the proportion of culturable waste land, have narrowed down during this period.

**Land Not Available for Cultivation**

Land not available for cultivation is the one which is either not cultivable due to some serious physical handicap or is devoted to non-agricultural uses. As such, it includes the unproductive land under barren hill slopes, non-reclaimable saline-alkaline soils, river or stream beds, etc., on the one hand, and highly intensively used land under urban and rural settlements, industries, military installations etc., on the other. Punjab had 12.3 per cent (as against the national average of 15.5) of its area under this land-use category in
Punjab
Land Not Available For Cultivation
as Percentage of Total Area
1951
DATA BY ASSESSMENT CIRCLES

Source of Data: Unpublished Revenue Records (Lali Kitabs)
Punjab
Land Not Available For Cultivation
as Percentage of Total Area
1966
DATA BY ASSESSMENT CIRCLES

Source of Data: Unpublished Revenue Records
(Lal Kitabs)
1966 for which the presence of dense network of roads and canals, closely spaced rural and urban settlements, defence installations and drainage lines are largely responsible (Maps 32 and 33). The proportion of land not available for cultivation, however, varies from 1.3 per cent of total area in Patiala tahsil to 72.4 per cent in Kandi circle of Hoshiarpur tahsil (Map 33).

The Siwalik hills constitute the most extensive tract with high proportion (20 to 72 per cent) of its area under this category. This is understandable in the context of badly dissected hilly terrain of this tract. The flood plains of the Ravi, the Beas and parts of the flood plain of the Sutlej also show high percentage (17 to 46 per cent) of their area under this category. The presence of wider river beds and numerous marshy pockets of land account for this phenomenon. As compared with these areas suffering from severe physical handicaps for agriculture, the urban assessment circles of Jullundur and Amritsar recorded 38.7 and 48.8 per cent of their land under this category. It needs no elaboration to say that this land is under intensive urban land-use.

The proportion of land not available for cultivation ranges from 1 to 14 per cent in the upland plains. This land is generally under non-agricultural uses, such as canals, roads, settlements, etc. The variations in this category of land-use
Punjab
Change in the Percentage of Land Not Available for Cultivation 1951-1966
DATA BY ASSESSMENT CIRCLES

Difference in Percentages of 1951 and 1966

Increase
Decrease

Source of Data: Unpublished Revenue Records (Lai Kitabs)
within the upland plains are a function of density of roads, canals, settlements, drainage lines and incidence of waterlogging. As a result, the more developed and crowded northern half of Punjab recorded higher proportion of land not available for cultivation than its southern counterpart.

Changes in Patterns of Land Not Available for Cultivation.

Area under this category increased from 10.9 per cent (1,404,371 acres) of the total area in 1951 to 12.3 per cent (1,522,563 acres) in 1966, in association with the growing demand of land for non-agricultural uses. Construction of new roads and canals, putting up of new defence installations etc., and lateral expansion of rural and urban settlements are mainly responsible for this increase. In many cases it has meant a loss of first class agricultural land. The time has come for a rational allocation of land to various uses and preservation of quality land for agricultural use only. This requires intensive land-use and other related studies.

It is noteworthy that land not available for cultivation increased in 100 out of 120 assessment circles in the state (Map 34). While this increase reflects growing tempo of development in the fields of road construction, canal irrigation and urban growth, it also means a loss of precious and scarce agricultural land practically for all times. In the urban assessment circle of Jullundur and western Bet assessment circle
of Ludhiana, the proportion of land not available for cultivation increased by 13.1 and 5.8 per cent, respectively.

The 20 assessment circles which experienced a decrease in the proportion of land not available for cultivation are confined mostly to the flood plain of the Sutlej. The construction of the Bhakra Dam on this river not only checked the menace of floods but also narrowed the width of its water current. As a result, some new land was made available for cultivation and for other uses. None the less, there is an unmistakable tendency towards increase in land not available for cultivation. This is more true of areas with faster rate of development. The urban sprawl over the surrounding countryside is a common phenomenon. To what extent an agricultural society, like that of Punjab, can afford this trend is a moot point.

**Forests**

All those areas which are actually wooded and are governed by 'forest' laws, whether owned by the state or private bodies, are included in this category. Hardly 0.3 per cent of the Punjab’s area was under "forests" in 1966. Even of this, a large part is covered by planted trees. True forests are only associated with the higher sections of the Siwalik hills. The planted belts of trees
are found on state waste lands, or along roads, railroads, canals etc. The government is fully seized of the problem of lack of forests in the state and has been trying to plant millions of new trees on hills, on state waste lands and along roads and canals. However, the possibility of expanding area under forests is rather remote.

CONCLUSIONS

With about three-fourth of its area under net cultivation in 1966, Punjab was the most extensively cultivated state of the country. A long history of settlement, plain topography, fertile alluvial soils, fairly developed system of irrigation and constantly increasing demand for more of cultivable land are among the factors responsible for bringing this distinction to Punjab. Out of the remaining one-fourth land, one-half is not available for cultivation being under settlements, roads, canals etc., or is just unsuitable for agriculture. The other half is shared equally by the culturable waste land and fallow land. The area under these two categories, as a matter of fact, is the only potential for further expansion of net cultivation. Unfortunately, forests in the state cover only a negligible area.

According to the forest law, wooded areas along the roads, railroads, canals etc., are included in this category.
The areal variations in Punjab's land-use are fairly represented by the spatial patterns of net area sown the distribution of which is complementary to culturable waste land, fallow land and land not available for cultivation. The proportion of net area sown to total area is the highest in the upland plains. The culturable waste land in the state is largely confined to the sub-montane zone, the flood plains and areas affected by waterlogging. Fallow lands of the state are mostly associated with the semi-dry southwest, waterlogged parts of the flood plains and the areas formerly ruled by local princes in the southeast.

The reclamation of new lands and extension of regular cultivation to fallow lands brought about a considerable extension in net area sown in the state during 1951-66. Culturable waste lands and fallow lands were reduced to half and the proportion of net area sown increased from about two-third to three-fourth of the total land during this period. Larger increase in net area sown, however, was a characteristic of (i) the areas associated with erstwhile princely states where a lot of land was lying waste under the then prevailing feudal system of land occupancy; (ii) flood plains of the Sutlej, the Beas and the Ravi, where adoption of flood control measures ensured much greater safety to crops and enabled extension of regular cultivation to many a fallow and culturable waste land and (iii) the north central upper Bari Doab where reduction in waterlogging conditions and the
southern Punjab where extension of irrigation brought about a sizeable fall in fallow lands. By contrast, net area sown could not be extended to any notable extent in the sub-montane zone due to the handicaps of terrain and problems of soil erosion, and in the upland plains because of the limited scope for its further expansion.

The frontiers of cultivation in Punjab seem to have been stretched to their near limits. The few available culturable waste lands are either marginal in quality or suffer from excessive soil salinity. Meanwhile more and more of good agricultural land is being pressed under non-agricultural uses, such as roads, canals, horizontal expansion of towns and villages, new industries, military installations, etc.

Population pressure on available land resources is constantly on the increase. Under such circumstances, there is an urgent need to formulate plans for a rational and intensive use of the precious land resource.