PART TWO - AGRICULTURAL DEVELOPMENT
CHAPTER VII

LAND USE PATTERN

Land use is a significant aspect of agricultural study. In order to increase food production, a proper utilization of land resources is very essential. The regional study of land use in the Valley indicates that in the Commanded area planned use of land resources has started since after the introduction of canal irrigation in 1960. As a matter of fact, the double cropped area in this compact fertile block has doubled, although there has been no marked increase in the net sown area. On the contrary, still there are some parts, especially ravine lands, where the use of land resources is still inadequate due to the meagre water supply, presence of ravines and ignorance of cultivators. On account of these facts, there has been a decline in the double cropped area. While taking the Valley as a whole, it may be noticed that within last decade (1956-57 to 1966-67) the total cropped area has increased from 904336.4 hectares to 933296.4 hectares, the net increase was about 28960.0 hectares of cultivated land. This increase in the total cropped area was due to the expansion of double cropped area.

Land use pattern in the Lower Chambal Valley is the result of the interaction of a complex set of factors and it is rather difficult to isolate the effect of any one
factor. Nevertheless, the geomorphic and hydrological framework exercise a governing influence.

The control of geomorphic factors on land use in the area will be evident by studying the geomorphic (Fig.30) and the land use maps (Fig.31) of the lower Chambal valley. The analysis brings out clearly that on the Audi-Sawai Hadopur hills, loca plateau and the Harsudara hills agriculture has been practiced only where the soil is thick, profile is well developed, land is fairly level, and soils are clayey and silty in texture. The topography of these parts is undulating, and level surface for cultivation is limited, therefore, extensive forests are characteristic of the hilly and plateau sections. The extensive plain area comprising of Audi, Ratam, Hadpora, Digra, Baran, Pipalsa, Jangra, Kishanganj, Hangrol, Bharatpur and Natah tahsils is fairly level and is well-drained. The soil is heavy clay, getting heavier with depth. Therefore, this portion is geomorphologically very suitable for cultivation. Moreover, in the ravine infested alluvial flood plain of the Chambal, a clear cut relationship between landforms and land use may be noticed. The surface material is sandy loams to loams. The faces of ravines are devoid of vegetation and only small pockets of the flat ravine bottoms are being used for cultivation. However, due to low fertility and meagre water supply this belt is either barren or unculturable waste.
Land use data of the Lower Chambal Valley as usual, is available under five major classes viz., the forest area, area not available for cultivation, other uncultivated land excluding fallow land, fallow land, and arable land. The analysis of each category of land is being given in the proceeding pages. The detailed results of land use pattern of the Valley are given in Appendix Table VI.

FORESTED AREA

The general land use map (Fig. 31) of the Lower Chambal Valley brings out clearly two major forest belts. Firstly, the northwestern belt comprising of the sandi-Kanthambhor-Arauli line of hills. This belt extends from south west to north east. Secondly, the southwestern belt consisting of the stony upland of Kota and the Mukandwara hills. It extends from north west to south eastern direction. Small patches of forests are also found in the plain and ravine lands of the valley, particularly around Sheopur, Vijaipur and Baran.

The data of 1956-57 reveals that the highest percentage of forest was recorded in Vijaipur (42.2%) and Sheopur (25.72%). The percentages between 15 to 25 were found in Bundi, Sewai Madhopur, Shahgarh and Atro tahsils. In the remaining tahsils percentage of forest was below 1.0% of the total geographical area.
The percentages of forest area in 1960-67 has increased in a number of tahsils of the valley. According to these statistics of 1960-67 tahsils of Vijaipur (42.72%), Kishanganj (41.30%), Sheopur (37.64%), Sapatra (30.32%) and Ladpura (39.02%) have conspicuously high percentage of area under forest. The tahsils of Ntru (15.54%), Khendar (15.90%) and Barai Madhopur (15.54%) have percentages of forest area between 13% and 16%. Most of the tahsils have very small area under forest - below 2% of the total geographical area.

The comparative scrutiny of 1950-57 and 1960-67 statistics of forest area would reveal that within this decade the area under forest in some tahsils has increased considerably except Small and Pasan. In most of the tahsils the forest area has increased only because of changes in the landuse categories. Conspicuous increase in the forest area has been reported in Kishanganj and Ladpura tahsils. In 1950-57 the forest area in Kishanganj and Ladpura was 451.2 hectares or 1% and 40 hectares or 0.01% respectively. While the area in 1960-67 in both tahsils increased to 56438.0 hectares or 40.30% in Ladpura and 56348.0 hectares or 40.30% in Kishanganj.

Area not available for cultivation

The high percentage of the total area lying as uncultivable waste is a significant aspect of existing
land use situation of the Lower Chamoli Valley. In this category two types of land are included: land put to non-agricultural uses and barren and unculturable waste.

The land use map (Fig. 31) shows that this type of land is well distributed in the Valley. Maximum concentration is evidently found in the hilly sections and ravine infested areas. In these sections stony nature of land, bold relief, continuous erosion by streams have collectively rendered greater proportion of land under this category.

The study of 1956 - 57 figures of the area not available for cultivation reveal that it was some what greater in nearly all tahsils of the Valley. The statistics indicate that highest percentage of this category was reported in Patan (33.89%), Ledipura (32.83%), Kishanganj (43.50%), Indergarh (39.55%), Sari (53.82%), Baseri (61.70%) and Rajakhera (36.81%) tahsils of the Valley. In the remaining tahsils percentages were below 10.

The figures of 1966-67 show some changes in the area not available for cultivation. The statistics of this year indicate that tahsils of Baseri (53.60%), Sari (47.56%), Bandi (49.91%), Sapotra (38.54%), Rajakhera (31.03%) and Indergarh (36.74%) have highest percentage of area under this class. The highest percentage of this category in these tahsils may be attributed to the stony nature of the land, meagre water supply for irrigation, and dissected ravine topography. Tahsils which have percentages below
30% and not less than 15% are Ladpura (20.00%), Pipalda (20.87%), Sangod (26.1%), Patan (25.68%), Vijaipur (25.95%), Dholpur (15.19%), Sheopur (15.0%), Digod (17.44%), Antah (17.05%) and Khander (24.96%). All these tahsils are astride the Chambal where due to the accelerated erosion by river considerable area has turned into unculturable waste and barren land. The percentage is low in those tahsils where the area is level and of productive soil.

The area under this category between 1956-57 and 1966-67 has increased slightly in Bundi, Digod, Indargarh, Baran, Kishanganj and Sheopur tahsils, otherwise in all the tahsils it has shown a decreasing trend. This declining trend of the area not available for cultivation may be due to the introduction of soil conservation services in the Valley. Due to soil conservation measures much of the ravine-infested area has been brought either under the plough or under permanent vegetation. The details of soil conservation schemes will be given in the next chapter.

OTHER UNECULTIVATED LAND

The scrutiny of the land use statistics would clearly reveal that the Lower Chambal Valley also has a fairly high percentage of other uncultivated land. This class includes, permanent pastures and other grazing lands and the land of those trees and crops which are not included in the sown area.
In the Lower Chambal Valley, the area of the other uncultivated land excluding fallow land was greater in 1956-57 in tahsils of Ladipura (33.62%), Indargarh (20.70%), Kishanganj (40.07%), Sawai Madhopur (26.56%), Shander (20.76%), Sheopur (20.00%), and Vijaipur (20.48%). In most of tahsils this was found about 5%. The minimum percentage was reported in Najakhera tahsil (1.14%).

The figures of 1966-67 indicate highest percentage of other uncultivated land excluding fallow land in the tahsils of Kishanganj (22.21%), Atru (15.74%), Bango (17.15%), Indargarh (16.93%), Sawai Madhopur (21.47%), Shander (27.91%), Sheopur (20.00%) and Vijaipur. The tahsils which have percentage below 10 are few and far between.

Between 1956-57 and 1966-67 there has been a decrease in this class of land in the tahsils of the Chambal Commanded area except Bigha and Ripalda. The reason of this decline is either the provision or reclamation work or changing attitude of farmers around Kota towards the ravine lands after the introduction of canal irrigation. Slight increase in this category of land has been noticed in the tahsils which are closely attached to the Chambal ravines. The reason of this is the continuous fluvial erosion and resultant deterioration of the agricultural lands.

FALLOW LANDS

This includes all the lands which were taken up for
cultivation but are temporarily out of cultivation for a period of not less than one year and not more than 5 years. The reasons for keeping such lands fallow in the Valley are poverty of farmers, inadequate supply of water particularly in the hilly and rainfed lands, and non-profitable nature of farming.

The 1956-57 figures of fallow lands indicate that in none of the tahsils the percentage of fallow land was found more than 10 except Saran (12.84%). The percentage in the tahsils of the Commanded area was somewhat greater than other tahsils.

According to 1966-67 statistics, the percentage of fallow lands between 5 and 12 is found in the tahsils of Pipalda, Indargam, Saran, Mangrol, Azru, Bengan, Amri, Sholpur, Bari, Naseri and Savai Dadanpur. In most of the tahsils the fallow land accounts for about 5% and even below.

Net sown area is a most significant aspect of land use study because it forms the basis of all agricultural activities in the Valley. It represents net area sown with crops and orchards. Double cropping is not included in this class.

The general land use map (Fig. 31) of the Valley indicates that net sown area is concentrated in the south
western part. From the south west it extends in north east and north west directions in descending order. The descending trend of net sown area may be explained by the occurrence of poor soils, low moisture contents in the soils, dissected and undulating hilly and ravine topography.

The distribution of net sown area in the year 1956-57 was interesting. The tahsils of Digod, Pipalda, Saran, Mangrol, Antah, Sangod, Atru and Patan, were accounted for the highest percentage i.e. between 50 - 75. The lowest percentage below 50% was reported in Ladpura (25.06%), Kishanganj (19.35%), Indergarh (26.30%), Bansi (29.51%), and Baseri (18.8%) tahsils of the Valley. The low percentage of net sown area was due to the greater area being under forests and ravine or barren lands.

The map of net sown area (Fig. 32) of 1966-67 shows an interesting areal pattern. The map indicates that the percentage of net sown area in the Chambal Commanded Area including Digod (66.96%), Pipalda (64.20%), Saran (73.00%), Mangrol (66.88%), Antah (62.74%), Atru (55.88%), Sangod (50.36%) and Patan (54.72%) is exceptionally high above 50% of the total area except in Bansi (35%), Ladpura (25.27%), Indergarh (38.70%) and Kishanganj (23.90%). The reasons of greater percentage of net sown area in the Chambal Commanded Area are fertile soils, high moisture retentive capacity of the heavy clayey and clay soils.
adequate irrigation facilities and use of chemical fertilizers.

The map further indicates that the tahsils excluding the Commanded Area have net sown area below 30% except in Sawai Madhopur (38.79%). The lowest percentage of 9.66 is reported in Vijaipur tahsil of Morena district.

The map indicates that the net sown area is also conspicuous in the tahsils of Bholpur (68.91%), Rajakhera (63.28%) and Joura (65.34%). But only ravine infested parts of these tahsils fall within the limit of the Chambai Valley.

The close scrutiny of the statistics of 1956-57 and 1966-67 of net sown area would reveal that there has been a general increase in the net sown area. The net sown area in 1956-57 was 850060.8 hectares while it increased to 864775.2 hectares in 1966-67. While studying the regional progress of expansion of the net sown area it may be stated that in the Commanded Area except in Digod and Ladpura tahsils, in spite of Canal irrigation facility, fertile soil, improved implements, soil conservation services and improved agricultural practices, there has been no marked progress in the net sown area. It is due to very limited scope for expanding net sown area either because of the unfavourable plateau like topography or all the cultivable areas have already been preoccupied. The tahsils which are astride the Chambai throughout show a slight expansion.
of net sown area. This expansion of net sown area under
the adverse conditions seems to be due to reclamation of
gullied and ravine lands.

double cropped area

This category of land represents the area on which
crops are cultivated more than once during the agricultural
year. It is an index which reflects the degree of intensity
with which the present land use is in operation.

In 1956-57 the area under double-cropping was very
limited. Only on 54275.6 hectares of land double-cropping
was practiced. It was unevenly distributed. The maximum
percentage of double cropped area to net sown area was
found in Sholpur (20.58%), Rajakhera (20.52%), Baseri
(23.73%), and Sari (18.11%). In all the tahsil of the
Chambal Command area it was below 8.0%.

In the lower Chambal Valley there has been an increase
in the double-cropped area. It increased from 54275.6
hectares in 1956-57 to 66521.2 hectares in 1966-67. The
highest percentages between 10-12 of double cropped
area to net sown area have been recorded in Nadopura (12.05%),
Sepotra (12.55%), Sholpur (10.78%) and Sawai (11.14)
tahsil.

While taking into consideration the individual tahsil
of the valley it is examined that double-cropped area has
largely deteriorated in Sawai Nadopur, Khander, Sholpur,
Sapotra, Rajakhera, Bari, Baseri, and Sheopur tahsils. It is to some extent due to the non-profitable nature of farming, decline of soil fertility, low rainfall, inadequate irrigation facilities, and negligence of ignorant farmers towards the intensification of agriculture. On the contrary, in all the tahsils of the Chambal Commanded Area there has been a marked increase in double-cropped area. This expansion is due to three factors; availability of water for irrigation, provision of manures and the nature of crops which the farmers intend to grow. In this block there has been an overall progress as regards irrigation facilities. The demand for cereals and cash crops has provided incentive to the farmers for growing more by using manures and fertilizers.

SAMPLE STUDY

The foregoing tahsilwise analysis of the landuse pattern of the Lower Chambal Valley brings out that within ten years (1956-57 to 1966-67) there has been a marked increase in the double-cropped area especially in the tahsils of the Commanded Area. On the contrary, the double cropped area has decreased in the badly eroded tracts due to continuous loss of top fertile soils and meagre water supply for irrigation. In order to justify the results
of the tahsilwise analysis, it is necessary to study the landuse pattern of some of the villages both of the Chambal Commanded Area and that of the ravine lands.

The Chambal Commanded Area*: Since after the introduction of the Canal system in 1960 the planned use of land resources has started in most of villages of the Chambal Commanded Area. As a matter of fact, culturable waste lands have been reclaimed and brought under cultivation. Therefore, both the net sown area and the double cropped area have also shown increasing trend. The table Ia gives a clear picture of land utilization of two representative villages of the Commanded Area.

* The Chambal Commanded Area is not a geographical region but it includes that part of the Valley which is Commanded by the Chambal Canal System (see fig.33).
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Village Year</th>
<th>Total area</th>
<th>Total cropped area</th>
<th>Uncultivated lands</th>
<th>Culturable net sown area</th>
<th>Double cropped area</th>
<th>Irrigated area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>sellop</td>
<td>1956-57</td>
<td>349.00</td>
<td>277.0</td>
<td>76.6</td>
<td>42.0</td>
<td>272.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1966-67</td>
<td>462.0</td>
<td>346.0</td>
<td>52.80</td>
<td>63.2</td>
<td>306.4</td>
</tr>
<tr>
<td>2</td>
<td>diged</td>
<td>1956-57</td>
<td>1762.0</td>
<td>1444.0</td>
<td>138.0</td>
<td>229.0</td>
<td>1362.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1966-67</td>
<td>1866.4</td>
<td>1573.2</td>
<td>166.8</td>
<td>124.4</td>
<td>1449.6</td>
</tr>
</tbody>
</table>

(All figures are in hectares)
The table IX indicates that in both the villages the total cropped area is conspicuously high above 70%. The area under uncultivated and culturable waste lands is very little.

The comparative analysis of the figures of 1956-57 and 1960-67 reveals that the cultivated area, net sown area, double-cropped area and irrigated area has increased in both the villages. The expansion of cultivated area and double cropped area is due to both reclamation of waste lands and introduction of canals. Due to the reclamation works the area under culturable waste lands has decreased.

On the basis of these statistics following two landuse trends may be marked in these villages of the Chambal Commanded Area:-

(i) increase in the cultivated area, and
(ii) reduction in the culturable waste lands.

RAVINE LANDS: A PLAGUE LIKE DISEASE OF LANDUSE

In the Lower Chambal Valley the ravine formation is a plague like disease of land use which slowly but surely engulfing the agricultural lands every year. While studying geomorphic features of the Valley it was observed that the land use pattern and problems in the ravine infested villages are somewhat different than in the uneroded regions. So, a detailed analysis of land use pattern is quite obvious. In the following pages an attempt is being made to examine landuse pattern in this problem area on the basis of selected villages.
Ownership and permanent management of ravine lands

As referred above, the ownership and permanent management of the ravine lands is a distinguishable factor affecting land use. The study reveals that ravine areas at present are under the ownership of three agencies, viz., Panchayat, Government and Private in proportion of 11%, 51% and 38% respectively. Normally the top catchment land of ravine is owned by cultivators and is under the plough with a variety of crops such as jowar, moong, bajra, wheat, urd, gram and mustard. Quite a bit of ravine lands are lying waste. Generally, down below the private land, are the Government waste lands and lands assigned to Panchayats. The Government and Panchayat lands are under various stages of erosion. These are marginal lands under which are medium and shallow ravines. These are the lands where the ignorant farmers generally practice cultivation without ownership. It is a misuse of land. It is assumed that long ago these lands might have been under plough (private ownership) but subsequently have been relinquished by their owners to the Government on account of being rendered useless due to ravine formation. These Government-Panchayat lands, usually support sparse growth of xerophytic species. So according to them what was the immediate necessity to prevent these lands from misuse.

Existing landuse

In order to show the existing state of land utilization in the ravine lands the average of two years (1965-66 to 1966-67) has been taken. The following table gives a picture of land utilization of ten selected villages of the ravine lands of the Valley.
Table A

<table>
<thead>
<tr>
<th>Village</th>
<th>Total area of village in hectares</th>
<th>Total cropped area</th>
<th>Culturable waste land</th>
<th>Fallow land</th>
<th>Grazing land</th>
<th>Uncultivated land</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% to total area</td>
<td>Area</td>
<td>% to total area</td>
<td>Area</td>
<td>% to total area</td>
</tr>
<tr>
<td>1 Oshata</td>
<td>1484.0</td>
<td>736.4 52.99</td>
<td>56.8</td>
<td>3.05</td>
<td>4.8</td>
<td>0.31</td>
</tr>
<tr>
<td>2 Basai Kena</td>
<td>650.4</td>
<td>281.6 33.11</td>
<td>17.2</td>
<td>2.02</td>
<td>34.0</td>
<td>3.69</td>
</tr>
<tr>
<td>3 Badbas</td>
<td>1045.6</td>
<td>492.4 47.03</td>
<td>228.4</td>
<td>21.84</td>
<td>94.4</td>
<td>9.02</td>
</tr>
<tr>
<td>4 Jalalpur</td>
<td>3330.8</td>
<td>89.6 26.60</td>
<td>10.0</td>
<td>24.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Ripalda</td>
<td>1005.6</td>
<td>246.0 24.46</td>
<td>21.6</td>
<td>2.14</td>
<td>51.2</td>
<td>5.09</td>
</tr>
<tr>
<td>6 Shatoli</td>
<td>996.4</td>
<td>367.6 36.39</td>
<td>45.6</td>
<td>4.57</td>
<td>179.6</td>
<td>16.02</td>
</tr>
<tr>
<td>7 Sagar Pada</td>
<td>274.4</td>
<td>144.0 52.47</td>
<td>6.0</td>
<td>2.18</td>
<td>13.6</td>
<td>4.95</td>
</tr>
<tr>
<td>8 Sari</td>
<td>1126.0</td>
<td>574.4 46.85</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Shatial</td>
<td>1607.2</td>
<td>126.0 45.17</td>
<td>40.4</td>
<td>2.51</td>
<td>80.0</td>
<td>5.47</td>
</tr>
<tr>
<td>10 Nal לפורה</td>
<td>900.0</td>
<td>400.0 51.00</td>
<td>126.0</td>
<td></td>
<td>58.0</td>
<td></td>
</tr>
</tbody>
</table>

|
The table indicates that only half of the total area of various villages is under cultivation and of the remaining half, a very large proportion is barren. This is the waste land most of which is under ravines of varying degree. The above table also indicates that in some villages the cultivated land is even less than 40% or mostly below 30%. The field observations reveal that the fields which are reported under cultivated areas in the patwari records, are actually occupied by ravine lands. These lands do not produce anything.

The table further makes it evident that in most of the villages the percentages of culturable wastelands are 2 to 4 except Badbas and Jalalpur villages. In these two villages the percentages of culturable waste lands are 21.84% and 24.94% respectively. The field study in Jalalpur village indicates that this is deserted village. In this village culturable waste land is comparatively high. Within last few years the cultivated land in this village have been eaten away by the continuous enroachment of ravines.

The highest percentage i.e. 18.02 of fallow land is recorded in Jhatoli village. In other villages the percentages are generally below 5.

The area classed under grazing land is sample villages
is actually under ravines of varying degree. The highest percentage i.e. 22.48 is found in Basai Neem village. In Guhata and Khatkar villages percentages are 10.5 and 10.97 respectively. In the remaining villages it is mostly below 10%.

The percentages of uncultivated land are conspicuously high in all the villages under study. The percentages are mostly above 30 except in Badbas (22.3%). The highest percentage is recorded in Pipalda village. The reason of high percentage is that the land of Pipalda is located on the junction of the Chambal and Kali-Sindh, therefore, the agricultural land has been eaten away from all the sides. The percentages of uncultivated land is also high in Jalalpur (48.45) and Barhi (43.06%) villages.

Some conclusions of the landuse pattern according to the classification of the ravines may also be drawn from the Ravine Survey Report of Forest Department, Kota, Rajasthan, (1962-67). The report reveals that G 1 type of ravines are mostly under cultivation. In Rajakhera and Dholpur tahsil nearly 80% of the total ravine area of G 1 type is under plough. The percentages in Kota and Bundi districts vary from 83% to 98%. 38% of G 2 type ravine lands in Dholpur are being cultivated. In Kota and Bundi percentages are 34 and 44 respectively. The percentage of G 3 type under cultivation in Dholpur, Bundi and Kota is 2%, 19% and 6% respectively. All ravine lands which are not under the plough are overgrazed for decades. These
lands at present produce mostly inferior variety of grasses like cisticola etc.

The land use pattern in the ravine lands changes considerably and relatively speaking faster than the uneroded regions. Although no record of land use of previous years is available, yet the author, on the basis of personal inquiry made the following two trends:

(a) reduction in the cultivated area,
(b) decline in the productivity of the soils.

The latter manifests itself in the changes in cropping patterns, decline in crop yield and reduction of double cropped area. The decline in the double cropped area is also noticed in the tansils affected by ravine erosion, as stated earlier.

The foregoing study leads to the following broad generalizations as regards land use pattern in the tansil belt:

1. The study of land utilization spread over a period of 10 years reveals that during this period a change in the land use is seen only in those places where some fundamental alternation has taken place on account of the natural ravine formation or mani factors.

2. The high percentage of area lying as uncultivable waste is mainly confined to areas with arid soil water scarcity, ravine and rugged lands or undulating hilly
topography.

3 In areas where irrigation has been introduced or water supply is adequate the culturable waste has been mostly reclaimed (as in the Chambal Command area).

4 The cropped area in the Chambal Command area as a result of expansion of irrigation facilities has increased while on the contrary there has been a decline in double cropping in the ravine infested areas of the valley due to declining soil fertility and meagre water resources.