CHAPTER X

TYPE-STUDY OF VILLAGES AND THEIR AGRICULTURE

Introduction

The aim of village surveys, the reports of which appear in the following pages, has been to review the condition of agriculture at the village level and to bring out its salient features. These villages are typical in the sense that they represent variety in form and functions with respect to agriculture.

To be sure, the north Indian villages are very similar to each other in many ways, yet despite their apparent homogeneity, they are different from each other in degree, if not in kind. Each and every village has its own individual line of growth, its own span of variation and its own traditions. It also has its own level of existence and its own problems and their solutions.

In Bundelkhand, where roughly 7,800 villages are dispersed over about 20,516 sq. miles of area with high degree of diversity (from north to south and east to west) in respect of site, situation, forms and functions, it is an impossible task for any investigator to examine and study all these villages in all their details. The problem could be solved by only having a recourse to sampling.
After a careful study of sampling techniques, stratified method was adopted and six villages i.e. Madhoganj, Chakbharkheri, Malehra, Bijoli, Barhai and Uncho were selected. The period fixed for the survey (including time spent in journey) was from 20th May to 20th June 1966. Roughly 3½ days were given to the study of each village. Village maps and agricultural statistics were obtained from the patwari or lekhpal and were verified later by field to field observations. First day was spent in tracing the village map and noting down the data from patwari records. Second day was given to field-study and the third day for enquiries and observations about the village.

**General Introduction of the villages**

Madhoganj is situated along the eastern slope of Ajaigarh Range of Panna Plateau near the town of Ajaigarh. It is surrounded by forests from three sides. Rocky exposures and infertile soils impart farming of the village a subsistence character and people supplement their economy by herding, lumbering and manual work. There are no canals but a few wells.

Chakbharkhari is situated in a rich black soil tract of Banda district with an additional advantage of irrigation from Ken canal. Unlike Madhoganj, where only kharif is
important, Chakbharkhari enjoys both kharif as well as rabi harvests.

Malehra, situated in an area of granitic surface intruded by dykes and reefs, is unique in the sense that it specialises in the cultivation of betel-vine. It is a rich and a large village in a rather infertile tract. Bijoli is very much similar to Malehra, but the former subsists on submarginal form of cultivation and village economy. People generally look for employment in Jhansi which is about 6 or 7 miles away from it.

Barhai is a small village in Kalpi tahsil. The soil and topography of this village are favourable for intensive cultivation, the possibilities of which have been enhanced by irrigation from a distributary of the canal. It represents an average small-sized village in the northern plain.

Uncho is a typical ravine village; it is situated in the Pahuj ravines in the western part of Jalaun district. It represents a highly contrasting nature of farming within the village area itself. Kachhar, (flood plain) is the richest portion and is given to grain farming. Upland area specialises in rice and sugarcane as kharif and wheat, gram and barley as rabi crops. Ravines of the village are used for grazing.
Agricultural data, as given in the reports, refer to agricultural year 1373 F. i.e. 1965-66.

Summary of the Village-reports

Land-utilization

The villages selected for type-study show a wide variety in land utilization. This has been brought about by those physical and cultural features in which the individual village finds itself.

Table No. L, on the following page, summarises the existing (1965-66) land-utilization in them.

Since we are mainly concerned with the agricultural situation rather than the pattern of land-use, we are more interested in such information about these villages as their soils, agricultural seasons, important crops, sources of irrigation, size and shape of land holdings etc.

Soils

None of the selected villages showed the prevalence of a single major group of soil in them; kabar, parua and rankar soils were found in them in varying proportions. In Barhai, situated in the northern plain, kabars cover about 55.9% of the total village area, while rankar covers about 36.00% and paruas only 8.1%. In Madhoganj,
<table>
<thead>
<tr>
<th>Land use</th>
<th>Madhoganj</th>
<th>Chak-Bharkhari</th>
<th>Malehra</th>
<th>Bijoli</th>
<th>Barhai</th>
<th>Uncho</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area</td>
<td>366</td>
<td>105</td>
<td>4,993</td>
<td>3,576</td>
<td>516</td>
<td>1,051</td>
</tr>
<tr>
<td>Forests</td>
<td>24</td>
<td>==</td>
<td>500</td>
<td>---</td>
<td>69</td>
<td>183</td>
</tr>
<tr>
<td>Not available for cultivation</td>
<td>26</td>
<td>2</td>
<td>483</td>
<td>2,214</td>
<td>33</td>
<td>52</td>
</tr>
<tr>
<td>Other Uncultivated Lands excluding Fallow lands</td>
<td>1</td>
<td>==</td>
<td>1,064</td>
<td>262</td>
<td>--</td>
<td>113</td>
</tr>
<tr>
<td>Culturable Wastes</td>
<td>76</td>
<td>==</td>
<td>127</td>
<td>51</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Fallow Lands</td>
<td>88</td>
<td>5</td>
<td>807</td>
<td>473</td>
<td>8</td>
<td>39</td>
</tr>
<tr>
<td>Net Sown Area</td>
<td>151</td>
<td>98</td>
<td>2,012</td>
<td>576</td>
<td>401</td>
<td>653</td>
</tr>
<tr>
<td>Area Sown More than Once</td>
<td>7</td>
<td>50</td>
<td>94</td>
<td>278</td>
<td>57</td>
<td>86</td>
</tr>
<tr>
<td>Gross Cropped Area</td>
<td>148</td>
<td>2,106</td>
<td>854</td>
<td>458</td>
<td>739</td>
<td></td>
</tr>
</tbody>
</table>
on the other hand rankar with 48.4\% area is the largest group. Here kobar and parua cover about 20.6 and 26.5 percent area respectively. Similar percentages are for Malehra and Bijoli both of which are situated in the granite country in the central part of the region. Chakbharkhari is situated in the black soil region of Banda district and hence kobar with 36.00\% area forms the most dominant soil group. Uncho on the other hand has 41.7\% area under parua soils. It may be, therefore, noted that each village represents a mosaic pattern of soil distribution. This is also true of the region as a whole. These soils have considerably influenced the choice of crops and their production from village to village.

**Agricultural Seasons**

Kharif and rabi are the two major agricultural seasons in all these villages; 'zaid' or additional crop is either totally absent or negligible. In table no. LI their respective acreages and percentages with respect to gross cropped area have been shown:

**Table No. LI**

<table>
<thead>
<tr>
<th>Village</th>
<th>Gross cropped area (acres)</th>
<th>Kharif</th>
<th>%</th>
<th>Rabi</th>
<th>%</th>
<th>Zaid</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barhai</td>
<td>472</td>
<td>199</td>
<td>42.37</td>
<td>273</td>
<td>57.63</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bijoli</td>
<td>938</td>
<td>419</td>
<td>50.00</td>
<td>420</td>
<td>50.00</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Contd....
### Table No. LI continued....

<table>
<thead>
<tr>
<th>Village</th>
<th>Gross cropped area (acres)</th>
<th>Kharif Acres</th>
<th>Kharif %</th>
<th>Rabi Acres</th>
<th>Rabi %</th>
<th>Zaid Acres</th>
<th>Zaid %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chakbharkhari</td>
<td>148</td>
<td>52</td>
<td>35.13</td>
<td>96</td>
<td>64.87</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Madhoganj</td>
<td>158</td>
<td>92</td>
<td>58.20</td>
<td>66</td>
<td>42.80</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Malehra</td>
<td>2107</td>
<td>789</td>
<td>37.00</td>
<td>1313</td>
<td>63.00</td>
<td>5</td>
<td>Neg.</td>
</tr>
<tr>
<td>Uncho</td>
<td>739</td>
<td>224</td>
<td>30.40</td>
<td>513</td>
<td>69.60</td>
<td>2</td>
<td>Neg.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4422</strong></td>
<td><strong>1775</strong></td>
<td><strong>42.17</strong></td>
<td><strong>2681</strong></td>
<td><strong>57.83</strong></td>
<td><strong>7</strong></td>
<td><strong>Neg.</strong></td>
</tr>
</tbody>
</table>

### Important Crops

None of the selected village showed a monoculture. Instead, a variety of crops were found being grown by the farmers. This means that a varying degree of crop diversification is in practice in accordance with the regional soils, climate and cultural traditions. Food crops, as a rule, are given priority over others, except in Malehra where maximum importance is attached to the cultivation of pan.

Table No. LII gives the basic pattern of crops in the villages.
Table No. LII

Nature of Crops in the selected villages

<table>
<thead>
<tr>
<th>Villages</th>
<th>Gross cropped area (acres)</th>
<th>Food crops (%)</th>
<th>Others</th>
<th>Non-food crops</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cereals</td>
<td>Pulses</td>
<td>Fruits &amp; vegetables</td>
</tr>
<tr>
<td>Bazhai</td>
<td>491</td>
<td>43.0</td>
<td>47.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Bijoli</td>
<td>838</td>
<td>64.5</td>
<td>30.5</td>
<td>0.6</td>
</tr>
<tr>
<td>Chakbharkhari</td>
<td>148</td>
<td>89.2</td>
<td>10.8</td>
<td>0.0</td>
</tr>
<tr>
<td>Madhoganj</td>
<td>158</td>
<td>52.6</td>
<td>24.1</td>
<td>4.4</td>
</tr>
<tr>
<td>Malehra</td>
<td>2107</td>
<td>47.2</td>
<td>27.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Uncho</td>
<td>786</td>
<td>49.3</td>
<td>19.4</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Size of Land-Holdings

The detailed information regarding the size of land holdings was collected from two villages i.e. Madhoganj and Chakbharkhari; the former represents a country of Vindhyan Plateau and the latter a flat and fertile plain of Banda district. The results are tabulated as under :-

Table No. LIII

Size of Land-Holdings in Madhoganj and Chakbharkhari villages

<table>
<thead>
<tr>
<th>Size of holdings</th>
<th>Madhoganj</th>
<th></th>
<th>Chakbharkhari</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of holdings</td>
<td>%</td>
<td>No. of holdings</td>
</tr>
<tr>
<td>Less than 1 acre</td>
<td>108</td>
<td>50.2</td>
<td>70</td>
</tr>
<tr>
<td>1 - 2.5 acres</td>
<td>70</td>
<td>32.5</td>
<td>23</td>
</tr>
</tbody>
</table>
Table No. MIII contd...

<table>
<thead>
<tr>
<th>Size of holdings</th>
<th>Madhoganj</th>
<th></th>
<th>Chakbhakhari</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of</td>
<td>%</td>
<td>No. of</td>
<td>%</td>
</tr>
<tr>
<td>holdings</td>
<td>holdings</td>
<td></td>
<td>holdings</td>
<td></td>
</tr>
<tr>
<td>2.5 to 5 acres</td>
<td>26</td>
<td>12.1</td>
<td>10</td>
<td>9.7</td>
</tr>
<tr>
<td>5.0 to 7.5 acres</td>
<td>7</td>
<td>3.2</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>7.5 to 10 acres</td>
<td>1)</td>
<td>2.0</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>above 10 acres</td>
<td>3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>215</td>
<td></td>
<td>103</td>
<td></td>
</tr>
</tbody>
</table>

Two points may be noted: (1) As a whole, the maximum number of holdings (60%) fall under the first group i.e. they are less than one acre in size. Holdings between 1 to 2.5 acres constitute 27.4% and between 2.5 to 5 acres 10.9%. Holdings above 7.5 acres are rare.

(2) Comparatively Madhoganj has bigger holdings than Chakbhakhari. This is in correspondence with infertile soils in the former where larger areas are required to meet the required production of grains. Size of population may also have its bearing on the holdings. The general axiom that larger the population at a place, the smaller will be the size of holding appears to be holding good in this case.
FIELD PATTERNS IN BUNDELKHAND VILLAGES

A. RADIAL PATTERN
   Maharajpur

B. NORMAL PATTERN (MIXED)
   Uncho

C. IRREGULAR PATTERN
   Bijoli

D. RECTANGULAR PATTERN
   Chak-Bharkhari
Types of field

Some of main types of agricultural holdings have been shown on Plate XX. Map A shows the radial pattern of fields in the flood plain area of Pahuj river in village Maharajpur (opposite village Uncho). This pattern is a result of a turn taken by river Pahuj near this village. In the flood plain there are no field boundaries as shown on the map. Fields are annually measured and demarcated with the help of long ropes which are stretched at right angle to the channel. This nature of demarcation of field boundaries enable the farmers to have an access to the river water for irrigation (if needed). It also gives each holder of the field a right of ownership to all types of soils which are deposited by receding floods.

Map B shows the field pattern of Uncho village in the plain area above the ravines. Here surface is even and fields are in the shape of broad rectangles (approaching squares). Such fields are most common in the whole of northern plain, particularly in the north-western part of Bundelkhand (also see Plate XXV map No. A).

Map C shows irregular pattern of fields in an infertile area of village Bijoli. Here the surface is strewn with gneissic boulders and granitic surface is exposed. The
boundaries of fields are, therefore, in accordance with the margins of these boulders - hence zig-zag.

Map D shows elongated rectangular fields of Chakbhar-khari village in Banda district. The pattern is obviously governed by Ken canal which crosses the fields from south-east to north-west direction. Since canal irrigation is the integral part of farming (rice culture), each field has been drawn in such a manner as to have direct connection with the canal for water.

**Crop Rotation**

Crop rotations in Bundelkhand differ from place to place depending on the physical conditions of climate and soils. Village traditions also determine them. Usually there is a marked difference between the irrigated and non-irrigated tracts in respect of crop-rotations.

In the irrigated tracts one may find one year, two year and three year crop rotations. In one year rotation, paddy is followed by peas or jowar by barley or chari by gram. In the two year rotation pattern may be; bajra-peas-sugarcane or chari-gram-sugarcane or jowar-barley-sugarcane. In the three year rotation the pattern remains almost the same as in the two-year rotation, but follows find a place either in the middle or at the end of the scheme.
In the non-irrigated tracts only one-year crop rotations were generally found. Usually a fallow is followed by wheat, chari by barley or jowar and bajra by gram.

Mixed Sowing

Mixed-sowing is very popular throughout the region. Some of the popular mixtures are wheat+barley (gojai), wheat+gram (birra), gram+barley (bejhar). Rows of oil seeds are thrown in a wheat or barley fields. Likewise arhar (pulse) is sown mixed with jowar or bajra. In these combinations one crop is invariably leguminous; it helps the other crop by providing nitrogen which is fixed in the soil by it.

Agricultural Labour

Enquiries reveal that in the small holdings the farmer and his family constitute more than 80% of the required labour. Hired labour is employed only in larger holdings or on the fields belonging to well-to-do farmers and ex-zamindars.

Madhoganj (1)

With an area of 365 acres and population of 428 persons, Madhoganj is a small village situated on the outskirts of Ajaigarh town. Its astronomical location is lat. 40° 9' N. and long. 80° 16' E.

(1) Account of the village surveys has been presented in that very order in which they were surveyed.
Physical conditions

Madhoganj is situated at the foot of the Ajaigarth Range of the Panna Plateau. The range is imposing in height and is crowned by the famous Ajaigarth fort (unconquerable fort) overlooking both Ajaigarth and Madhoganj which are at a distance of two furlongs from each other. High relief of the surrounding area is impressive, but it is also responsible for over-drainage so that in spite of a normal rainfall of 46.5" and with about 50 rainy days, the area is deficient in water. The problem is somewhat serious in summer.

Average annual temperature of Madhoganj is much the same as of Ajaigarth. Temperatures in June often rise above 100° F. and in winter fall below 50° F. The air-drainage of the village is excellent.

Ajaigarth range is covered with forests and much area is spotted by bushes. These have been cleared from the cultivated area.

Soils and Agriculture

One of the most striking features of Madhoganj is its limited use of land for cultivation. Out of its total area of 365.56 acres only 92 acres are under kharif and 66 acres under rabi. On the other hand comparatively large areas of culturable wastes (75 acres) and fallow lands (88 acres) exist in the
village. These are the direct results of general prevalence of infertile rankar soils which cover about 48% of the village area. Parua soils of the village, with 26.5% area under them, are much less productive for want of irrigation. The scene of farming activity is, therefore, mostly confined to kabar soils (20.6%) which do not require more water than they receive in the wet season.

This is the primary reason why the area under paddy in Madhoganj is so small (6 acres only) despite enough rainfall. The deficiency of water in the village is caused not so much by its normal annual amount but by its uneven distribution and rapid run-off both of which discourage rice culture. Black soils, which become very sticky when wet, are also not favourable. Only parua soils are favourable, but there are no facilities for irrigation (except by wells). Wells are also not reliable; they are 40 or more feet deep and many of them dry up in summer as the spring level falls down.

**Cropping Pattern**

Plate XXI depicts the cropping pattern of the village Madhoganj. Following points may be noted from the map:-

1. Except in the centre, all the area around the village is either covered by sal forests or it is in the
form of waste lands, including culturable wastes.

2. Fields are larger in size than one can see in Plate XXII (for Chak-Bharkhari). It is because this entire area is infertile and needs larger fields for required production.

3. Jowar-arhar-moong forms the most popular combination in the village. Arhar and moong are both leguminous crops. Wheat is only grown in the centre where mixed parua and kabar soils are found. Gram is sown single as well as mixed with wheat.

4. Settlement (abadi) is focused along the road leading to Ajaigarh, but houses are scattered over half a dozen places.

It may be noted that barley in rabi and jowar in kharif are the only popular crops of the village. The former is generally sown mixed with gram and wheat and the latter with arhar. This state of farming is the result of infertile soils the productivity of which is very low indeed.

Yields

The average yield of gram and barley is 7 to 8 maunds per acre, of 'arhar' and 'jowar' 5 mds. and of rice and wheat 7 to 8 mounds. Farmers do not apply any other kind of fertilisers. Cattle-dung is only applied in rough manner.
Live-stock

According to the live-stock census of 1965 there were about 925 heads of cattle in the village i.e. about 2 cattle per head or 7 cattle per census house. Among these cattle, 60% are sheep and goats, these graze in the jungles throughout the year.

Agricultural implements and labour

The farmers use plough (country), bakhar, nihari, khurpa and scythe (hansiya) as their traditional tools in farming; they engage no hired labour in their fields.

From the description, it may be realised that cultivation in Madhoganj is at a very low level of efficiency and, therefore, village economy is of sub-marginal nature. People are forced to supplement their income from other sources. Many people have become professional herdsmen while others have sought employment (servants) in Ajaigarh proper. Women and children collect tendu leaves (for bidi-making) and sell them to the agents in the village and thus earn from Re. 1.00 to Rs. 1.50 per day. This is, however, a seasonal activity.

Prospects for improving agriculture

Since construction of canal in the area is impossible and highly undulating surface of hard rocks does not permit deep boring for wells, the prospects for improving agriculture
in the village are very meager. Some improvement is, however, possible by popularising improved varieties of seeds. Soil conservation must be launched as a programme of great agricultural value as it has been done in Singpur (two miles south) which is now largely protected. It is encouraging to note that for catering technical assistance to the farmers and providing them with improved varieties of seeds, the government of Madhya Pradesh have recently opened a state farm near Ajaigarh, but enquiries made on the subject revealed that the farm is running in loss owing to the extravagant items of expenditure.

Chakbharkhari

Chakbharkhari, situated on the Banda-Baberu road about seven miles from Banda, has an area of 105 acres only. It, however, presents a picture of agricultural conditions which is contrasting to the one we have already studied. The village at present has no settlement and no population. These were in existence about 40 years ago, but theft and robberies (for which Banda is still well-known) from the surrounding villages became so frequent that the people left the village and took shelter in the surrounding villages of Arbai and Chilli, where they now reside and cultivate their fields in the abandoned village.
Physical conditions

Chakbharkhari lies in a low land area east of River Ken. The area is monotonously flat covered by kabar or mixed kabar and parua soils of high fertility. The area in and around the village is less than 400 ft. above the mean sea-level, with absolutely no undulations of more than 10 feet. The area, with a very low gradient, slopes gently towards north-east, a direction in which all the local drainage channels flow.

Climate

No meteorological observations were ever made in the village, but some idea about them may be obtained from those taken at Banda. Here the average annual temperature vary from 53° F. in December to 90° F. in May. Mean minimum temperature may be as low as 50° F. and mean maximum temperature as high as 110° F. The latter is largely responsible for number of deaths due to sunstrokes. Rainfall averages 33.73" (77 years' average) though it may vary from as low as 13" (1930-31 and 1896-97) to as high as 76" (1933-39). As kabar forms the principal soil group, more damage to the crop is done by excessive rains than by deficient rains, but when wet and dry years alternate for more than two seasons, calamity is worst and famine is most intense. Ken canal, which passes through the village has certainly lessened the intensity of droughts but no solution could be found out for excessively wet seasons.
Soils and Vegetation

There are only two principal groups of soils i.e. kabar and parua in which the former predominates with 85% area of the village; parua soils cover only 15% of the area, but they are very productive (unlike Madhoganj) owing to the facilities of canal irrigation to which they respond very quickly. Their productive capacity has also increased by application of chemical fertilisers which are now quite popular.

The natural vegetation of the area must have been jungles in the past, but they are entirely absent now. Grasses which grow as a secondary growth have also disappeared because the entire village area is intensively cultivated and no fallow lands are left.

Land Utilization

It may be seen from table No. I that there are no forests, pastures and the fallow lands in the village. Roughly 66% of the village area is actually cultivated, 50% of which is under double cropping. Such a high percentage of double-cropped area suggests intensive nature of farming encouraged by both, the fertility of soils and facilities of irrigation from the canal. This leaves no room for keeping lands as fallow. These features stand in sharp contrast to the conditions at Madhoganj.
Important crops

Rice (50 acres) in Kharif and 'birra' (81 acres) in rabi are the only principal crops of the village. Masur (14 acres) is the only pulse of some significance. Neither oil-seeds (except rows of rape and mustard with wheat and gram) nor fruits and vegetables nor fibres find any place in the cropping scheme. As a whole the total cultivated area under kharif is 52 acres and under rabi 96 acres, all of which is irrigated in both seasons. As the number of crops grown is very few, crop-rotation is also very limited. In the usual practice rice is followed by 'birra' which is replaced by masur to complete the circle of crop-rotation. Yields per acre of wheat, gram and rice are about 30% more than at Madhoganj.

Cropping Pattern

Plate V/DI represents the pattern of agricultural holdings as well as the pattern of crops grown in Chakbharkheri village. Following points may be noted :-

1. The fields are in the shape of elongated rectangles. They are neatly cut and demarcated.

2. The cropping pattern is equally simple and clear-cut. Wheat and gram (birra) in the rabi and rice in the kharif are the most important crops.
3. Most of the area is double cropped i.e. wheat and paddy are grown in alternate seasons in the same field.

4. Canal provides irrigation to the entire area.

5. Culturable wastes and fallow lands are negligible. Culturable wastes are found over small pieces of land along the canal. These have developed as a result of excessive soil moisture.

Because there are no grazing grounds in and around the village, farmers do not keep many cattle. This results in the scarcity of cattle-dung. Chemical fertilisers are, therefore, in popular use and are supplied by the office of the development block stationed at Barokhar-khurd.

Use of improved varieties of seeds and checking the soils from erosion are two steps which may be recommended for further improvement of soils productivity. Only indigenous varieties of wheat and gram are at present sown. Green-manuring may also be introduced in the scheme of crop-rotation with profit. Yet the problem of soil erosion may jeopardise crop production. The soil conservation officer at Banda told the author that the problem of soil conservation is black soils, specially through bunding, is very difficult because these soils become extremely soft and
erodible when wet. Experience has shown that the bundings are immediately breached and washed away even in a single heavy shower. In order to strengthen these bundings the authorities are now envisaging their plantation with certain grasses in order to protect them from falling rain or moving water.

Malehra

Considered at the regional level, there is no cash crop of any major significance in Bundelkhand. This is, however, not true at the village level. Malehra (popularly known as Garhi-Malehra) provides a case of agricultural specialization of considerable importance i.e. the cultivation of betel-vines or pan in which it has monopolised since medieval times.

Malehra (recognised as a town in 1961 census) with a population of over 7,000 souls, is situated on Chhatarpur-Mahoba road at a distance of eight miles from the former. Its astronomical position is lat. 25° 2' N. and 79° 5' E.

Physical features

The scenery around Malehra is typical of Bundelkhand granites, criss-crossed by dykes and quartz reefs. The physical setting of the village is between two parallel quartz reefs running in south-west to north-west direction.
The depression between the two is occupied by an elongated tank which is the scene of intense agricultural activity i.e. betel-farming. Hills around the village are about 400 to 500 ft. from the general surface which is strewn with granite boulders all over the village area. The tank which has been embanked on the lower side, receives most of the local rain in the wet season.

Climate and Vegetation

Temperature records of Malehra do not exist, but rainfall data are available for about 20 years. The mean annual rainfall of this town is 46.29" which comes mostly from June to September. Temperatures range from 60°F in December/January to 93°F in May/June. May is the hottest month when mean maximum temperature frequently crosses 105°F.

The hills on the west are covered by bushy jungles and stunted trees and contain much fire wood. Other hills are devoid of vegetation, except grasses which spring up in the wet season. These are soon overgrazed to give the landscape a barren and dreary look in the dry season.

Land Utilization

The land utilization statistics (Table No. L) suggest that out of the total village area (5,000 acres) 10.0% is
under forests, 19.0% not available for cultivation, 15% under pasture and grazing lands, 16% under fallow lands, 1.6% under culturable wastes and the rest 40% under net-sown area. Double cropped area constitutes 2% of the village area or 4.6% of the net cultivated area. These percentages point out the general poverty of soils.

Agriculture

Roughly more than 50% of the agricultural activity in Malehra is centred round the cultivation of betels as a cash crop of great commercial value. Enquiries in the village revealed that in normal years pan worth Rs. one crore is annually sold out and exported to towns of Uttar Pradesh. Strange as it may appear, they do not find market in Madhya Pradesh towns. Betels, like tobacco, have regional varieties and find markets in fixed regions only.

Betel-vine flourishes best on well-drained and well-aerated rankar soils in tropical climate, but the tender green leaves are very susceptible to direct insolation, specially in summer. The entire field, therefore, has to be nicely thatched to provide proper shade to the creeper. It needs plenty of water which should come in regular showers otherwise artificial watering (thrice a day) has to be resorted to.
It may be noted that the physical conditions under which the cultivation of pan is carried on in Malehra and Maharajpur repeat at many places in Bundelkhand, but the centres of its cultivation are a few only, namely Maharajpur, Kusma, Bari, Nivari, Gaurari and Mahoba. The reason for this centralisation at a few places only is to be found in socio-cultural rather than physical factors. These places are mostly settled by Chaurasia - a community which monopolises in the cultivation and trade of betel-leaves throughout India. To be sure, betel cultivation is a specialised branch of farming, the techniques of which have come to them from their forefathers and which other communities entirely lack.

Betel leaves are planted in neatly drawn rows; they are thirty inches apart. Bamboo poles are fixed in these rows at an interval of 10 to 12 inches and the entire field is thatched by grass. The initial cost of plantation is, therefore, very high, about Rs. 200.00 per row and deducting all the investment each row of pan pays about Rs. 150 to 200/- in normal seasons. Plantation is done in October/November and plucking of leaves starts from May and continues up to July. Fresh leaves are sold at Rs. 3/- per seer, but the old ones fetch Rs. 7 or 8/- per seer.

From the Plate XXIII it may be noted that all the betel gardens seek water front and are either located on the sloping
banks of the lake or at places which can be approached by water channels from the tank or well, because the betel-vine needs abundant water for sprinkling. At least 400 to 500 gallons of water is needed for each row which is sprinkled thrice a day in dry season. Hired labourers are engaged for this purpose. They use an earthen pot (capacity 5 to 6 gallons) to fetch water from the 'holes' facing the garden. They are usually paid Rs. 60/- a month; they also apply manure (oil-cakes) in the rows.

It has been reported to the author that huge losses are being suffered by the betel cultivators during the past five or six years owing to the invasion of some pest which the agricultural scientists could not recognise yet nor could they suggest any remedy for it.

**Field crops**

The crop pattern of the village has been shown in map referred above which represents only a small portion of the total agricultural area. (1) Following points may be noted from the map:

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(1) The original village map is in six big sheets and hence could not be traced in full. The portion shown in the map represents the area where intensity of farming is highest.
1. The map shows a large number of betel-vine gardens. They are found either along a water channel (as in the western part) or around a tank (as in the eastern section of the village). It is owing to huge amount of water needed by the vine for irrigation as well as for sprinking on the green leaves.

2. Most of the pan gardens on the map show them as 'bareja' land i.e. fallows of betel-vine. This is owing to the out-break of a disease in the year 1965-66 and hence fields were left as fallow.

3. The area is mostly infertile and, therefore, much of the map is shaded to show waste lands including culturable wastes.

4. Among the crops, a large variety of them are grown such as wheat, gram, barley, jowar, arhar, small millets oil-seeds and rice. Of all these wheat and gram are of some importance by virtue of their acreage, if not by their production. Among the kharif crops jowar and arhar are important crops.

5. Fields are generally large and neatly cut into rectangles, specially in the case of betel-vine of this village.
Kharif and rabi are the major agricultural seasons of the village. Out of the total cultivated area (2,012 acres) roughly 40% is under kharif and 60% under rabi crops. The area under the former is mostly rainfed but 39% of the rabi area is irrigated by wells and tanks, the only sources of irrigation in the village.

Following table shows the acreage and percentage of the principal crops grown in the village:

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area in acres</th>
<th>%</th>
<th>Crop</th>
<th>Area in acres</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jowar and</td>
<td>174</td>
<td>21.9</td>
<td>Gram</td>
<td>333</td>
<td>25.3</td>
</tr>
<tr>
<td>Arhar</td>
<td></td>
<td></td>
<td>Wheat</td>
<td>256</td>
<td>19.4</td>
</tr>
<tr>
<td>Kodon</td>
<td>119</td>
<td>14.9</td>
<td>Wheat</td>
<td>193</td>
<td>14.6</td>
</tr>
<tr>
<td>Til</td>
<td>119</td>
<td>14.9</td>
<td>Gram</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td>82</td>
<td>10.3</td>
<td>Barley</td>
<td>162</td>
<td>12.2</td>
</tr>
<tr>
<td>Jowar</td>
<td>40</td>
<td>5.0</td>
<td>Linseed</td>
<td>253</td>
<td>19.1</td>
</tr>
<tr>
<td>Urd</td>
<td>73</td>
<td>9.0</td>
<td>Betel</td>
<td>93</td>
<td>8.8</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>50</td>
<td>6.3</td>
<td>Linseed &amp; gram</td>
<td>10</td>
<td>0.7</td>
</tr>
<tr>
<td>Others</td>
<td>137</td>
<td>17.5</td>
<td>Others</td>
<td>13</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>749</strong></td>
<td></td>
<td><strong>1,313</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A PORTION OF VILLAGE

BIJOLI

CROP PATTERN & LAND-USE

1:500 YARDS

SETLEMENT

[Map of Bijoli with legend indicating crop patterns and land use]
Yields of grains are low and their total production falls short of the needs of the village. It is just sufficient for five months only. For the rest all food is imported from Chhatarpur. This, however, is easy because people of Malehra are much better off. They have shown to the people, a way for economic improvement in a rather infertile tract of Bundelkhand.

Bijoli

Bijoli is a village situated on the Jhansi-Saugor road lying in lat. 25° 22' N. and long 78° 35' E. about 6 miles from Jhansi city. The village has a population of about 1,000 souls mainly consisting of Lodhis and Ahirs. The village contains a small lake (approx. 70 acres in extent) which may be utilised for irrigation.

Village Bijoli, though similar in its physical setting, is just an antithesis of Malehra in the sphere of agriculture. It is one of the poorest villages with very precarious level of village economy because much of the village area (57%) is stony and infertile barren land. The cultivated area is very unproductive for want of irrigation.

Physical features

The village provides another example of a settlement situated in the oneisses and granites with intrusions of dyke.
and quartz-reefs. These stand out of the general surface in the form of hills and low ranges imparting the general surface an undulating character. Granite boulders are found scattered everywhere. The village tank forms the major depression which collects water from the surrounding area.

Climate and Vegetation

Climate of Bijoli and the surrounding area is very hot in summer (May/June 95° F) and moderate in winter (Dec./Jan., 63° F). These are average temperatures. The actual shade temperatures remain well above 100° F. throughout May and June. In winter the area sometimes suffers from very low temperatures generally associated with cold waves which sweep over the region. Frequent are, therefore, very frequent on calm, cool and clear nights. Lowest winter temperatures of 26° F. and 30° F. were recorded from Jhansi (6 miles away) in the month of November and December. Mean annual precipitation of this area is 36” and average number of rainy days 44, but the variability is great (20%) so that droughts in the past were very frequent. As most of rain comes in the wet season, it is not always deficient for kharif crops but winter crops suffer from want of soil moisture.

Vegetation

High temperatures and insufficient and ill-distributed rain have given the village scrubs as a natural form of
vegetation; the original cover was definitely forests, which still occupy the quartz-reefs in the area. On the other hand rocky surface, covering a sizeable area, does not permit even a blade of grass to grow on them.

**Soils**

The general infertility of soils may be judged from the fact that out of the total village area (3,576 acres) only 576 acres i.e. 20% is under cultivation. Much of the tank-bed is covered with deep kabar soils but it is not cultivated as in the case of Malehra or Talbahet because when dry it becomes too hard to permit even scratchings by ordinary country plough. Even tractors used on experimental basis a few years ago, were badly damaged. In the rainy season these soils becomes too sticky to permit ploughing and sowing. Black soils (kabar) also cover other flat or low lying areas where cultivation is concentrated on them.

**Size and shape of Land Holdings**

From the village map (Plate XXIV) it may be clearly seen that majority of cultivated plots are very small in size and they are subdivided and fragmented. These are found admist boulders and rocky hillocks. On dividing the total village area with the number of plots, the average size of holding is found to be roughly one acre. However, when only net cultivated area is considered it works out too 0.16 acre
only. It gives a fairly correct picture of the size of holdings; these can be seen on the map also. The shape of these plots is very irregular because hillocks and boulders and other rocky exposures do not permit straight boundaries.

**Crops**

The ratio of kharif and rabi crops in Bijoli is roughly 50:50. Maize, with 226.83 acres, appears to be the main food grain of kharif season followed by peddy, with 39 acres only. The third place is occupied by jowar with only 9.73 acres. Others are not important at all though their number is large. Among the pulses urd is the only important crop (87 acres).

Among the rabi crops wheat, birra, barley and bejhar are important cereals and together they occupy 265 acres (63%) of the area under rabi crops. Of this wheat alone covers 236 acres, one fourth to one third of which is sown mixed with gram. Gram and masur share all the area (153 acres) under rabi pulses. There are no cash crops in the village such as singhara, betels, oil seeds, cotton etc.

Plate XXIV shows a portion of the village area which is considered as the only good area for cultivation. The full map of the village fields is seven sheets. Following points are quite clear from this map:-
1. Although this portion of the village is considered as agriculturally 'good', much of the map shows extensive waste lands, especially in the east of the main road. Here barren, stony wastes and fallow lands abound. It is also true of north-western and south-western parts.

2. The agricultural area of the village is really found in the western part between two seasonal nala or rivulets. The most conspicuous in this area is a (east-west) belt of rice fields (dark shade). Soils brought by the nala enable rice to grow here. Irrigation is also applied in them from the channel.

3. Like Malehra, a large number of crops are grown here under varying conditions of soils, slope, availability of water and cultural practices, but none are important except wheat, gram and masur.

4. Fields are most irregular in shape as well as in size. Where land is infertile holdings are large, but in the western part where soils are somewhat suitable for crops these holdings become very small. They represent pressure of population on the cultivated area which is very limited in the village.

**Crop Rotation**

There is no scientific or systematic crop rotation.
In many fields urd may be followed by either barley or by wheat or a fallow or masur. Maize may be followed by a fallow or wheat, or wheat-gram.

Irrigation

Wells are the only major source of irrigation. In the year 1965-66, they provided irrigation to 325 acres as against 40 acres by the tank. Total irrigated area was 365 acres i.e. about 63% of the net area sown or 10% of the total village area.

Manures

Among the manures compost and the peat (from the bed of the tank) are used for manuring the fields. Peat contains much humus; it is dug out from the bed of the tank and is spread over fields having rankar soils. It improves their soil texture as well as soil fertility.

Economy

Although majority of the families have land, but either it is too small or too infertile. The villagers, therefore, look to other vocations. Some people are professional grazers; others have sought service in Jhansi, specially in the Railway Department yet others are employed in the water supply project.*

*This project is now complete. Water from Matatila dam moves in a 30" diameter pipeline to Jhansi and Babina. The total cost of the project was slightly more than Rs. 5 crores.
BARHAI
PATTERN OF CROP LAND UTILIZATION

INDEX

GOJAI  | JWAR-ARHAR
GRAM   | BAJRA-ARHAR
MASUR  | JWAR-CHAI
MATAR  | SUGARCANE
BEJJAR | PADDY
RAPE & MUSTARD | BAJRA
FRUIT GARDENS | OTHER CROPS
VEGETABLES | GRAVEYARD
FALLOW LANDS | TANK

LOCATION MAP OF BARHAI
Others are stone-breakers working in stone- quarries in Jhansi or near the village itself.

**Barhai**

With 516 acres as its total area and 511 as its population, Barhai is a small village in tahsil Kalpi of district Jalaun. It is situated about two furlongs away on Kalpi-Hamirpur road and is about 6 miles from the former. It was originally a village owned by Baoni State but now it is merged in the Kalpi tahsil. Final settlement of the village had been done in Samvat 1976 i.e. year 1919.

**Physical Features**

Barhai is typical of many a small village found on the flat, fertile and well-irrigated plain of district Jalaun. Physically the village area may be divided into two distinct portions i.e. northern and southern.

Northern portion is largely found north of Mabai, 'razbaha'. It constitutes mostly bushy jungles and much eroded land. There are no agricultural fields here, except along a belt fringing the 'razbaha'. The 'abadi' area is also found here. This area, which is bounded by streams in the east and west extends northward upto a point where both these streams meet.

Southern part extends south of the Mabai 'razbaha'.
It is a flat and fertile part covered by mixed and parua soils and is entirely given to farming. There are undulations on this side.

**Soils and Vegetation**

Soil map (X\V - B) of Barhai village shows that northern part is made up of rankar soils (36%) which are of little agricultural value. Just south of this is an area of parua or goind (8%) soils which are very rich owing to their proximity to the village site and hence contain much humus. The central part is covered by mixed kabar and parua soils (majhar) with 54% of the village area. It is intensively given to grain farming and such cash crops as sugarcane and fruits. Southern portion is made up of light kabar soils. Here jowar, arhar and birra are important crops.

Vegetation in the north mainly consists of scrubs like 'reunjhar' trees and other secondary forms of accacias. In southern part it has been completely removed to make room for cultivation.

**Climate**

Climate of Barhai is much the same as of Kalpi. Average temperature in summer is slightly about 95° F. and in winter 65° F. Range of temperature is thus 30° to 35° F. degrees of fahrenheit. Actual daily temperatures, however, often cross 100° F. and the 'loo' is very severe.
Rainfall of Barahi averages about 40" annually. First few showers, which reduce the temperatures by about 10° F., usually come in the 3rd week of June. Rainy season ends in October/November. Winter rains (2 to 3") come in January and are very beneficial to the standing rabi crops.

**Land Utilization**

(Table 1) Land utilization statistics of the village reveal that out of its total geographical area (516 acres) roughly 73% is under actual cultivation. Forests (actually 'behar' with truncated soils and stunted trees) occupy about 13.3%; area not available for cultivation such as under settlement, canal-cart-tracks etc. is 6.4%. There are no permanent grass lands. Fallow lands constitute a small fraction of the village area i.e. 1.5% and culturable waste is 5 acres only. Double-cropped area forms 1.4% of the net area sown. The village area is thus better utilized for cultivation than in the plateau villages of the south.

**Agriculture and Irrigation**

Mixed cropping is the main feature of the village cultivation. Jowar and bajra cover 151 acres out of the total of 200 acres under kharif crops. Fruits and vegetables, which come next, cover only 22 acres. Non-food crops, occupy only 17 acres as against 200 acres under food crops.
In rabi season 'birra' occupies 162 acres (59% of rabi area). Pulses, among which gram is the most important, are grown over 109 acres (40% of rabi area). Food crops in this season occupy 99% of the total cropped area which is fully irrigated. Kharif crops are not irrigated except when monsoon temporarily withdraws.

**Cropping Pattern**

Cropping and field patterns of Barhai village have been shown on Plate XXV map No. A, while distribution of soils has been given in the inset map B. Both these maps provide a basis for understanding the cropping pattern of the village. From the map A following points may be noted:

1. Most of the northern portion of the village is eroded land called 'behar'; no crops are normally grown here.

2. The most intensively cultivated area of the village is in the central part covered by mixed kabar and parua soils. In this area wheat and gram (as also in the southern part) are the most important cereal crops. Sugarcane and rice is grown along the Mabai 'razwaha' or distributary which crosses the village from south-west to north-east.

3. Fruit gardens (guava) and vegetables are grown on many fields. It is because the village is inhabited mostly by kachchi community which sell them in Kalpi town.
4. Bajra is grown only in drier parts and is not irrigated.

5. Area under pulses, specially arhar, is almost always grown mixed with either jowar or bajra.

6. Fallow lands are rare.

Presence of fertile soils and facilities of irrigation enable peasants to obtain better yields of crops. The average yield per acre of wheat and gram is from 12 to 15 maunds, gram and peas 10 to 12 maunds, masur 12 to 14 mds., jowar and bajra 8 to 10 mds., lin-seed 8 mds., and rice 20 to 25 mds. Despite very good yield of rice, very little area is under paddy. It is grown only on parua soils with facilities of irrigation. Parus soils are, however, very small in area and kabar soils are very heavy and sticky.

Manures
Cattle-dung is the only popular manure, but it is never applied in adequate quantity. Farmers have also started using chemical fertilisers but never adequately.

Prospects
The village affords an example in which much improvement is possible. It is noteworthy that despite facilities of canal irrigation, double-cropped area is very insignificant.
(1.4%). There is no reason why this area may not be considerably expanded. On the parua soils rice and wheat may be grown without much crop rotation and use of fertilisers. Chemical fertilisers, if applied, may also enhance production by at least 15 to 20%. The northern area on the other hand needs measures of soil conservation and hardy crops such as gram and sennhua (oil seed) may be produced there. Kachhis, who specialise in the cultivation of vegetables have to change their outlook and devote more attention to grain farming.

Uncho

Uncho is a typical village of Pahuj ravines; it is situated about five miles west of Madhogarh - an important grain market in western part of Jalaun district. The total geographical area of the village is 1,031 acres and population about 1,000 (976 in 1961) persons.

Physical features (Plate XXVI)

The area of Uncho village may be divided into three distinct physical parts: (1) Kachhar i.e. flood plain of River Pahuj; (2) Upland plain and (3) An intermediate belt of ravine lands between them.

Kachhar

Kachhar is the low lying alluvial area constructed by the old floods of the river. Although its total area is
limited (13 acres) it holds great prospects for intensive cultivation. Much bigger area under kachhar falls on the other side of the stream in Maharajpur village. An idea of its immense fertility and agricultural importance may be judged from the highest revenue rates i.e. Rs. 6.00 per acre as compared to Rs. 4.25 of parua and Rs. 3.00 of kabar soils. Gullying has destroyed much of this fertile area. Some portion has been cut and lost by receding cliff of the stream towards the village. In Maharajpur, kachhar is the scene of monoculture i.e. wheat, which is sown year after year without rotation as its soils are renewed every year. Cultivation is, therefore, not only most efficient but also cheapest.

Upper Plain

The margin of the ravines in the centre marks the beginning of a flat portion which is an extension of Trans-Jamuna low land. In the village area this is the highest portion, hence termed as 'Uncha har'. It covers about 42.3% of the total area of the village and is laid over by mostly parua soils which are fully irrigated and cultivated. In certain sections the ravines have encroached upon this plain with deep gullying and no measures of protection have been taken so far. The general height of this plain is about 300 feet from the bed of the river.
Ravine belt

Pahuj ravines as a whole are not comparable with Chambal ravines, the latter being more fully developed and very deeply cut, but near Uncho the Pahuj ravines are also fairly deep and extensive, covering a belt of about one and half miles in breadth in which roughly 55% of the village area falls. The problem of ravines has been treated at length in Chapter XIII. In brief, ravines have been formed due to extensive gullying on extremely soft and loose soils which have lost their protective cover by gullying and sheet erosion. The sub-soil zone of 'kankar' bed has been exposed with the result that even a small rivulet successfully accomplishes the task of much greater erosion than its size would normally permit in other areas. The author was astonished to note that at the very head of the gully itself, its depth was in some cases from 15 to 20 feet.

Land Utilization (Table No. L)

The land utilization table points out that out of the total area of the village i.e. 1,051 acres, 17.4% is under forests, 5.0% not available for cultivation, 10.8% other uncultivated lands excluding fallow lands, 1.0% culturable wastes, 3.7% fallow lands and 62.1% as net sown area. Roughly 86 acres or 13.2% of the net sown area is under double cropping.
The total cropped area thus forms 70.4% of the total village area. The land use, therefore, strictly follows the dictates of the natural conditions of relief and climate.

**Major Crops**

Bajra (123 acres), rice (41 acres), sugar-cane (50 acres) and fruits and vegetables (37 acres) are the important crops of Kharif season. It may be noted that in none of the villages so far studied, bajra ranked so high among the kharif crops. Cultivation of bajra is only confined to district Jalaun in the whole region of Bundelkhand. The reason being that bajra grows best under slightly drier conditions (25" to 30") and favours parua soils which are lacking in the rest of the region. Cultivation of sugarcane and rice in this village is again due to suitable soil conditions and facilities of abundant irrigation from Betwa canal (Kuthond branch) which passes through the upland plain. Jowar, arhar, savan and chari (green fodder) are less important and cover altogether only 9 to 10 acres of the land.

In the rabi season wheat (167 acres) is the single most important crop. Next in acreage is 'birra' (wheat and gram) with 80 acres; 'bejhar' (11 acres) is the third major crop. This completes the picture of rabi season. The total area under rabi is about 71.0% of the gross cropped area.
**Cropping pattern**

In Plate XXVI Map A shows the agricultural holdings in the upland portion whereas Map B shows the flood plain area.

Following points may be noted from these maps:--

1. Along the ravine edge 'seonha' (oil seed) is invariably grown because it grows best on infertile well-drained areas under dry conditions. It is followed by gram fields. Gram also does best on medium lands without irrigation. Gram fields are followed by wheat + gram (birra) fields and later in the east only fields with pure wheat predominate.

2. Along the water channels the most important crop is sugarcane. The same is true of rice fields; both need plenty of irrigation.

3. Jowar and bajra fields are found scattered in various parts; they are not irrigated.

4. Flood plain (inset map) of Uncho grows many crops. It is found above the level of normal floods and hence not very rich. Here bajra, arhar, 'birra', 'laha', 'seonha' (oil-seeds) barley and other crops are grown. Artesian wells have now provided opportunity for irrigation and vegetables are now produced here.

5. Culturable waste lands are found in the form of field fences.
6. Soil erosion is great in the whole of ravine belt which is found west of map A and north-east of map B. No crops are grown here.

7. As a whole the fields are rectangular. The area is intensively cultivated with the help of canal irrigation.

**Irrigation**

Owing to the construction of canal agriculture of the upland plain has been stabilized to a great extent, but the greatest change is now taking place in the older flood plain area which is well beyond the reach of normal floods. Here a number of artesian wells have been struck to provide perennial source of water supply to the surrounding fields. Artesian wells were first discovered in Gopalpura, seven or eight miles south. Here the newly struck well (by development block authorities) sends forth a 25 ft. high stream of water. The hydraulic pressure is naturally high. This opened the way to other villages situated on similar area along the river. Now there are about 30 such wells in Uncho, Meghani, Maharajpur and Silaoa villages. In Uncho much of this high flood area which had no source of irrigation before, is now pulsating with intense agricultural activities even in the summer days. Fruits and vegetables are generally grown here and sugarcane is becoming rapidly popular. The hydraulic pressure in these wells is, however, weak. Perennial source of water level
exists at a depth of about 130 or 140 ft. Beyond Uncho no wells could be found further north. The potential area for artesian wells is thus from Gopalpur to Uncho only.

**Manures**

Manures and fertilisers are not applied in kachhar where soils are renewed by high floods. Cattle-dung and chemical fertilisers are used in the upland plain, specially in sugar-cane and wheat fields.

**Yields**

Though 'kachhar' is very rich in soil fertility, yet owing to its height above the normal floods and absence of water for irrigation make it secondary to upland area which is traversed by Kuthond branch of Betwa canal. However, in the fields where artesian wells have been struck, the average yield of wheat is about 14 to 15 mds. per acre plus two mds. of rape and mustard (sown with wheat in certain rows). The yields of bejhar are also same as of wheat. These figures are highest so far observed in the surveyed villages.

Yields are also fairly good in the upland plain area. This area is generally given to wheat, gram, rice, pulses and oil-seeds. Here the yield per acre of 'birra' is 12 to 14 mds. of jowar and bajra 10 to 12 mds., maize 7 to 8 mds., gram 10 to 12 mds., masur 15 mds., rape and mustard 8 to 10 mds.,
peas 13 to 15 mds. and sugarcane 60 to 80 mds. (in terms of gur). Fertile soils, use of compost and fertilisers together with the facilities of irrigation are directly responsible for better yields here also. But cultivation is much more expensive as compared to Kachhar.

Size and shape of land holdings

There are 706 agricultural plots over an area of about 888 acres (which excludes area not available for cultivation or other uncultivated lands). On the basis of this the average size of the holding works out to be 1.25 acres. This is smaller than the villages of Panna and Chhatarpur. This average size of holding (i.e. 1.25 acres) is hardly satisfactory and is the outcome of the shrinkage of the agricultural area by encroaching ravines and growing size of the village population.

So far as the shape of holdings is concerned, this village shows three peculiarities :-

1. Long and narrow strips in the kachchar.
2. Irregular pattern of fields in the ravines, and
3. The rectangular pattern of fields in the upland plain.

Exceptionally narrow strips of fields in the Kachhar are called 'tirs'; they have no boundaries or fences as shown in
plate XX map No. A for Maharajpur facing Uncho across the river. Inquiries revealed that fencing is not possible owing to annual flooding of the area. The division of the area, (after the recession of floods) with the help of strings and ropes is, therefore, an annual feature. Measurements are done very accurately with reference to certain fixed points, because no cultivator would like to loose even a furrow of fertile soils.

Another feature of these strips is that they run transversely to the stream and seek water frontage as far as possible. There are two reasons for it:

1. Recession of flood results in deposits of varying fertility, parallel to the stream. Therefore, the best solution of the problem of division of the area lies in striping the land at right-angles to the stream so that all types of soils fall in the share of each cultivator.

2. Water frontage grants every land owner the right to use river-water (if need be) for irrigation.

In the upland plain the fields are generally rectangular approaching the shape of squares. The shape of agricultural holdings is very irregular in the ravines. This is in consonance with their relief and gradient.

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