1, crops, yields and the productivity

... a comparison between the productivity of the soil and the movement of the crops indicated to these products for a period between 1837 and 1841, which is attempt in this chapter, suggests a remarkable degree of similarity. No doubt, some new crops were introduced during the 19th century, but as compared with the traditional crops of videh, these were only grown over a small area, by the end of the 19th century.

A rural of the dstūr rates given in Ḥiṣn-i Akbarī shows that 24 crop crops are listed for the six revenue-circles of ṣarkāρ Avadh and Schranich, while the crops on which dstūr are recorded under ḥiṣn-i Chirābd, Lucknow and Gorakhpur are fewer. Even crops such as wheat, barley and mustard-seed, grown in the localities during the 19th century, have been omitted from the dstūr lists. Among the twenty-nine kharīf crops, fourteen have been mentioned in all the twelve dstūr, while eleven minor crops are

2. Agricultural Statistics of British India-1865-6
3. Maul Fazl, Ḥiṣn-i Akbarī, pp-354
listed in only six dastūrs of the sarkār Awadh and Bāhraich. Arhar (a pulse) is mentioned in the revenue circles of Bāhraich, Kharonsā, Khaīrabād, and Pāli, for the other two, lobiya and carrots, rates are provided only for one circle (i.e. Ibrahimabad), while kūr (a wild grain) finds mention in the Ibrahimabad and Bāhraich circles.

The cereal crops cultivated in Awadh can be broadly divided into rice, wheat and millets. A substantial quantity of pulses were also grown in both the rabi and kharif harvests.

Rice constituted the chief cereal crop of the region, since its cultivation suited the low lying areas subject to inundations. It was cultivated throughout the Terai region and along sides of the courses of major rivers traversing Awadh. The high-quality and the common grades of rice find mention in every dastūr circle. The different varieties of high grade rice namely sukhdas, kachkār and jhanwan were praised for their "whiteness, delicacy, fragrance and wholesomeness". Bāhraich was famous for such rice and it was obtained for the imperial kitchen. Sukhdas rice continued to be famous throughout the 17th century. Sujan Rāj Bhandari asserts that "it (sukhdas rice) was of the best kind, the delicacy and fragrance was beyond imagination. The king, nobles

1. Minhā-i Akbarī, I, p.433
2. Minhā-i Akbarī, I, p.433
and the common men, all appreciated its taste, flavour and delicacy." Another peculiarity of the rice crop in Awadh noted by these writers was that it grew three months earlier than in other parts of Hindustan.

Sometimes during 16th century, sarkar Gorakhpur especially pargana Hansi had become quite famous for the high-grade varieties of rice raised there. These were called bhairni shāmzīra, rājha, and rāt kauval. In the markets of Faizabad and Lucknow these varieties sold with the name of pargana Hansi. The area under rice cultivation seems to have been much larger than under wheat. The Agricultural Statistics of 1865-6 disclose an area of 21,59,424 acres (about 20.5% of the total area) under rice, while under wheat this came to 15,56,198 acres (about 16.5% of the total).

Another major crop of the province was wheat. Its cultivation suited only the higher-grounds and drier areas. The high lands between the rivers was considered especially suitable for the crop. Significantly Maul Fazl has not recorded the revenue rates for wheat in some of the higher regions such as sarkar Bhairabād and Lucknow, although during the 19th century these regions were known to raise substantial crops of wheat. Wheat

2. ibid., p. 145.
3. mufti shulam haerat, kweif-i gorakhpur, p. 12b
5. ibid.
cultivation is not suitable in the low lying areas and the
Territory does not thrive there. It turns yellow and dies.
Wheat is extremely prejudicial to both wheat and corn.
In schematic, a substantial area under the wheat cultivation
in Terai panchayat. The agricultural statistics for the same are covered by urak, urak, the districts of
Lalitpur, Sitamarhi, show that in 1885-6 wheat was cultivated
over 4.7,06,141 acres as compared with 16,72,416
acres under rice cultivation. Varanasi was famous for
high-yielding wheat during the 12th century. Butler tells us
that it produced around twenty-five maunos per bigaha, while in
Duncel beyond the province of high quality wheat without irri
tion to 15 to 16 maunos per bigaha.

Abul Fazl furnishes us with castor rates for the coarse-
grain and most of the pulses in various revenue-circles. But a
comparison of the crop-pattern during 16th century with that of
the 19th century is not possible, as these cereals have been put
under a column headed by 'other food-crops' in the agricultural
statistics. But it is evident that these constituted the bulk of
agricultural production during the 10th century, as the 'other
food crops' were grown over an area (in Oudh, including parva
parakpur, of 76,27,739 acres as compared with 53,20,622 acres
2. I.c., p. 66.
under rice and wheat. Crops like jumār, lahoara (jaíra) pher and chana could be raised only on higher grounds, and the cultivation of these crops closely coincided with wheat. In this category, a new crop, maize, was introduced by the end of 15th century, but as Butter has not noticed its cultivation in southern Juch, it was still sparsely cultivated by 1638.

The chief cash-crops raised in the province were oil-seeds, sugar cane, cotton, indigo and tobacco. The cultivation of the vegetables for markets as well as for the domestic use was also undertaken. It was carried on by the peasants belonging to some special castes.

Abul Fazl has provided the revenue rates for mustard-seed only in six castur-circles. Although oil has been a part of diet of every Indian it was not considered to be an important crop of Awadh in the Mughal period. The *Agricultural Statistics* of 1885-6 show an area of 4,98,879 acres under oil seeds. Possibly the cultivation of oil-seeds as a cash crop expanded after the annexation owing to European demand promoted by the construction of railways.

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1. *Agricultural Statistics, 1685-6*
2. The peasants who carried on garden cultivation were mostly nāchis, morais, kunjra and luniya or nuniya. They raised almost every vegetable on the 'richest soil immediately around the village, in enclosed and reserved fields'. Garden cultivation needed much manuring; the land around the village was very fertile in having 'natural manure' provided by human and animal waste. See Butter, p.69; Sleeman I, p.123-6.
3. *Agricultural Statistics, 1885-6.*
Sugar-cane was perhaps the most important cash-crop. The revenue rates for high quality and common sugar-cane are provided by रिन for all the पाटूँ cycles of आवाज. Mufti Ghulām Hazrat mentions extensive cultivation of this crop in sarkār Gorakhpur, it was of the best kind as compared to the other places for 'its sweetness and delicacy'. In some parganas of sarkar Gorakhpur, however, its cultivation had to be abandoned due to the menace of the wild elephants.

During the 15th century, Butter noticed the crop was raised in 'small patches here and there, particularly between the river sāi and Ganges; and sugar was made in small quantity is south-west part of Oudh. Thornton described its cultivation as 'very circumscribed'. However, while passing through the district of Sultanpur, six kinos of sugar-cane were noticed by J.H. Sleeman, and he found its cultivation to be quite extensive there. The agricultural statistics show as many as 2,40,975 acres under the sugar-cane. This large acreage may be due to the subsequent extension in sugar-cane cultivation after Annexation.

Cotton constituted yet another important cash-crop.

2. Butter, p.61.
The *Mins* provide *n*-numera for the crop in each of the
*12-2* bu*",* circles. It continues to be widely cultivated
in this province during the *13th century*, but it noticed that cotton
was not cultivated in the country and mainly on the banks of *Ganga* and
other smaller rivers. It was also *cultivated* particularly on its western
side. A small amount of cotton was exported to the British districts
in the *18th century*. The remainder was worked up by the cotton
trade in the country, particularly at *Ranee*. In
the first half of the 18th century it was said to have been
used in the **47**. But it was noted that cotton cultivation declined
considerably after annexation; the agricultural statistics of
*1* record only 36,246 acres under cotton.

The indigo produced was manufactured in the province of
*Ganga* was judged to be inferior even during the 19th century.

Perhaps for this care on the European indigo planters were not
attracted to the area. Those areas of *Bhach* kingdom which bordered
the *Ganga* territories such as the districts of *Gonda*, *Fyzabad*,
*Bara*, and *Jhajjan* planted indigo in some localities. The *Mins*
provide *Mins* numera rates for indigo in only six districts. The
agricultural statistics show under this crop

1. *Bullii*, m. 2
2. *Mins* *Mins* Statistics 3
3. *Mins*
in Oudh, and in the district Gorakhpur to only 14,201 acres were under indigo cultivation.

Among the new crops, introduced after the Ainis's time was tobacco. Butter noticed that it was being raised in a light o. two by the Kunjra and Murais near each village. It seems that even after the annexation, the crop was produced only over a small area. The return of agricultural statistics of 1865-6 show only an area of 17,744 acres under tobacco cultivation.

The cultivation of potatoes does not seem to have made much progress in Nawabi Oudh; it was planted by few Kunjras and Kachis in the vicinity of Kanour, Lucknow and Fyzabad. The produce was mainly exported to the nearest British Cantonments. The extension of this crop, in the interior was checked by the prejudice felt by the people, especially the Brahman and Bachgoti Rajputs against eating a new vegetable, especially a root. It also does not seem to have become yet a part of the town- or man's diet in Oudh.

Hoppy cultivation was noticed by Butter along the bank of river Gomti by some special castes particularly the Kachis. It was mainly exported to the adjacent British districts.

1. Ibid.
2. Butter, p.69.
3. Agricultural Statistics 1885-6
4. Butter, p.76; Watt, DEP p. 1026
The little amount of opium produced on the right bank of the Jumna was consumed inside the country and was also bought to the markets of Lucknow and Fyzabad. Its cultivation seems to have been abandoned in the later period, or it was fully brought under government control, since the agricultural statistics of 1865-6 record no area under the opium cultivation.

A small amount of ganja was raised in the country. Butter explicitly asserts that, "no ganja is raised in Bainswara" and he attributes this phenomenon to the, "high tone of the morality" of the inhabitants of the districts.

Quite a large number of other crops were raised in the province. A comprehensive list of these crops has been provided by Abul Fazl in daftar rates of the suba for both rabi as well as sherif seasons. But it appears that the peasants of Awadh could not make any improvements in their methods of cultivation during the subsequent period. While describing the rotation of crops, Luttar specifically says that, "the knowledge of the natives ..... is very limited", only two systems of crop rotation; one suited to high ground and another to the lower ground/being followed.

1. Butter predicted that, 'the time is not far distant, when the growth of opium will constitute one of the principal sources of the revenue of Oudh' (pu.60-1). Watt however informs us that in 1865-6, an area of little less than 200,000 acres under opium, DVP, p.851.

2. Apart from the above reasons, the soil of Bainswara was dry and irrigation was difficult; and this inhibited the growth of poppy and ganja. Cf. Butter, p.69.

The major cropping seasons of the province were, *rabi* and *khari*. Double-cropping (i.e., raising of both *rabi* and *khari* crop over the same field) was possible on some parts of cultivated land in Awadh, but even the approximate extent of such area during the Mughal period cannot be determined. However, the agricultural statistics of 1885-6 discloses 29,93,965 acres under double cropping (being about 25% of the total cultivated area).

No estimates are provided for the actual seed-yield ratio during the Mughal period. These are given only by Butter for the southern districts of Uudh (1836). The figures he offers are reproduced below:

<table>
<thead>
<tr>
<th>Name of the crop</th>
<th>Acres of land</th>
<th>Seed per acre</th>
<th>Duce in good year</th>
<th>Duce in bad year</th>
<th>Former produces per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Chana</td>
<td>30</td>
<td>14 or 15</td>
<td>5 to 8</td>
<td>18 to 20</td>
<td></td>
</tr>
<tr>
<td>2. Jethun (wheat)</td>
<td>51</td>
<td>14 or 15</td>
<td>7 to 8</td>
<td>20 to 25</td>
<td></td>
</tr>
<tr>
<td>3. Dau (Barley)</td>
<td>40</td>
<td>20 to 22</td>
<td>10 to 13</td>
<td>20 to 25</td>
<td></td>
</tr>
<tr>
<td>4. Suger</td>
<td>1/4</td>
<td>1 or 2</td>
<td>1/2 or 3</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>5. Tiga or Arsi</td>
<td>10</td>
<td>3 to 4</td>
<td>1 1/2 to 2</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>6. Mesur</td>
<td>30</td>
<td>8 to 10</td>
<td>4 to 5</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

2. *Agricultural Statistics 1885-6*. 
**Table 41**

<table>
<thead>
<tr>
<th>Name of the crop</th>
<th>Seed of crop</th>
<th>Produce in good year</th>
<th>Produce in bad year</th>
<th>Former produce in mans.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashan Khariif</td>
<td>30</td>
<td>15</td>
<td>8 or 9</td>
<td>20</td>
</tr>
<tr>
<td>Jarhan</td>
<td>40 for 6 bigha</td>
<td>100 from 6 bigha</td>
<td>50 or 60 from 6 bigha</td>
<td>-</td>
</tr>
<tr>
<td>Bakai</td>
<td>50</td>
<td>16 or 18</td>
<td>5 or 6</td>
<td>-</td>
</tr>
<tr>
<td>Jower</td>
<td>6</td>
<td>10 or 12</td>
<td>4 or 5</td>
<td>-</td>
</tr>
<tr>
<td>Uajra</td>
<td>6</td>
<td>10 or 12</td>
<td>4 or 5</td>
<td>-</td>
</tr>
<tr>
<td>Urad</td>
<td>7½</td>
<td>8 or 10</td>
<td>3 or 4</td>
<td>-</td>
</tr>
<tr>
<td>Arhar</td>
<td>1½</td>
<td>8</td>
<td>3 or 4</td>
<td>-</td>
</tr>
</tbody>
</table>

The tables show a fairly reasonable seed-yield ratios. For wheat, for example, we have 1:11 or 1:12 in good years and about 1:5.6 or 1:6 in lean years.

Estimates for crop yields and revenue rates per bigha are provided by Abul Fazl on the basis of the rai worked out by Sher Shah’s administration (1540-5). The yields are given for pūlaj and parāuti land (the lands continuously under cultivation). Three estimates of yields are furnished for each crop: gazīda, 'āla (good or high quality), miyāna (middling) and zabūn (low quality). Then an average of yields is given simply by dividing the total by 3.
The figure, arrived at, is further divided by 3 to get the amount of product of each crop that was claimed by the state as land revenue. In the agricultural statistics from 1632 onwards estimates have been provided separately for irrigated and un-irrigated lands in pounds per acre. An attempt could be made to compare the yields of high and middling categories of land during Sher Shah's administration with modern estimated yields for irrigated lands. Similarly, the yields of low category of land in Sher Shah's schedules could be compared with the yield estimates of unirrigated lands of modern statistics. However, a comparison of the yield rates for certain crops in Sher Shah's time with those of modern times will be quite conjectural. The modern reported yields for cotton are those of cleaned cotton, while the Ain's data refer to the raw cotton only. Similarly in case of mustard seeds, the modern statistics has combined it with the rape seed, while the Ain's information pertains to mustard only. A comparison of the Ain's data for बाँध (paddy) with that of husked rice in modern statistics would seem to be too hypothetical. In the accompanying tables a comparison has been offered for the major crops only.

1. The units of area and weight, are to be assumed, are those used during Sher Shah's time. Man-i Shershahi was based on 28 dams and not of 30 dams (as was man-i Akbari). Similarly the bigha under Sher Shah was based on gaz-i sikandari which was 39/41 of gaz-i Ilahi (Irfaq Habib, pp. 367-8 and pp. 353-6). Since both weight and area were smaller by about the same proportion the difference hardly requires conversion of Sher Shahi units into those of Akbari.

2. The comparison is made with uniform units by converting acres and British mound into bigha-i Ilahi and man-i Akbari. (0.6 acre=1 bigha; 55.32 lb = 1 akbari mound).
### TABLE 'a'

Average yields in Man-i Akbari/bigha-i Ilahi of irrigated land for c. 1892

<table>
<thead>
<tr>
<th>Districts</th>
<th>Wheat</th>
<th>Rice</th>
<th>Sugarcane</th>
<th>Barley</th>
<th>Gram</th>
<th>Pea</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Hardoi</td>
<td>13.39</td>
<td>-</td>
<td>-</td>
<td>14.28</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. Kheri</td>
<td>12.50</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. Unao</td>
<td>12.50</td>
<td>10.17</td>
<td>22.32</td>
<td>13.39</td>
<td>-</td>
<td>12.50</td>
</tr>
<tr>
<td>6. Lucknow</td>
<td>12.50</td>
<td>-</td>
<td>-</td>
<td>14.28</td>
<td>10.71</td>
<td>-</td>
</tr>
<tr>
<td>7. Rae Bareli</td>
<td>12.50</td>
<td>-</td>
<td>-</td>
<td>14.28</td>
<td>-</td>
<td>14.28</td>
</tr>
<tr>
<td>9. Barabanki</td>
<td>13.39</td>
<td>-</td>
<td>-</td>
<td>14.28</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11. Fyzabad</td>
<td>13.39</td>
<td>-</td>
<td>17.85</td>
<td>14.28</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13. Gonda</td>
<td>13.39</td>
<td>-</td>
<td>17.85</td>
<td>14.28</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**AVERAGES**: 13.15 11.45 20.79 14.16 12.09 12.09

Maj's average of good and middling lands: 15.00 15.10 11.30 9.00 11.30 11.30
Average yields in man-i akbari/bigha-i ilshi of irrigated land for c. 1892

<table>
<thead>
<tr>
<th>District</th>
<th>Wheat</th>
<th>Rice</th>
<th>Jowar</th>
<th>Gram</th>
<th>Rea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitapur</td>
<td>6.25</td>
<td>7.14</td>
<td>8.35</td>
<td>6.25</td>
<td>7.14</td>
</tr>
<tr>
<td>Turjai</td>
<td>5.92</td>
<td>7.36</td>
<td>8.92</td>
<td>6.25</td>
<td>-</td>
</tr>
<tr>
<td>Bahraich</td>
<td>6.92</td>
<td>8.75</td>
<td>8.35</td>
<td>5.35</td>
<td>6.25</td>
</tr>
<tr>
<td>Ghazi</td>
<td>7.14</td>
<td>7.36</td>
<td>8.35</td>
<td>5.35</td>
<td>-</td>
</tr>
<tr>
<td>Unnao</td>
<td>6.25</td>
<td>7.36</td>
<td>7.14</td>
<td>5.35</td>
<td>7.14</td>
</tr>
<tr>
<td>Lucknow</td>
<td>6.25</td>
<td>7.36</td>
<td>7.14</td>
<td>5.35</td>
<td>-</td>
</tr>
<tr>
<td>Rae Bareli</td>
<td>-</td>
<td>7.36</td>
<td>8.92</td>
<td>6.25</td>
<td>-</td>
</tr>
<tr>
<td>Saranekhi</td>
<td>7.14</td>
<td>9.92</td>
<td>8.92</td>
<td>6.25</td>
<td>-</td>
</tr>
<tr>
<td>Patta Ghar</td>
<td>7.14</td>
<td>8.75</td>
<td>8.92</td>
<td>6.25</td>
<td>-</td>
</tr>
<tr>
<td>Fyzabad</td>
<td>6.92</td>
<td>8.75</td>
<td>8.92</td>
<td>6.25</td>
<td>-</td>
</tr>
<tr>
<td>Basti</td>
<td>6.92</td>
<td>8.60</td>
<td>8.03</td>
<td>7.59</td>
<td>6.25</td>
</tr>
<tr>
<td>Sanda</td>
<td>-</td>
<td>9.92</td>
<td>8.92</td>
<td>6.25</td>
<td>-</td>
</tr>
<tr>
<td>Gorakhpur</td>
<td>8.52</td>
<td>8.60</td>
<td>8.03</td>
<td>6.25</td>
<td>-</td>
</tr>
</tbody>
</table>

Yields recorded in din for low quality land: 6.35 8.35 8.35 6.03 6.69
Table 'A' sets out the yields of eight major crops (rabi and kharif both) from the irrigated lands for the districts falling within the limits of Mughal provinces of Awadh (including districts situated on the periphery) along side the averages of Sher Shah's high and 'middling' yields. Table 'B' sets out the yields of these very crops from the 'unirrigated' land compared with Sher Shah's 'low' yields.

These tables show that the average of Ain's 'good' and 'middling' yields are slightly higher than in 1892 estimates for these crops like wheat, barley and gram, but in the case of coarser grains such as jumār and bīra the rates of productivity were substantially higher during Sher Shah's time the opposite is the case with peas. The yield of rice and sugarcane in terms of gur was certainly higher (about two folds) towards the close of the 19th century as compared to the Ain's time. So far as the increase in the yield of gur by the 1890s is concerned, this is understandable in view of the wide-spread use of iron crushers which has resulted in a higher extraction of juice.

The Ain gives us details of the revenue rates on each crop for each dastūr circle of the Mughal empire. These rates

essentially represented the cash value of the portion of 
produce claimed as land-revenue. In other words, the variation 
of castur rates from one area to another could be taken as a 
phenomenon denoting the actual variation in yields or prices 
or both. In the province of Awadh, some of the rabi crops 
the final castur are not recorded for all circles and the 
rates have been provided only for six circles while the 
remaining six circles have been left out for unspecified reasons. 
However, with the rates available, we can study the main trends 
of these variations.

The rates of wheat vary from 54-20 dams (in Awadh and 
Bahraich) to 62-15 dams (per bigha Ibrahimabad). Rates 
early varied between 35-20 (Firozabad) to 45-21 (Ibrahimabad 
again). Notable variations are discernable in the rates for 
green pea; the highest was 30 dām (Ibrahimabad) the lowest 
24-15 dām (Firozabad). The maximum rate recorded for the high 
grades coloured paddy (shāli) was 74-20 (Lucknow) while the 
lowest was 62-5 dām (Bahraich). The rates were generally lower 
towards the North-East, and tended to be high towards south and 
north-west. The cotton rates were high in south-west (93-23 dām 
in Ibrahimabad, Pali, Lucknow and Unam) while lower rates were 
recorded towards the south-east (83-21 dām in Awadh and 
Sharwara). For labhara the rates seems to have been pretty 
uniform, the lowest 23-12 dām (Bahraich, Gorakhpur and Kharansa), 
the highest 25-18 (Ibrahimabad and Unam). Similarly the rates 
for juwar show little variations; the high rate region was the
The general pattern emerges from the 

The modern data for yields gave an almost set pattern for the crops, with only a few exceptions. In case of wheat and barley, almost a uniform rate of yield is assigned to all the districts of the 

However in a few districts of the north-west, the yields were a little low. In these districts, the yield rates of 

In case of cotton a decline in yields from the uniform is discernible in eastern districts of 

The maximum yield blocks of sugarcane (in terms of 

annually for all crops.

The south crop being a 

while low rate of return in the eastern parts (35-75% and upwards). In the case of thick

while the rate of ordinary cane at

the minimum was 123- 

while the 

The data on the 

The most

probably because the latter were determined not only by yields estimates but also by prices.
Specific details about the practices followed by the peasants of Awadh during the Mughal period are lacking. In the absence of such information, it may yet be assumed that the methods of cultivation and irrigation adopted by them were similar to other peasants of north India. Obviously, these methods, similar as these might have been to those of Europe in the 17th century, tended to become outmoded as two centuries passed by. Thornton thought that in Awadh the "modes of tillage were extremely rude and inefficient. The operation of ploughing was carried out so feebly and unskilfully that it had to be repeated 30 and 40 times for a wheat crop, after that harrowing had to be undertaken 7 or 8 times. The reasons for such 'fearable operation of ploughing' were not far to seek, as the cattle employed in agriculture were mostly 'stunted, broken down and miserable'.

In the time of the Akbar the number of tax-free animals allowed per head of peasant were four bullocks, two cows, and one buffalo. Large grazing grounds, in waste and forest both, were available for the cattle during the Mughal period.

1. Cf. CLHI, I, p.214. The use of seed-drill and dibbling were the methods, employed by Indian peasants, were unknown in the contemporary Europe. Cf. Ibid.
2. Thornton, op. 29-30.
3. Ibid.
4. CLHI, I, pp.220-1. During the Mughal period the price of ghee was about 8.75 times its weight in wheat.
The situation underwent a change as the population increased
and cultivation expanded. The peasants in Awadh depended on the
siul dhāk and other jungles for the support of their animals.
During the 18th and 19th centuries the forests were reclaimed
on a large scale to extend the area under cultivation and for
the purpose of firewood. The scarcity of the 'grazing ground'
led ultimately in fall of the number of animals in relation to
the total human population. This deterioration in the south-
western districts was so acute that, "people who would formerly
have possessed 100 oxen and 50 buffaloes, have now only four or
five of them". The animals left with peasants were in no good
condition because, "excepting along the Sai and near Faizabad,
where there is still a good supply of water and fodder, the
oxen are most miserable animals of the kind ...... lean, stunted
and frequently diseased."

The scarcity of the cattle had also become acute because
of the "universal practice of revenue collectors seizing and
carrying them away when their owner fell into arrears." The
problem had assumed such dimensions that when the fields had
to be watered, it was quite common to see, "all members of the
family, male and female, working instead of cattle at the well
rope." The fall in the number of livestock per capita ultimately

2. Ibid., p. 64
3. Ibid., p. 65-6.
raised the price of rice. It was, "formerly sold at 20 sers the rupee, is now sold at a yer and half."

Manuring was done with the dung of cattle and horses. This was supposed to raise the fertility of land and the productivity of the crop in, 'triple measure'. But one would think that since there was some scarcity of cattle, and reduction in grazing grounds during the 19th century, the dung manure would also have become relatively less plentiful. Moreover, manuring was not done scientifically and Butter thought that the local peasant had much to learn in this regard.

The peasants seem to have had an accurate idea of the nature of soil and its adaptabilities for particular crops. Separate schedules of tillage were divided for each crop. The fields were especially prepared for wheat cultivation; such fields had to be left fallow in the kharif season. In this period of four months, thirty-two ploughings were carried out lengthwise (whara-whara) and across (bōra-bōra) while the ordinary peasants repeated this course twenty times only. Some diagonal ploughing operations were also carried out. After this much of ploughing, smoothing out of the field was done in order to pulverize the soil. This was done by using a heavy wooden plank called segawan eight times; lengthwise and across. The other

1. Butter, p. 64.
2. Ibid., p.65
3. Ibid., p.55
fields, in which rice was not hard to be grown, were first filled with water at least a foot deep, and then, "three or four double ploughings are given and the furrow is once passed through the soil, so as to reduce it to the state of soft mud."

...been

...by a jad-driel and broad-cast has described by Butter. No reference is made to dibbling, already noticed in the 17th century.

The agricultural implements used by the peasants of Qiewah Hurra, the 18th century were judged by butter to be "rude and simple in the extreme." But as compared to others, the one lo or Qiewah had no, "superstitious prejudice against the introduction of new agricultural implements." The only objection they might have against the use of any new device or implement would be the cost. The following is the list of the implements given by Butter:

1. Butter, p. 55
2. Ibid., p. 56
3. Ibid., p. 62
4. Ibid., p. 63
The rainfall and the rivers flowing through the province were the major sources of irrigation. Abul Fazl mentions the rivers, Sarju, Ghagha, gai and Gomti as the principal streams traversing the province. There is no information about any water lifting devices set upon these rivers. But the floods were very important for rice cultivation. Abul Fazl says, "With the beginning of the dry season it is wonderful how the floods begin from the Saru and Ghaggar; they flood the land before the onset of the monsoon. As the waters rise, the rice stalks also grow and lengthen. Only if the floods take place..."
before the ears grow, is the rice crop destroyed." Similarly over on small area of cultivated land, artificial methods of irrigation were also applied, but in crude forms. Bhandari tells us that, "although at some places cultivation is supported by the wells ------ most of the land still depended on rainfall". Earlier the abundance of the rainfall in the province has been praised as it resulted, "in extension of the cultivation, augmentation of the crop-yields, cheapness of the grains, and the large settlements in parqanes."

But with the extension of the cultivation through a continuous process of the reclamation of virgin land, the need for having more artificial irrigation began to be felt. During the 15th century, irrigation was practised throughout the kingdom of Awadh in order to supplement the monsoon. The principal sources of artificial irrigation were wells, tanks and lakes. Butter thought that the need for artificial irrigation had been growing in Awadh because of a possible diminution of rainfall owing to forest clearance. The forest clearing had been carried out very rapidly in north-western parts of the kingdom, and it was not accompanied by any artificial system of planting which might counter-act "the parching effects" produced by the removal of the forests.

3. Butter, v.48
4. Ibid.
The most common practice for obtaining water from a river or a lake, when the bank happened to be perpendicular, and close to water, was by means of a basket, woven of split bamboos, called dungi. It was manipulated by two men facing each other and holding a rope, tied with the sides of the well. By applying this method three miles of land could be irrigated in a day by four men, who used to work by turn and raise the water up to 6 feet. When the river bank was much above the water level, the water was raised by using a leather bag, and rope. The rope was either passed over a pulley wheel made of wood or a cylinder made of split bamboos. The rope was pulled either by cattle or manually.

The wells were dug 60 or 70 feet deep. From these wells the water was raised by using a leathern bag (mur) pulled by rope. The lever-based dhenkli was also used for raising water from the wells of small depth. However, even the raising of the wells alongside the left bank of Jumli was not economical because of the aridity and sterility of the soil. But in 1895-6, the total area irrigated by wells was about 10,63,760 acres, this being 7% of the total irrigated area.

The absence of the Persian-wheel (rahat) was noted by Rutter. It was a labour saving device; that it was not used

1. Jinnah, pp. 66-7
2. Id.
3. Agricultural statistics 1895-6, p. 32.
4. Rutter, p.32.
It appears that there was absolutely no canal-irrigation in any part of Audah. The agricultural statistic of 1885-6, which returns under the column 'area irrigated by the canals'.

As compared with the cultivated area in 1885-6, the total irrigated area was very small (about 19% of the total cultivated area). There is no reason to believe that the proportion was higher under the Audah kingdom. Much of the larger area of land was thus left to the mercies of rainfall and riverine inundations.