South Indian agricultural production developed mainly on the basis of utilizing the natural features of the land and by way of adaptation to them. According to L.B. Alaev the tropical climate allowed some kind of agriculture all through the year, more even distribution of rains, made it possible to vary dates of sowing and harvesting of some crops.

Agriculture in the region depended to a large extent on the two main monsoons, the North East and the North West. In the absence of large scale irrigation works with no proper network to distribute existing artificial irrigation systems, periodical rains came to be depended on heavily. The monsoon rains were erratic and inconsistent. To depended on them for agricultural operations entirely made it difficult to conduct agricultural operations on time. Speaking of the inconsistency of rains in the region, one of the Telugu proverb says ‘Vana Rakada Pranam Pokada Evariki Teliyadu’ (‘no one can predict coming of rains and death’). Though the region Masulipatnam, was situated near the two delta systems of Krishna and Godavari, in the pre anicut period their potential could not be fully exploited.

Besides, as the South Indian rivers were rain fed, their water level fluctuated considerably during the year. Therefore the canal system of irrigation did not develop much in South
India. In the absence of canal irrigation, storing rain and high flood water in special reservoirs or with the help of dams became the main method of irrigation.

The region had a variety of soils and based on the soil variety and irrigation facilities the cropping patterns differed from place to place in the region. So it is interesting to study the intra regional variations in the soils and what were the soil varieties in different taluks of Masulipatnam.

Though the two major river systems of Krishna and Godavari which enveloped the Masulipatnam region were not of great importance to the region in the pre anicut period in matters of irrigation, they did provide fertile soil in certain tracts of the district. The river systems combined with the existing artificial irrigation sources like tanks and canals played an important role in the agricultural needs of the economy.

Soil Varieties:

There was a wide variety of soils in Masulipatnam region ranging from the most fertile to the Sandy ones near the coastline. The three taluks of Bandar, Pedanah, and Divi bordering on the sea and there was a broad strip of Sandy villages situated in these taluks all along the coast. The greater portion of the district consisted of Red or Black Cotton soil. On the northern
side it stretched out to the North East through the Kolleru lake and Eluru taluks and as it gradually approached the hills was mixed with Sandy Red soil produced from their degradation.

On the North West, the Nuzividu Zamindari and especially Bezwada and Jagghiahpet taluks had Red Sandy soil as these taluks bordered on the neighbouring hills. But in the extreme South that is in Divi sand was largely mixed with the alluvial deposits of the Krishna river which not only improved the soil but changed its character making the stiff clay of lighter consistency and more easy for the plough.

But the large expanse of Regada was not equally fertile throughout. The best Regada for dry crops existed in parts of Gudivada. It was of a dark colour and consequently had the valuable property of absorbing and retaining moisture. A dark soil radiated the heat much quicker than a light coloured one. The clay soils would absorb the dew a long time before the Sandy soils and thus would sustain vegetation while the crops in a Sandy soil might be languishing for want of moisture.

But the best Regada for wet crops was of a lighter colour and consistency and was mostly to be found in the lower parts of Bezwada and Eluru. As the Regada approached the Sand on one side and the Red soil on the other it deteriorated and the inferior Regada was found through out Bandar, Pedanah lower parts of Gudivada, Kaikalur, Gundagolanu, north of Eluru and the western
portion of Bezwada near the Krishna river, Nandigama and the lower part of Jaggiahpet.

However the best and the most productive soils were the alluvial series which were widened in breadth towards the mouth of the river. For example, the Divi delta was favourably situated by nature to receive the deposit from the water. The next in line for their riches and fertility were the garden lands which were commonly found in and around the villages.

The other varieties like the Red Series were found on the northern part of the district consisting of a loose Sandy consistency. Sandy soils bordering the sea coast were the last ones in the point of fertility.

Thus the soils and climate of the region favoured the cultivation of great variety of crops. As mentioned above, the cropping pattern was mainly based on the soil variety. For instance, the Black soils were generally cropped with Cholum and Cotton. The Red soils were chosen for the cereal crops mainly, though other crops were also produced. The Gray soils were regarded as the inferior variety in terms of soil fertility. Hence they were usually cropped with Varagu, Korra, and inferior Kambu, and Cholum.
The soil was mainly categorized into three groups depending mainly on the requirement of irrigation facilities. They were dry lands, wet lands, and garden lands, which corresponded to Telugu terms of Metta, Pallamu, and Thota. Sometimes there were wells which gave limited but reasonably guaranteed quantity of water. Lands with well irrigation were used mainly for fruit trees and vegetables and were called garden lands.

The main crop on the wet lands was Paddy. In Masulipatnam several varieties of Paddy were grown like Rajanalu, Chitti mutyalu, Akkullu, Ramasagaralu, Kusumalu, Krishnaneelalu, Sivanilalu. The dry crops were various pulses, Ragi, Cholum, Kambu, Cotton, and Indigo. The garden crops included Betelnut, Betel leaf, Tobacco, Vegetables, Fruits, and Chillies.

Sometimes the lands were generally grouped under five categories - Pallapu lands that is those which produced mainly Paddy; Metta lands, which were exclusively cropped with Jonna; Meraka lands which produced other dry grains; Jareeb lands producing garden crops like Tobacco, Chillies, Turmeric, Garlic, Onion, and Sun hemp. The last one was lands having Phala vrukshalu or fruit trees. However the classification was not strictly followed. Often dry grains were cultivated with the aid of artificial irrigation, while wet crops depended solely on rainfall.
The land revenue assessment varied in wet, dry and garden lands. For instance, tables 5.1, 5.2, 5.3, 5.4. show the amount of land under cultivation in wet, dry, and garden lands and rate per acre in three villages in Nunestalam pargana and also the revenue assessment in Devarakota and Gollapalli parganas. They were assessed differently, one at a highest rate, the other at a medium rate and another at lowest rate. For example the villages of Vaduru and Pavuluru were assessed at the highest rate.

**Table : 5.1**

<table>
<thead>
<tr>
<th>Village Statistics of Vaduru and Pavuru</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry land</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>1. Waraput</td>
</tr>
<tr>
<td>2. Tirwaput</td>
</tr>
<tr>
<td>wet land</td>
</tr>
<tr>
<td>Garden land</td>
</tr>
<tr>
<td>Tobacco</td>
</tr>
<tr>
<td>Chillies</td>
</tr>
<tr>
<td>Chilagadam</td>
</tr>
</tbody>
</table>

**Source:** Compiled from Collector E. Roberts letter Masulipatnam district to the BOR, 18.4.1826. PBOR, v. 1061, p. 5824.
### Table 5.2

Revenue Assessment in **Kanumolu** village

<table>
<thead>
<tr>
<th>Nature of Land</th>
<th>Extent of Land in Acres</th>
<th>Amount of Revenue Rs.</th>
<th>Rate per Acre Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tirwaput</strong></td>
<td>157- 16 5/4</td>
<td>252- 8-0</td>
<td>1-11- 1</td>
</tr>
<tr>
<td>Wet lands</td>
<td>261- 0</td>
<td>1,122-14-8</td>
<td>4- 4-10</td>
</tr>
<tr>
<td>Garden land</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco</td>
<td>5- 55</td>
<td>85- 1-5</td>
<td>22- 5-10</td>
</tr>
<tr>
<td>Nutcheny and Mokka Jonna</td>
<td>5- 1/2</td>
<td>10- 0</td>
<td>5-5-9</td>
</tr>
</tbody>
</table>

Source: Compiled from Collector E. Roberts letter Masulipatnam district to the BOR, 18.4.1826, PBOR. v. 1061, p. 5824.

### Table 5.3

Revenue Assessment in Teryer Nyanavaram in **Nunstalum** Pargana

<table>
<thead>
<tr>
<th>Dry land</th>
<th>Extent of land in acres</th>
<th>Amount of Revenue MRs.</th>
<th>Rate per Acre MRs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Waraput</td>
<td>144-56</td>
<td>224- 6-6</td>
<td>1- 8- 9</td>
</tr>
<tr>
<td>2. Tirwaput</td>
<td>64-14</td>
<td>71- 7-0</td>
<td>1- 1- 9</td>
</tr>
<tr>
<td>Wet land</td>
<td>9-56</td>
<td>32- 9-0</td>
<td>5- 4- 7</td>
</tr>
<tr>
<td>Garden land</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco</td>
<td>-38</td>
<td>16-14-0</td>
<td>17-12- 5</td>
</tr>
<tr>
<td>Chillies</td>
<td>1- 21 3/4</td>
<td>18- 7- 9</td>
<td>11-14- 9</td>
</tr>
</tbody>
</table>

Source: Compiled from Collector E. Roberts letter Masulipatnam district to the BOR, 18.4.1826, PBOR. v. 1061. p. 3824.
Revenue Assessment in Devarakota and Gollapalli Parganas

<table>
<thead>
<tr>
<th>Dry land</th>
<th>Extent of land in acres</th>
<th>Amount of Revenue in MRs.</th>
<th>Rate per Acre in MRs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Waraput</td>
<td>1.665-27</td>
<td>7,936-2-6</td>
<td>4-12-5</td>
</tr>
<tr>
<td>2. Tirwaput</td>
<td>60-21</td>
<td>478-8-9</td>
<td>7-14-6</td>
</tr>
<tr>
<td>wet land</td>
<td>73-23</td>
<td>191-6-7</td>
<td>2-9-7</td>
</tr>
</tbody>
</table>

Garden land

<table>
<thead>
<tr>
<th>Crop</th>
<th>Extent of land in acres</th>
<th>Amount of Revenue in MRs.</th>
<th>Rate per Acre in MRs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco</td>
<td>10-25 1/4</td>
<td>557-7-0</td>
<td>51-6-1 1/2</td>
</tr>
<tr>
<td>Chillies</td>
<td>- 11 5/4</td>
<td>5-7-0</td>
<td>11-11-5</td>
</tr>
<tr>
<td>Sown Hemp</td>
<td>- 6 1/2</td>
<td>0-7-6</td>
<td>2-12-4</td>
</tr>
<tr>
<td>Nutcheny and Mokka Jonna</td>
<td>5-59</td>
<td>33-7-0</td>
<td>5-8-11</td>
</tr>
</tbody>
</table>

Source: Compiled from Collector E. Roberts letter Masulipatnam district to the BOR, 18.4.1826, PBQR, v. 1061, p. 5824.

A particular village raised a variety of crops and depending on the soil variety one particular crop was produced more and some less. For instance in the Kondapalli Haveli in the village of Cowloor crops like Paddy, Jonna, Senagalu, Amudalu, Cotton, Pesalu, Ulavalu, Kandulu, Valavadam, Minumu, Mokka Jonna and 12 certain garden crops were raised. But among them it was Jonna that was produced extensively. Table 5.5 shows the crop varieties and quantity of land cultivated under each crop in Cowloor village in 1800.
Extant of Cultivated land under each Crop

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Crops</th>
<th>Quantity of Land under cultivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Paddy</td>
<td>38 - 13 - 0</td>
</tr>
<tr>
<td>2.</td>
<td>Jonnalu</td>
<td>258 - 0 - 0</td>
</tr>
<tr>
<td>5.</td>
<td>Senagalu</td>
<td>2 - 2 - 0</td>
</tr>
<tr>
<td>4.</td>
<td>Amudalu</td>
<td>3 - 0 - 0</td>
</tr>
<tr>
<td>5.</td>
<td>Cotton</td>
<td>7 - 4 - 0</td>
</tr>
<tr>
<td>6.</td>
<td>Pesalu</td>
<td>6 - 10 - 0</td>
</tr>
<tr>
<td>7.</td>
<td>Ulavavalu</td>
<td>4 - 12 - 0</td>
</tr>
<tr>
<td>8.</td>
<td>Kandulu</td>
<td>6 - 14 - 0</td>
</tr>
<tr>
<td>9.</td>
<td>Valavadum</td>
<td>0 - 8 - 0</td>
</tr>
<tr>
<td>10.</td>
<td>Minumulu</td>
<td>1 - 6 - 0</td>
</tr>
<tr>
<td>11.</td>
<td>Mokkajonna</td>
<td>4 - 1 - 0</td>
</tr>
<tr>
<td>12.</td>
<td>Garden Produce</td>
<td>10 - 0 - 0</td>
</tr>
</tbody>
</table>

Source: Compiled from the village officials account of Cowloor village, 10.11.1800. MDR, v. 2998, p. 21

Dry grain cultivation: The principal dry grains were Ragi, Cholam, and Varagu. They consisted the chief ingredients in the food of the poor classes in the region and were cultivated commonly. The cultivation of the crops was comparatively easy and inexpensive, for they occupied the ground for barely a few months and did not require much water. The monsoon rains were sufficient to bring them to maturity.

Jonna, as mentioned earlier, was the staple crop in the region. It was five months crop and was grown at different seasons throughout the year in various districts. But the major crop was
Sown in October and November and was reaped in March. It was sometimes raised as a second crop on dry lands after the Castor or Varagu. The Jonna crop did not need much ploughing and hence the fields which had been well ploughed the previous year were selected and after a slight preparation the seed was sown. The seasonal rains were mostly sufficient for its cultivations as it required little water.

Wat grains – Paddy

Of the most important cereals cultivated in the region Paddy was one. Among the different varieties the superior sorts of Paddy took a longer time to ripen and were cultivated only in the best soils. But the coarser varieties which could be harvested in three to five months were the ones which were commonly grown. The crop is adjudged as the superior or inferior variety based on the timing of its sowing. For example, the best varieties of Paddy were transplanted from 15th August to 8th September while the grains transplanted between September and October were termed as late crop or second sort. The same was the case with other varieties of grain also. If Jonna, Tamedy and Nalla Pesara were sown from 9th September to 4th December the produce was called the early crop and also the good crop. But if these grains were sown after 4th till 17th October then only inferior varieties were sown as they were raised as second crops.
Generally three modes of raising paddy were distinguishable: the dry seed, the sprouted, and the transplanted. In the first method the seed was sown in the Paddy fields straight away and the expenses were low. But correspondingly the produce was also less.

In the sprouting system, the seeds were steeped in water till they germinated and were then transplanted to the field. In the third method, the seeds were sown in well prepared nursery beds and after the seedlings were several days old they were transplanted in the field. Under this system the nursery beds were ploughed several times and richly manured. Water was let in at regular intervals and weeding was frequently done. After a month Paddy was transplanted to the field. Thus wet cultivation was very labour consuming and incurred heavy expenditure also when compared with dry grains. But the third system of Paddy cultivation seemed to be absent in Masulipatnam region and Paddy was largely cultivated by the transplantation methods.

Cotton Cultivation : The Company took great interest in the cultivation of Cotton. Several experiments were carried on to introduce new Cotton varieties like Bourbon, Tinnevelly, and American suitable to the region. Farms were set up and the Company employed officials from time to time to experiment. But Cotton was not extensively cultivated in the region.
The cultivation of Cotton involved great labour and expense. Seed was not sown in the monsoon months as the shoots perished from over moisture. April and May were also not suitable for the cultivation of Cotton due to excessive heat. So excluding these four months the culture of Cotton was done in any of the remaining eight months of the year. The Cotton cultivation was carried on in both nunjah and punja lands either by means of artificial irrigation or assisted by monsoons.

The sowing of seeds in cultivation of Cotton was also an expensive process. Generally in each hole five seeds were sown, and when they had shooted fourth, two or three shoots only were allowed to remain and the rest were plucked off. Perhaps the expenses involved in the cultivation must have dissuaded the not so substantial ryots with little land to take up cultivation of Cotton. However, the government provided certain incentives and encouraged Cotton cultivation in the region.

When the shoots had grown one or two spans high the space left between them was ploughed and all the plants out of the line or growing too close from each other were cut off. The second or third year after the growth of the plant around fifteenth December and fifteenth January, all tender branches were lopped off leaving the more ripe boughs and the trunk to remain and the ground was properly turned up and ploughed.
Cotton cultivated in both wet and dry lands, was required to be watered during the height of the hot season, and in the period when strong winds blew. But at the same time the ground had to be allowed to dry well between the interval of each watering for if repeatedly watered when the ground was still moist, the berries would rot.

Generally in Cotton cultivated lands mixed cropping was practiced. The ground selected for the cultivation of the Cotton was divided into four portions. One was planted with Cotton, two with dry grains and the other portion was generally left fallow. After the first or the second year one half of the portion was left fallow. In the fourth year the remaining moiety of the portion left fallow was cultivated. Thus the cultivation every year should be one portion Cotton, two portions dry grains, and one portion fallow.

In the principle of crop rotation the land cultivated with Cotton was always cultivated with dry grains and the land in which dry grains were cultivated were divided into two portions, one to be cultivated with Cotton and the other to be left fallow, thus causing every year a regular succession of cultivated and fallow land.
Cost of cultivation

Table 5.6 shows costs of cultivation in both wet and dry crops in the district of Northern Circars.

Table: 5.6
Cultivation Expenses in Northern Circars

<table>
<thead>
<tr>
<th>Districts</th>
<th>Crop</th>
<th>Cost of cultivation</th>
<th>Assessment</th>
<th>Value of produce</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>R A P</td>
<td>R A P</td>
<td>R A P</td>
</tr>
<tr>
<td>Vizag</td>
<td>Paddy</td>
<td>9-14-0</td>
<td>14-0-9</td>
<td>30-9-9</td>
</tr>
<tr>
<td></td>
<td>Masulipatnam Paddy</td>
<td>4-15-0</td>
<td>4-6-9</td>
<td>10-14-10</td>
</tr>
<tr>
<td>Black</td>
<td>4-9-8</td>
<td>7-13-8</td>
<td>19-5-11</td>
<td>6-14-7</td>
</tr>
<tr>
<td>White</td>
<td>4-9-8</td>
<td>7-13-8</td>
<td>19-5-11</td>
<td>6-14-7</td>
</tr>
</tbody>
</table>

Source: Compiled from A Sarada Raju, Economic conditions in the Madras presidency 1800-1850, Madras. 1941, p. 73

The costs of cultivation included the hire for the ploughs and bullocks if they were hired, the value of seed grain, irrigation expenses, cost of manure, and sometimes labour charges, that is labour hired for ploughing, sowing, weeding, and transplanting. The costs of cultivation generally differed from district to district due to variations in costs and also due to differences in methods followed. It is evident from table 5.6 that the cultivation of white Paddy in Masulipatnam was by far the most profitable, the net return being about 50% of the total charges. The costs of cultivation were not very high and hence the large yield must be due to the superiority of the soil.
Rotation of crops

Crop rotation was followed and the principle of not overstraining the resources of the soil also seem to have been understood by the cultivators in the region. The cultivators were also well aware of the crop combinations. Generally a crop requiring little nourishment succeeded an exhausting crop. Leaving the soil fallow was another common method in the case of inferior soils.

Table 5.7
Rotation of Crops in Practice

<table>
<thead>
<tr>
<th>Lands</th>
<th>First crop</th>
<th>Crop cultivated in rotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet lands</td>
<td>Kusuma</td>
<td></td>
</tr>
<tr>
<td>Dry lands</td>
<td>Sajja</td>
<td>Minumu</td>
</tr>
<tr>
<td></td>
<td>Korra</td>
<td>Bobbarlu</td>
</tr>
<tr>
<td></td>
<td>Gingeli oil seeds</td>
<td>Tamedy</td>
</tr>
<tr>
<td></td>
<td>Jilama Paddy</td>
<td>Senaga</td>
</tr>
<tr>
<td></td>
<td>Budama Paddy</td>
<td>Senaga</td>
</tr>
<tr>
<td></td>
<td>Nutcheny</td>
<td>Janumu</td>
</tr>
</tbody>
</table>

In the rotation of crops certain crops were known as recuperative and others as exhaustive. Tobacco was usually followed by dry grains or gram and Cotton was hardly ever raised on the same land consecutively. Mixed cropping was really a variation of the principle and it was a practice which further secured the cultivation against possible loss due to inclemency of season for even if one crop was lost the other would remain. These principles were so common that they almost formed part of traditional prognostications like Goddu pairu veyaradu (a single crop should not be sown >, and aithe arike kakunte Kandi, dunnì challithe senaga (if harvested arike or Kandi and if ploughed and sown Senaga). Frequently a cereal crop and a leguminous one were sown together and the latter crop continued on the ground after the former was reaped.

Under the pedda crop or great crop, along with Jonna which was sown in August and September, generally Kandulu, Pesalu or Alasandalu, were sown. The three kinds of crops sown did not interfere with one another as they were reaped at different times and were different in their nature. The Jonna crop was reaped in January when the Kandi was about a yard high. Each crop was sown in separate rows, so that one crop could be cut from between other.
Black Paddy, the Jilama and Budama varieties which were usually sown in July were often sown with Kandulu. Black Paddy was reaped in November whereas the other two crops were harvested in October.

The other crop Mokkajonna was sown both as Punasa and Paira crop. Tsode was sown as punasa, pedda and paira corps in July, September and April. The tsode crop under punasa and pedda was sown in dry land and under paira the same crop was sown in garden lands.

The crops were sown under three heads. In an agricultural year three crops were raised. The first was punasa, that is the early crop. Under this, in Masulipatnam, generally Mokka Jonna, Korra, Nuvvulu, Sajja and Ragi were grown. The second was the pedda crop that is the great or the main crop. The crops grown were Van, Kandi, Pratti, Cholum, Pesalu, Alasandulu, Indigo, and Black Paddy. The third one was pyra or the late crop. A great variety of pulses like Mokka Jonna, Ragi, Senagalu, Ulavalu, Minumulu, Anumulu, Bobbarlu, Amudalu, Mirapa, Pogaku, and Avalu were grown.

From the seasons of sowing and harvesting it was observed that the pedda crop stood alone, but lands cultivated with a punasa crop were ready to receive a paira crop afterwards. But the pedda crop yielded the largest produce but it was inferior to
the joint out turn of the punasa and paira crop. The punasa and paira crops generally needed richer grounds than the pedda crops.

The punasa crops were sown with the first rains in June. The great crop generally commenced before the end of September and the pyra crops mainly dependent on the moisture in the soil were commonly sown in November and December after the North East monsoon rains.

In Masulipatnam also as else where in the Northern Circars, the cultivating operations generally commenced with mrigasira pravesam that is the beginning of monsoon around 5th or 6th of June. The traditional practice in the region was that the cultivators started their agricultural operations for the year with Yeruvaka, an invocation ceremony. The cultivators generally performed puja to the agricultural implements and gods before commencing cultivation. For this the head ryot usually led the bullocks to the fields followed by others. The various agricultural operations which commenced with the North West monsoons generally continued till December.

Tillage occupied an important role in the cultivation. Before sowing seeds for any crop the land was ploughed in various directions and the number of times a particular type of land was to be ploughed differed from place to place and also from crop to
crop. For instance, in Gundur pargana, in the low lands, for Paddy varieties land was ploughed four times, whereas in the high lands for Ulavalu, Senagalu, the ground was ploughed five times whereas for Chayroot it was done fifteen times. For Tobacco and Chollu land was ploughed eight times. In the case of other garden crops like Onions, Garlic, and dry crops like Amudalu, it was ploughed six times. The less number of times ground was ploughed only for Ulavalu, Kusumalu, that is two times followed by Pesalu and Jonnalu in which case it was ploughed at least thrice.

The plough that was in use in Masulipatnam was a very simple wooden instrument with only a little iron at the tip. This plough only stirred the soil and it seldom penetrated deep into the soil.

Several contemporary accounts opined that at the beginning of the nineteenth century the agricultural methods used in India were extremely defective and were based largely on custom and superstition. The implements of cultivation were considered to be last word in crudeness and inefficiency. The application of manure was defective and irrigation was inefficient. As far as the rotation of crops was concerned the principle was little known and imperfectly practiced while seed selection was seldom or never attempted.
But these features of agriculture traditionally looked upon as the general parameters for its backwardness were linked to the entire production as a whole, so could not be assessed individually. The agricultural implements were sufficiently diversified and generally they catered to the needs of cultivators in the region. There were special implements for every agricultural operations and for various kinds of soils. For instance, in the Ceded districts the Black Cotton soil was cultivated with heavy plough drawn sometimes by five to six bullocks. But this was unknown in Masulipatnam and Guntur regions. On the wet lands the commonly used plough was the smallest. Besides these, there were several other varieties of agricultural implements like Nagali, Gorru, Moieties, Goddali, Gandra goddali, and Iron hoops which were commonly used in the region.

The actual operation of seed sowing was performed either by broadcasting the seed by hand or by using the drill. Where land was either too wet or was not cultivated commonly before, the seed was sown with hand. But sowing by gorru was more economical than sowing by hand, because in the former method little grain was needed. For instance, in Masulipatnam district in the taluk of Six Islands there was difference in the quantity of seed needed for each cutty of land. Table 5.8 shows quantity of seed needed for different crops sown with gorru and with hand in a cutti of good land.
It had frequently been asserted that certain production decisions of farmers in India were governed chiefly by the custom of the country on certain traditional *prognostications* about the weather. Several scholars seem to have attributed backwardness of Indian agriculture to traditional beliefs. According to Misra, prevalence of custom, tradition and sometimes superstitions narrowed down *individualism* and subordinated personal initiative and competitive spirit. Bhattacharjee characterized Indian agriculture as a world of *relationships* and behaviour fashioned by traditions and environmental uncertainty.
But even many of these traditional prognostications about weather and sowing operations were well judged forecast rules. They corresponded roughly to the timing of monsoon and specific soil varieties which suited specific crops. So these traditional sayings had some relevance scientifically. But the cultivators who followed these rules might not have been aware of the principle behind them. The cultivators generally followed them as the age old sayings and believed that any digression from them resulted in a disaster or a crop failure.

It was believed rainfall during some of the nakshatras was good for certain crops. The rainfall during each of the nakshatra periods affected crops differently. Paddy sowing operations in kanya and rohini kartes were regarded as inauspicious. The proverbs 'kanyalo challithe kanugunta lokaru', (if sown in Kanya it is not even enough to be a mote in the eye) and 'rohino vittuta Rotilo vitthute' (sowing in Rohini is like sowing in the grinding stone) indicate these.

Generally certain kartes were not suitable for sowing. 'Mala punanama mundu Madiga vadaina challadu', (even a Madiga will not sow before Mala Punnama), 'pubbalo challina budida lo challina okate', (sowing in Pubba is like sowing in the ashes), Hastene karte lo challithe akshinthalaka kaina ravu', (if sown in Hastina even a handful of grin will not be produced). These proverbs generally served as indicators to the ryots regarding the suitab-
bility of the season to different crops. These rules were generally observed by the cultivators.

Certain kartes moreover were regarded as inauspicious to certain crops. The Proverb kruthikalo vithuthe kuthukalu nindavu (if sown in Kruttika even a morsel of food would not be produced), indicates that krithika karte was bad period for sowing of Jonna. But there were certain other traditional sayings which indicate favourability of a particular karte to a particular crop like `uttara padunu ulavaku adunu'(Uttara karte is good for Uluva crop).

In the same manner it was believed that each caste had a favourable karte. For instance, uttara was regarded as that of the Vellalars. This perhaps coincided with the peak of the agricultural seasons, whereas Bharani was for the Madigas.

There were several sayings for each of the agricultural operations indicating to the ryots that a particular agricultural operations had to be done at a particular time. Speaking of the commencement of the rains in June and starting of the agricultural operations the traditional saying, goes if there be drizzle in mrigasiram it will make even an old bull bellow' Pushyami aslesha and Makha were commonly regarded as hectic seasons for agriculture.
Normally it was expected that cultivators based their cultivating decisions on the actual availability of effective rainfall during the sowing period, and again the amount of rain water available during the growth period of the crops. Indicating the good rains and hence a good season the customary sayings indicate that if there be lightning and thunders in magham it was taken as a certain sign of an oncoming good season. Another proverb suggests that if magham thunders even the dry stalk on the wall coping would yield fruit. But if there were no rains during kartes of makha and pubba it was an indication to the ryots of a coming famine. One of the proverbs suggests that failure of rain in Magham and pubba forebodes a famine but it did not rain even then it was best to emigrate with your basket.

It is interesting to note that these traditional prognostications more or less coincided with the general rules of the agricultural seasons. These rules which were framed with conventional wisdom of the cultivators were however framed with great experience and in the rural setup in the absence of scientific and modern decision making rules, these acted as a sort of yardstick to the ryots in their day to day agricultural operations.

In the rural structure, various groups of cultivators interacted with each other closely and certain amount of interdependence among the cultivating groups in their day to day agricultur-
tural operations was an essential feature in any agrarian economy. For instance, the cultivators who possessed only one plough definitely had to take the assistance of others in the agricultural operations as he could not hire labour or extra ploughs.

The process of fallowing required that the soil should be frequently turned up and the more quickly it was done the better would be the produce. The unassisted exertions of the single cultivator protracted the work so long that the first furrows were obliterated before the completion of the entire field, and the part first ploughed was again covered with weeds. Not only for this but for several other reasons as well the assistance was required. Throughout all the remaining stages of the work, help was needed because as the plough which turns up the earth must be followed by the drill as that again must be immediately succeeded by the harrow to cover the seed with mould. For all these not only technical assistance but even individual labour was also needed for the reaping, threshing, and removal of the harvest.

In Masulipatnam region what was the common practice existing in the region? How was the poor ryot supported? Was there a sort of exchange of labour?

Generally the poor cultivator with a single yoke assisted in the cultivation of another and in return received the aid of his neighbours' ploughs and servants for the cultivation of his own lands. As the obligations were reciprocal each one's crop re-
mained their own property and no further recompense was expected by either party. The communal labour or its organizations seemed to be in existence at least among the poor cultivators. Though communal land holding was not common, practices like exchange of labour were common. As these agricultural operations were so elaborate and labour intensive they could not be done alone. Even a tiny bit of land needed all the trouble and may be it was one of the reasons why the cultivation of small holdings was unprofitable and hence joint holdings were still in existence.

Rather than the brotherhood feeling it was their economic necessity that bound the cultivators together and use one another's services in agricultural operations as the hiring of labour was expensive.

In Masulipatnam region maximum number of ploughs belonging to an individual might be reckoned at ten and the minimum at three. But generally most of the ryots possessed two. A double plough was altogether unknown in this region. The cultivation was usually carried on by a single yoke. If the cultivator had a second pair, then a fresh pair was used in the noon to avoid exertion and pressure.

For instance, a ryot who had two ploughs would cultivate one cutti of dry land and this in a favourable year produced 4
puttis and 10 tooms of Jonnalu or other grain. Value of 4 puttis and 10 tooms of Jonnalu at 22 MPs. per putty was 99-0-0

Deduct circa's share (which was half usually) 49-8-0

Ryot's share 49-8-0

Deduct darbari charges or 4 puttis of Jonnalu at 2 MPs. per putty 9-0-0
Deduct Nazar at 5 MPs. per cent 1-8-0
Batta to Mahasuldaars and Anchanadars 8-0-0

18-8-0

What remains to the Ryots 31-0-0

Deduct charges of cultivation

Value of 2 1/2 tooms of Seed grain 3-0-0
Subsistence to 2 labourers for 6 months at 1 seer of Jonnalu per diem 10-12-0
2 Kambalis 0-8-0
Charges incidental to the replacing of Cattle one year with another wear and tear of ploughs 21-4-0
Balance in favour of the Ryots 9-12-0

In Paddy lands

8 puttis grain value at 28 MPs/putti 160-0-0
Deduct Circa's shares 80-0-0
Ryot's share 80- 0- 0

Deduct Darbari charges at Rs. 1 1/2/putti 12- 0- 0

Nazrana at 3% 2- 6- 6

Mahsuldars charges at 16% 12-12- 6

Remaining with the Ryot 52-13- 0

Deduct charges of cultivation Rs - A- P

4 tooms of seed grain at 20 MPs./Putty 4- 0- 0

Substance of 2 slaves for 6 months at 2 seers of paddy each per diem 18- 0- 0

Seed value at 20 MPs./putti 0-18- 0

2 Kambalis 1- 0- 0

127 planters at the average rate of 30 men for every toom sown 10- 8- 0

charges incidental to the replacing of buffalo one year with another (wear & tare of ploughs 8- 0- 0

42- 8- 0

what remained with the Ryot 10- 5- 0

Source: Russell Collector Masulipatnam to the BOR, 20.3.1820.
PBOR. v.852, pp.3050-3052.
Thus not much was left to the cultivator's share. This amount in the context of his family maintenance was very meager. The following family expenditure of an average peasant family would show how much was needed for the bare minimum existence, without any expenses towards social occasions in the event of which the cultivators were left in the grip of the money lenders.

For instance, an average peasant family consisted of five persons the ryot, his wife, two children and a female relation. The daily consumption of grain could not be estimated at less that 4 seers. Considering that the usual staple food of the average peasant families was Jonna they needed at least 1 putti and a half for a year's consumption. The price of that (jonnalu) being 33 MPs. Thus the required amount of grain alone costed more than the surplus which remained with the ryot.

According to the account of the Collector of Masulipatnam the plough itself afforded little towards his support and without the right to graze his cattle in common pasture grounds and cultivate pumpkins in backgrounds he could not subsist. A single she buffalo alone would yield him Rs. 8 per annum in ghee and the profit he derived from this source added to the labours of his women enabled him to procure the necessaries of life. But even these aids would not always afford him the means of subsistence and for 2 or 3 months of the year the fruit from his Pumpkin
garden mixed up with butter milk on a very small proportion of meal was the daily diet of the cultivator's family.

During the period 1750-1850, in Masulipatnam region customs and traditions were at work in the agrarian practices and agricultural production like in other spheres. They played a major role and influenced the decision making of the cultivators and sometimes also wrapped the peasants in a web of superstitions. The cultivating technologies of the region in the pre anicut period did show a great variation in terms of its nature.
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