

CHAPTER IV.

AGRICULTURE AND IRRIGATION.

AGRICULTURAL PRACTICE. WET CULTIVATION—Paddy—Sugar-cane. DRY CULTIVATION—*Mungári* and *hingári* crops—Implements and methods—The *guntaka* or scuffle—Manuring—The *gorru* or drill—Mixing of crops—Weeding—The *pedda madaka* or big plough—Iron ploughs—Harvesting—Crops principally grown—Varieties and improvement of cotton. IRRIGATION—Protected area small—Wells—Tanks—Channels—Spring channels—Anicut channels—Tungabhadra channels—Projects under investigation—Nelikudiri project—Tungabhadra-Pennér project. ECONOMIC CONDITION OF AGRICULTURISTS.

CHAP. IV. AGRICULTURAL practice in the district divides itself, as elsewhere, into the cultivation of wet and of dry areas. On the latter it further varies with the nature of the land, one system being followed in the cotton-soil country and another in the tracts covered with the red and mixed soils.

AGRI-
CULTURAL
PRACTICE.

WET
CULTIVATION.

As will be seen later on in this chapter, the wet land of Bellary forms an extremely small proportion of its total area, and consists mainly of the tracts irrigated by the channels from the anicuts across the Tungabhadra. The crops chiefly grown on this are paddy and sugar-cane.

Paddy.

The cultivation of the former is less carefully carried out than in the southern districts.¹ The coolies work shorter hours, not going to the fields in the cold weather until 9 or 10 A.M.; excepting near Kampli, seedlings are not transplanted but the crop is sown broadcast; the fields are divided into very small plots and consequently can scarcely be properly ploughed; the ploughing is hardly ever done when the land is dry but only after it has been soaked with water; and thus the soil is not properly exposed to the air and the alkaline salts with which it is often heavily impregnated have little chance of being carried away into the sub-soil. These last two disadvantages are, however, to some degree counteracted by the constant flooding which it is possible to give land under these perennial supplies, the water bringing air with it and washing away salts which rise to the surface.

The seed is soaked for one night and then placed in a basket, covered with *lakki* or margosa leaves or grass, and wrapped in a

¹ See Mr. Benson's report in G.O., No. 1067, Revenue, dated 13th July 1881, to which this chapter is much indebted.

blanket. The next night it is soaked again and the day following it is sown broadcast. When the paddy is a month old the uneven crop which thus results is remedied by transplanting seedlings from the thicker parts to the thinner patches. The best kind of rice grown is that known locally as *Gaurisanna*, while next in popular estimation come the varieties of *Sipáyi*. Both these are six months' crops which are sown in July. Cheaper kinds are the different varieties of *Gargu*, a five months' crop sown in August, and of *Siranga*, a four months' paddy which is put down in September. The last is the sort usually grown as a second crop. The field is flooded daily until the crop is ripe, when the grain is threshed out by the usual methods. Statistics for a series of years show that on an average one-third of the area under paddy in the district is grown in Rayadrug taluk (chiefly under the Hagari channels), Hospet and Adóni having the next largest extent under the crop.

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Sugar-cane is grown in rotation with paddy every second, third or fourth year, according to the richness of the soil and the supply of manure available. The cane is a thick-stemmed white variety which was introduced into the district about 1840 by Mr. Blane, then Sub-Collector.¹ It has since almost entirely superseded the thinner red cane which was formerly grown. The plant is propagated by the method of making the whole cane into cuttings instead of using only the tops, which have far less sugar in them than the rest. Some authorities hold that much sugar is thereby wasted. Ratooning is practically unknown. The field is not trenched as elsewhere, but after it has been heavily manured and puddled with ploughs a furrow is made with a plough and the cuttings are put into that. After six weeks, however, trenches are cut between the rows and the earth from them is banked round the roots of the plants. The crop is flooded twice the first week and thereafter once a week until the cane is well-grown, when two waterings a week are again given it. The crop is cut in the eleventh month. The manufacture of the sugar, which is not always done by the man who grows the cane, is referred to on p. 110 below. The refuse cane is used for boiling the juice and its ashes are employed as a manure. On an average some five-eighths of all the cane grown in the district is raised in the one taluk of Hospet.

Sugar-cane.

Agricultural practice on dry land varies, as has been said, according as the soil is black or red and mixed. The proportional areas under each of these varieties in each taluk have already been given at p. 10 above and it has been seen that, generally

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¹ Report of Committee of the 1851 Exhibition. For further particulars see Bulletin No. 50, Vol. II, of the Madras Department of Land Records and Agriculture.

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speaking, Adóni, Alúr, Bellary and (to a less degree) Rayadrug are cotton-soil taluks, while the west of the district is mainly covered with red and mixed earths. The poverty of the majority of these last is clearly exhibited in the following statement showing the percentage of the dry land in each taluk which is assessed at the various rates :—

| Taluk. | Percentage of dry land assessed which is assessed at— | | | | | |
|---------------------|---|------------------------|---------|----------|-----------------|----------------------------------|
| | As. 2 and As. 4. | As. 6 and As. 8. | As. 12. | Rupee 1. | Rupee 1-8-0. | Rupee 1-12-0 and Rs. 2. |
| Adóni | 1 | 20 | 21 | 39 | 15 | 4 |
| Alúr | 2 | 8 | 9 | 37 | 32 | 12 |
| Bellary | 5 | 21 | 27 | 35 | 12 | ... |
| Hadagalli | 30 | 31 | 22 | 11 | ... | 6 |
| Harpanahalli | 19 | 44 | 20 | 15 | ... | 2 |
| Hospet | 35 | 47 | 11 | 6 | ... | 1 |
| Kódligi | 35 | 43 | 17 | 4 | ... | 1 |
| Rayadrug | 40 | 23 | 15 | 17 | ... | 5 |
| District Total ... | 19 | 27 | 19 | 23 | 8 | 4 |

These red and mixed soils require constant showers to enable them to bring a crop to maturity and consequently the seed (cereals, pulses and oil-seeds) is put in with the first good rain of the south-west monsoon in June and July, and so benefits by both monsoons. But the heavier varieties of black soil are held to require the thorough soaking only obtainable from the last rains of the south-west monsoon before they can be profitably sown and the seed time on them is September and even October.

Mungári and
hingári
 crops.

These early and late crops are known respectively as the *mungári* and *hingári* crops. The lighter black soils, such as those in Adóni taluk, can, however, be cultivated either with *mungári* or *hingári* crops. With the rains of June a considerable area of them, usually the manured land near the villages, is sown with cholam, korra, cambu and pulses, all of which the ryot necessarily requires to support himself and his cattle. With the later rains he sows the cotton which pays his assessment and puts money in his pocket. This crop is never sown till August. The ryot says it requires the cold and dews of the cooler months. It is generally then sown in every third row, korra occupying the other two. The korra is reaped after three months and the cotton left to mature. The *hingári* cotton is generally sown unmixed with any other crop, except that a little safflower is drilled in along the

headlands to prevent cattle trespassing into the field. White cholam is practically the only other *hingári* crop on the heavier black soils.

Should the *mungári* crop fail on the red and mixed soils, a later crop is sometimes put down, this being almost invariably horse-gram, which requires less rain than any other.

The agricultural cattle of the district have already been referred to in Chapter I, p. 21. The implements employed and the system of using them are much the same in all dry lands and for all dry crops, but local variations in practice are frequent and it is seldom that any custom can be confidently declared to be followed universally.

Generally speaking, then, the stubble of the last crop is first of all rooted up and collected in heaps and burnt. The rooting up is done sometimes with the plough and at others with an implement, called in Telugu a *guntaka* and in Canarese a *kunte*, which is one of several very useful agricultural appliances which curiously enough are confined almost entirely to the Telugu districts¹ and are unknown in the Tamil country. It is a kind of scuffle which somewhat resembles a "Dutch hoe" but has an iron blade from three to five feet long and is drawn by two bullocks. The driver usually stands on the wooden bar which carries the blade so as to sink this as deep as possible into the earth. After the stubble has thus been got rid of, the land is sometimes ploughed with the ordinary wooden plough as soon as rain falls. But over considerable areas the plough is not employed at all, the ryot trusting to the *guntaka* to give the necessary tilth. Many ryots do not even own a plough. The reasons are that cattle are scarce and holdings large and that it is necessary therefore to hurry through agricultural operations on the rare occasions when enough rain falls to render them possible. Moreover the cotton-soil cracks so much and so deeply in the hot weather that it gets naturally aerated without tillage and the surface soil is reduced to a fine tilth by exposure alone.

Next the manure is applied. The quantity used depends upon the proximity of the village and the wealth of the ryot. Every man gives his land as much as he can get or afford, but many fields are far from the villages; the villages are few; cattle are not over numerous; in the black soil taluks hedges and trees are rare, fuel is consequently scarce, and much cowdung is therefore dried and used for cooking; such manure as there is, is stored in

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Implements
and
methods.

The *guntaka*
or scuffle.

Manuring.

¹ An illustrated account of it and its uses, and also of the *gorru* or drill and the *danthi* or bullock-hoe mentioned below, will be found in Bulletin No. 40, Vol. II, of the Madras Department of Land Records and Agriculture.

CHAP. IV. DRY CULTIVATION. heaps exposed to the air instead of in lined pits, and thus rapidly deteriorates; the 'homestead system' of the ryot living on his land is unknown and consequently all the cattle are driven into the villages every night and all their urine is lost and all their manure has to be carted back again to the fields; and in the result a dry field is lucky if it gets a scanty manuring once in every two or three years. Some of them are said to be never manured at all, except by the ashes of the stubble burnt upon them. The manure having been spread, the *guntaka* is used again to work it in and break up the clods. Next, as soon as enough rain has again fallen, the seed is sown.

The *gorru*
or drill.

This is almost always done with a most ingenious drill, called in Telugu a *gorru* and in Canarese a *kurigi*, and hardly ever by broadcasting. The *gorru* has either three teeth or six. Three is the usual number. A three-rowed drill will sow from three to four acres a day and this unit used to be a standard measure of area called the *gorru*. The teeth are of iron, strengthened by a wooden backing, and are hollow. Connected with each of them is a hollow bamboo and the upper ends of these are brought together and fixed into a hopper called the *zadigan*. The seed is dropped into the hopper, passes down the bamboo tubes, through the hollows in the teeth and so into the miniature furrows which these teeth make as the instrument is dragged over the field by the pair of bullocks yoked to it. After the *gorru* has sown the seed the *guntaka* is used again to cover it.

The advantages of this drill are obvious. It economises seed (though with the smaller grains, such as ragi, it is apt to be wasteful), sows it evenly and at a uniform depth, and, as will be seen immediately, permits of the weeding being done by bullock-power instead of laboriously by hand. And yet the implement is unknown north of the Kistna or in the Tamil districts except in those parts of the latter which adjoin the Deccan. The fact is a striking instance of the backwardness of the ryot in adopting improved methods. In the Guntur famine of 1833¹ a colony of Christians emigrated from Guntur to Sriperumbúdur in the Chingleput district and continued to use the drill in their new habitation. But even though its advantages were thus demonstrated in their midst, the Tamil ryots of the district have not yet adopted it in any numbers.

The *gorru* is sometimes used as a grubber, or harrow, as well as for drilling, the hopper and the bamboo tubes being detached on such occasions. The implement lends itself admirably to the

¹ See the Bulletin above quoted.

sowing of the mixed crops which are so popular in the Deccan districts. The commonest form of mixing is to sow two rows of some low-growing crop such as ragi and then one row of a taller and more spreading plant, such as dhall or niger. This is effected by stopping up one of the holes in the *zadigam* and attaching by a string, a foot or two behind the *gorru*, a separate seed-tube consisting of a separate hollow bamboo or hopper, into which a second sower drops the seed required for the third row. This seed-tube runs in the track left by the tooth of the *gorru* which has been put out of action and thus sows the seed at the proper distance from the other rows. Other variations of the same system enable the different seeds to be sown in alternate lines, and in many other proportions. The seed is generally fed into the hopper by a woman who, to prevent pilfering and carelessness, is usually one of the ryot's own family.

No fixed system or custom exists regarding the mixing of crops. The variety of combinations is very large. The practice of mixing is useful in two ways. It acts as a rotation of crops and it economises land by enabling the large intervals which are necessary in the case of wide-branching crops to be cultivated with staples which require less room. It gives some trouble to those whose duty it is to make out the statistics of the area under the various crops, as they have to note the proportion borne by the rows of each plant to the total number of rows and thence calculate the area under each. The figures for pulses, which are mixed with other crops on no system, are perhaps seldom reliable.

Weeding between the rows is done with bullock-hoes. One variety of these consists of three implements resembling English hoes fixed to a transverse bar at such intervals as to pass between the rows made by the *gorru*. This is called a *mella guntaka* and requires a pair of bullocks to pull it. Another kind is the *danthi* (or, in Canarese, *yedé kunte*) which is the same shape as the *guntaka* described above but has a blade only nine inches wide. Three of these, each guided by a separate man, are drawn by one pair of bullocks and the advantage of them is that any one of the three can be lifted to avoid rocks and so forth without stopping the work of the other two. In the Canarese taluks a variety of this, called the *manisálu kunte*, in which the blade has a gap about three inches long, is used for hoeing crops when they first sprout. The row of crop passes untouched through the gap while the ground on either side of it is hoed.

In the black cotton-soils one other implement is used. This is the *pedda madaka*, or big plough. It is of wood and just like the ordinary smaller plough in shape, but is a cumbrous affair & clogging

Mixing of
 crops.

Weeding.

The *pedda
 madaka*
 or big
 plough.

CHAP. IV. some 230 lbs., and requiring six pairs of bullocks and raw-hide
 DRY traces to pull it. It is only used when bringing waste under
 CULTIVATION. cultivation or when land gets foul with deep-rooted grasses like
 Iron ploughs. huriáli or *nath* (*ischæmum pilosum*).¹ To break up the great
 clods which it turns up, a specially heavy variety of *guntaku*
 weighing as much as 350 lbs., is employed.

During the last fifteen or twenty years, owing chiefly in the first instance to the efforts of the late M.R.Ry. Sabhápáti Mudaliyár of Bellary, these unwieldy machines have been very largely superseded by iron ploughs of European pattern, which are found to work more quickly, obviate the necessity for a second cross-ploughing, and require less powerful cattle. Large numbers of them are now in use. Some of the ryots hire thoirs out to their more needy neighbours, who then borrow the additional bullocks required to drag them. Of the various makes which have been tried the three following are those most extensively used:—

| Kind of plough. | Approximate cost at Bellary of — | | Weight. | Pairs of cattle used in working. |
|-----------------------|----------------------------------|---------------|---------|----------------------------------|
| | Plough. | Spare shares. | | |
| | RS. | RS. | lbs. | |
| No. 1 Swedish | 55 | 3 | 188 | 5 or 6 |
| No. 2 Swedish | 60 | 3 | 210 | do. |
| Massey's No. 1 | 70 | 4 | 200 | 6 |

The first two are procurable from Mr. D. Schwartz of Öfverum, Sweden, and the third from Messrs. Massey and Co., Madras. In Adóni and Alúr taluks about half the iron ploughs are Swedish and half Massey's and in Bellary and Rayadrag three-fourths are Swedish and the remainder either locally made to the Swedish pattern or Massey's.² In several villages the blacksmiths are learning how to repair these implements, and in Adóni they make a pattern which is preferred by the ryots to any of the European varieties.

Harvesting.

The harvesting of the various crops presents no particular points of interest except that cholam is now threshed in some places by rolling it with light stone rollers like those used in road-making. They are pulled over the corn by bullocks and are said to do their

¹ A scientific description of this latter pest by Dr. Wight the botanist will be found in *Madras Jour. Lit. and Sci.* for April 1835 (Vol. II).

² For further particulars see Bulletin No. 33, Vol. II, of the Madras Department of Land Records and Agriculture.

work exceedingly well. It has been suggested that they would travel round more easily if they were shaped like a frustrum of a cone, instead of being, as they always are, cylindrical. The practice of storing harvested grain in pits in the ground is still very universal. The pits are dug wherever the soil is hard enough to be suitable and sometimes occur in the most unlikely places. There are, for instance, thirty or forty of them in the open square in front of the Rámasvámi temple in Hadagalli town.

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The statement below gives details of the crops principally grown in the district. Column 2 shows in thousands of acres the total area (including areas cropped twice) under the various wet and dry crops, the figures being an average of the returns of nine faslis. The remaining columns show for each taluk the percentages borne by the area cultivated with each of these crops to the total area cropped :—

Crops principally grown.

| Crops. | Area cropped in thousands of acres. | Percentage of area under each crop to total area cropped in— | | | | | | | |
|--|-------------------------------------|--|-------|----------|-----------|---------|------------|---------------|----------|
| | | Adóni. | Alár. | Bellary. | Rayadrug. | Hospet. | Hadagalli. | Harpanahalli. | Kádligi. |
| Cereals - | | | | | | | | | |
| Paddy | 41 | 1.5 | 0.1 | 0.7 | 6.2 | 7.9 | 0.6 | 1.1 | 2.4 |
| Cholam | 792 | 43.1 | 39.4 | 40.7 | 21.3 | 40.9 | 38.2 | 39.9 | 27.2 |
| Korra | 481 | 22.1 | 33.2 | 32.4 | 25.1 | 13.8 | 9.9 | 9.9 | 12.1 |
| Cambu | 78 | 3.2 | 1.4 | 5.3 | 10.1 | 4.1 | 1.0 | 0.5 | 3.6 |
| Others | 71 | 1.6 | 0.2 | 0.4 | 8.3 | 2.2 | 3.6 | 5.6 | 12.1 |
| Pulses— | | | | | | | | | |
| Horse-gram | 88 | 0.6 | 0.0 | 0.5 | 7.5 | 8.7 | 9.2 | 6.4 | 11.0 |
| Red-gram | 39 | 1.6 | 0.8 | 0.6 | 0.3 | 3.7 | 3.4 | 4.6 | 3.5 |
| Others | 57 | 2.2 | 1.6 | 2.1 | 2.5 | 3.4 | 6.9 | 2.9 | 1.3 |
| Vegetables and fruit trees | 9 | 0.3 | 0.1 | 0.3 | 0.5 | 0.6 | 0.4 | 0.6 | 1.1 |
| Condiments and spices. | 15 | 0.7 | 0.2 | 0.3 | 1.3 | 0.7 | 0.5 | 1.2 | 1.9 |
| Industrial crops— | | | | | | | | | |
| Cotton | 290 | 17.4 | 21.9 | 15.4 | 11.1 | 4.6 | 11.9 | 7.3 | 4.0 |
| Sugar-cane | 8 | 0.0 | 0.0 | 0.2 | 0.0 | 5.0 | 0.2 | 0.5 | 0.4 |
| Custor | 103 | 3.2 | 0.5 | 0.6 | 3.8 | 2.7 | 10.2 | 12.6 | 16.0 |
| Other oil-seeds | 34 | 1.5 | 0.3 | 0.2 | 0.7 | 0.5 | 3.5 | 6.0 | 2.4 |
| Miscellaneous | 18 | 2.0 | 0.3 | 0.3 | 1.3 | 1.2 | 0.5 | 0.9 | 0.4 |

In every taluk except Rayadrug, where (on an average of the statistics) korra takes the first place and cholam comes second, the chief cereal crop is cholam (the staple food of the people) and the next most important korra (*panicum italicum*). In the three

CHAP. IV. taluks of Hadagalli, Kúdligi and Rayadrug, where the soil is often poor, more horse-gram is grown than anywhere else. It is a crop which will come to maturity with the help of dew if only it gets one good shower when young. Castor is mainly grown in Hadagalli, Harpanahalli and Kúdligi and the cotton of the district in Ádóni, Alúr and Bellary.

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The surplus cholam and korra are exported. Some of the castor (see Chapter VI, page 111) is made into oil, but a great deal is exported as seed, whereby the cake is all lost to the district. The cotton, as will be seen in Chapter VI, is either spun into yarn at the Bellary mills or is pressed locally and exported to Madras and Bombay. A certain amount of wheat is grown in Hadagalli and Ádóni taluks. Another uncommon crop is the niger seed (*guizotia abyssinica*, *gúrellu* in Canarese) of the south-western taluks.

Varieties and
improvement
of cotton.

Except cotton, the crops grown do not differ in their nature from those found elsewhere. The cotton is what is known in the market as "Westerns." Westerns may be divided into "Westerns" and "Northerns," the latter coming from those parts of Cuddapah and Kurnool which lie in the Nandyal valley and some portion of Anantapur round Tadpatri and the former, Westerns proper, being grown in the Nizam's Dominions, Kurnool and Bellary. Northern cotton is silkier than Western and would be in more demand but for its slightly red tinge, but it fetches from $\frac{1}{2}d.$ to $\frac{3}{16}d.$ per lb. more than Western. This last is a longer stapled cotton than that grown in Tinnevely, but is dull, rough and often mixed with broken leaf and seed and fetches about a halfpenny a pound less. The variations in the nature and colour of the lint appear to be due partly to botanical differences in the plants producing them and partly to the soil on which the crop is grown, régada producing cotton which is superior in colour and fineness to that raised on the red and mixed soils, and different qualities of régada giving samples of different character and value. There appears to have been a gradual improvement in recent years in the condition of the cotton brought to market, owing probably to more careful preparation.¹ No improvement has yet, however, been made in the varieties grown. In the forties, the Madras Government obtained the services of American cotton-planters to advise them as to the possibility of growing imported kinds. The efforts of these gentlemen were chiefly confined to

¹ For further information see Bulletins Nos. 8 and 19 of the Madras Department of Land Records and Agriculture.

the south of the Presidency but one of them¹ visited Bellary and Adóni and came to the conclusion that neither taluk was likely to be favourable to the growth of the American cotton, the soil being unsuitable and the country too far from the influence of the sea-breeze. Broach, Bourbon, New Orleans and Nankin cotton have all been tried. The second and last did not succeed, the first seems to require heavier rainfall and earlier sowing than cotton in Bellary gets, and though New Orleans grows freely in Kurnool the difficulty of separating the seed from the lint makes the ryots unwilling to grow it.²

It is now proposed to utilise the Experimental Agricultural Farm which was started at Bellary in 1901 for the purpose of seeing what can be done for the improvement of the indigenous cotton by hybridisation:

Less land is under irrigation in Bellary than in any district in the Presidency except the Nilgiris, Malabar and South Canara. The total area watered by wells, tanks and channels in a normal year is only some 100 square miles, or between two and three per cent. of the net area cropped. The percentage of the cultivated area in each taluk which is protected in ordinary seasons and in all

IRRIGATION
Protected
area small.

| Taluk. | Ordinary seasons. | All seasons. |
|---------------------|-------------------|--------------|
| Adóni | 1.3 | 1.1 |
| Alúr | 1.4 | Nil. |
| Bellary | 1.6 | 0.9 |
| Hadagalli | 1.4 | 1.3 |
| Harpanahalli | 2.0 | 1.6 |
| Hospet | 14.4 | 14.2 |
| Kúdligi | 5.7 | 4.4 |
| Rayadrug | 5.4 | 3.5 |
| Total | 2.8 | 2.2 |

seasons respectively is shown in the margin, and it will be seen that it is only in Hospet, Kúdligi and Rayadrug that it is above the miserable average for the district, which is the lowest in the Presidency. The percentage is highest in Hospet, which is served by the Tungabhadra channels referred to below. In Kúdligi the protected area is under tanks and

wells. In Rayadrug about one-third of it is under the Hagari spring channels, described later, and the remainder under tanks and wells. Alúr, Bellary and Adóni, the cotton-soil taluks, are the three tracts most at the mercy of deficient mousoons.

¹ James Morris. He died at Bellary in 1846 and is buried there. For further particulars of these experiments see Wheeler's *Handbook to Cotton Cultivation*, Madras, 1862, and Forbes Royle's *Review of the measures for the improved culture of cotton*, London, 1857.

² For further information see Bulletins Nos. 9 and 10 of the Madras Department of Land Records and Agriculture.

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IRRIGATION.
Wells.

Except Ganjám and Vizagapatam, where well cultivation may be said to be almost unknown, and the three delta districts, where it is seldom required, there is no district with so few wells as Bellary. In the cotton-soil taluks, where they would seem to be most wanted, the reasons given for not digging them are that cotton-soil does not take kindly to irrigation; that the sub-soil water lies at a great depth and beneath the stratum of limestone which so often underlies the régada; that when reached it is often too brackish to be of any use; and that in the loose black earth the wells have to be expensively revetted to keep their sides from falling in. But these reasons do not apply to Harpanahalli or Hadagalli and yet the number of wells in these taluks is far fewer than in their neighbour Kúdligi, where the conditions are very similar. During the famines of 1891-92 and 1896-97, many wells were dug in the district with money obtained under the Land Improvement Loans Act, but in these two taluks (and Hospet) less was done than elsewhere. There are a few "supplemental wells," mostly in the Rayadrag taluk under the Hagari and its spring channels.

Water is usually baled from the wells with the ordinary single mhote worked by two pairs of bullocks. Each pair pulls up the bucket alternately, walking down an inclined plane. When the first pair has raised the bucket it is detached from the bucket-rope and left to walk to the top of the inclined plane while the other pair pulls up the bucket a second time. The cattle are not backed up the ramp as in some districts. Theoretically, the steepness of the ramp and the weight of the cattle ought to bear a definite relation to the weight of the bucket when full, but these niceties are not considered. Nor has anything been done to introduce pullies with less friction, or better buckets than those which the village chuckler makes from hides. These last are always leaking and requiring repair. Elsewhere¹ stout canvas has been found cheaper and more durable than hide.

Tanks.

Bellary possesses fewer tanks than any district except Coimbatore, there being only some 280 of them in all. Only seven of them have an ayacut of over 500 acres; only two of them, those at Kámalápuram and Kanékallu, are river-fed; and many of them are greatly silted up, some of the smaller ones having been entirely put out of action from this cause. Practically all of them were made by native administrations before the district was ceded to the English. The difficulties in the way of constructing others are that (as Munro remarked a hundred years ago) all the best sites have

¹ See Bulletin No. 35 of the Department of Land Records and Agriculture.

already been seized upon, and that in a country of such light rainfall a large catchment area is necessary to ensure a reliable supply. Statistics show that in the eight years ending with fasli 1310 less than half of the existing tanks received a full supply. In the black soil taluks there are the additional difficulties that irrigation is not popular and that the tanks would quickly silt up. The area irrigated by tanks is largest in Kúdligi taluk, where the nature of the ground lends itself to the construction of reservoirs.

The only tanks worth separate mention are the four given in the margin. Some account of the first of these and of the damage it sustained in the flood of 1851 is given below (page 258) in the notice of the village after which it is named. It is the last of a group of seven tanks.

| | Ayacut. | Assess- ment. |
|---------------------|---------|------------------|
| | Acres. | Rs. |
| Daróji | 1,272 | 5,856 |
| Dhanáyakanakeri ... | 1,031 | 7,167 |
| Chinnatumbalam ... | 1,206 | 5,881 |
| Kanákallu ... | 2,483 | 12,403 |

The six above it have a catchment area of 84 square miles, and an ayacut of 797 acres assessed at Rs. 4,602. The surplus from these runs into the Narihalla, or Nari Vanka, which itself has a basin of 336 square miles, and between them they supply the Daróji tank. After discharging from this last the Nari Vanka runs on to join the Tungabhadra near Ittigi, irrigating as it goes, from seven small anicuts, another 950 acres assessed at about Rs. 4,600.

The Dhanáyakanakeri tank is also the last of a chain. The tradition regarding its builder is mentioned below. The three tanks above it have a catchment basin of some 30 square miles and irrigate 354 acres assessed at Rs. 1,796. Their surplus and the drainage from an additional 18 square miles feed the Dhanáyakanakeri tank and the surplus from this forms the Ganripuram Vanka which runs into the Tungabhadra near Málápuram.

The Chinnatumbalam tank has only two tanks above it and both are insignificant. Its catchment area is 59 square miles, but in the last ten years, owing to insufficient rainfall in this, the average cultivation (including that under three temporary dams annually constructed across its surplus channel near Mádhavaram) has been only 680 acres out of an ayacut of 1,296 acres.

The Kanákallu tank has a catchment basin of only 20 square miles with one tank in it, but receives a supply by a channel from the Hagari.

The only spring channels of importance in Bellary are those in Rayadrug taluk which are annually dug from the Hagari. They are 28 in number and the nominal ayacut under them (though it is not all of it always irrigated) is nearly 7,000 acres. The channels silt up every year and every year they are cleaned

Channels—
Spring
channels.

CHAP. IV. out again by the ryots who benefit by them, the provisions of
IRRIGATION. section 6 of Act I of 1858, under which any one not contributing
his share of labour is fined twice its value, being strictly enforced.
Bellary taluk also contains some similar channels from the
Hagari.

Anicut
channels.

There are no dams across the Hagari or the Chinna Hagari.
On the Chikka Hagari there is one near Bâchigondanahalli which
irrigates about 150 acres in that village and Anandévanahalli.

Tungabhadra
channels.

The only anicuts of any importance are those across the
Tungabhadra. They are ten in number, as under. The list gives
them in their order on the river, beginning with the highest :—

| Taluk. | Name of anicut. | Name of channel leading from it. | Length of channel in miles. |
|----------------|--------------------------|----------------------------------|-----------------------------|
| Hadagalli | Vallabhápuram | Basavanna | 15 |
| Hospet | Rámanna | } Ráya | 20 |
| | Kurndagadda or Hosakóta. | | |
| | Bella or Hósúru | Bella | 3 |
| | Turuttu | Turuttu | 12 |
| | Rámaságaram | Rámaságaram. | 10 |
| Bellary | Kampli | Kampli | 12 |
| | Siruguppa | Siruguppa | 5 $\frac{1}{2}$ |
| | Désanúru | Désanúru | 5 |
| Ádóni | Rámpuram | Rámpuram | 10 $\frac{1}{4}$ |

The waste water of the Ráya and Bella canals forms the
Kalaghatta channel, four miles long. From the Kampli canal
branches the Belagóduhálu channel, 7 $\frac{1}{2}$ miles in length, and from the
Siruguppa canal the Bógavádi channel, 3 $\frac{1}{4}$ miles long.

Besides these ten anicuts, there are three others in ruins at
Modalukatti¹ in Hadagalli, Sígúru in Bellary and Manteála in
Ádóni taluk. All of these anicuts and channels were constructed
by the Vijayanagar kings some 300 or 400 years ago, and it has
been stated by competent authority² that “the positions for the
anicuts have been chosen with great judgment and the channels
have been formed with consummate skill.” Our Engineers have
since made many improvements in them, such as supplying them
with head sluices, devising means to check their tendency to silt,
and so on. The tradition regarding them is that they were all
built by an officer (Dhanáyak) of king Krishna Deva (A.D.
1509–1530) called Mudda. This Mudda, says the story, started

¹ See the reference to this village on page 245 below.

² Major Henderson C.B., in Report on Important Public Works for 1852.

life as herd-boy to a Bráhmán astrologer. The Bráhmán foretold that he would be famous, as one day he found a cobra with outstretched hood watching over him as he slept in the fields.¹ Mudda is said to have first built the big tank of Dhanáyakanakeri (the name means "Dhanáyak's tank") and then the Tungabhadra channels, and to have been buried in the big embankment south of Hospet which is referred to in the account of that town on p. 299 below. The Vallabhápúram anicut was undoubtedly built in Krishna Deva's time, for an inscription on the bank close by, dated 1521, says so, but nothing is definitely known about the construction of any of the others and the Turuttu anicut seems² to have been made by Bukka II, who ruled from 1399 to 1406. All of them are made of large boulders and rough masses of stone piled one upon another without mortar or cement. In the Rámanna anicut stone clamps and pegs, and in that at Siruguppa clamps of iron, have been used to hold the mass together. The anicuts leak much less than would have been expected, as the lower parts of them have been rendered water-tight by the silt which has collected in their crevices. Except the Vallabhápúram and Turuttu anicuts none of them go straight across the river, but they run diagonally or in a zig-zag across it, utilising to the utmost any ledges of rock, small islands or large boulders which the bed happens to contain.

They irrigate altogether some 13,200 acres in Hospet taluk, 2,300 in Bellary and 900 in Adóni, which is very little in comparison with the sums which they must have cost. The ground rises sharply away from the river and it is impossible for them to command much more land than they do. A few details regarding each of the anicuts and its channels may be added.

The *Vallabhápúram anicut* (so called, like most of the others, from the village nearest it) runs straight across the river to an island and is 330 yards long. On the other side of the island, connecting it with the western bank, is another dam, called the Korragal anicut, which belongs to the Nizam. The Vallabhápúram anicut as it now appears is a reconstruction on improved principles of the original dam. Some of the loose stones of the latter used to be washed away in every flood and constant repairs were necessary. In 1847-48, therefore, Rs. 26,000 were spent in rebuilding it of stone in chunam, brick in chunam being used for the interior of the work. The remains of the old dam are

¹ The same story is recounted of many other celebrities.

² *Forgotten Empire*, pp. 51, 301.

CHAP. IV. still to be seen about 50 feet upstream. The Basavanna channel
IRRIGATION. has been lengthened by our Engineers by about $1\frac{1}{4}$ miles, new
sluices and other works having improved the regulation of the
supply, and it is in contemplation to pass the Gauripuram Vanka
above alluded to, which now runs into it and silts it up, across the
channel by a super-passage.

The *Rāmanna anicut* runs between the upper end of the Kurudagadda island and the further bank of the river and was designed to drive the stream between the island and the Bellary bank so as to increase the supply at the *Kurudagadda anicut*. This is three miles lower down, runs from the Bellary bank to the island, and is 250 yards in length. The Rāya channel which takes off from it is the most important of the whole series. It ends in the Kāmalāpūram tank. "Great science and ingenuity are displayed in the selection of the line so that the level of this channel should be preserved above that of the bed of the tank, and to effect this the line is carried along the side of a range of low hills at a considerable height above the valley below. The work is in some places excavated in solid rock and in others it is embanked with stone, plastered with chunam and backed with earth." ¹ The Gauripuram Vanka and other cross drainage pours into this just as it does into the Basavanna channel and causes much silting.

The *Bella anicut* is about a mile above the Southern Mahratta Railway bridge and runs across the eastern of the two branches into which an island there divides the river. The western branch is crossed by a ledge of rock which serves as a natural anicut. The dam is about 1,000 yards long.

The *Turuttu anicut* is about a mile above the ruins of the old city of Vijayanagar and was built to supply its gardens. The name means "swift," the channel which takes off from it running at a great pace. It is constructed with the same ingenuity as the Rāya channel.

The *Rāmasāgaram anicut* is nearly opposite Bukkasāgaram village and runs diagonally across the river for about a mile. The channel from it is in places led across the Kampli channel by pipe aqueducts to irrigate the high-level lands on the left bank of the latter.

The *Kampli anicut* is about $1\frac{1}{4}$ miles long, running diagonally upstream for some distance and then straight across to the opposite bank. Its channel is now being lengthened by some three miles.

¹ Major Henderson's report above quoted.

The *Siruguppa anicut* is opposite Kenchanaguddam. It is in all some three miles long, but the actual masonry is only two miles in length, the anicut being built in seven different sections across the seven streams into which the river is here divided by rocks and islands. The channel has a fall of only about three inches to the mile and consequently deposits much silt.

The *Désanúru anicut* stands at the head of the island of the same name about half a mile further down. It is 800 yards long and intercepts only four of the seven streams. Its channel runs lengthwise through Désanúru island, at the lower end of which it rejoins the river. There is said to be a stone bearing an inscription near this anicut, but it was under water when I was in these parts.

The *Rámpuram anicut* is about a mile in length and its crest is so irregular that even in the dry season much water runs to waste over the lower portions of it. For the first six furlongs the channel from it is so near the river that there is not room between the two for a sufficiently large flood bank, and when the river is high this part of the channel is submerged.

A number of small projects for increasing irrigation in the district have been suggested at different times,¹ but at present only two schemes, the Nelikudiri project and the great Tungabhadra-Pennér project, are under investigation.

Projects
under
investigation.

The former of these proposes to throw a dam across the Chikka Hagari near Nelikudiri in Hadagalli taluk to bring some 14,500 acres of waste and dry land under irrigation. The estimated cost of the work is seven lakhs and the net return expected is nearly seven per cent.

Nelikudiri
project.

The Tungabhadra project is a revival on new lines of previous proposals to utilise the water of this river. Largely at the suggestion of Sir Arthur (then Colonel) Cotton, the original scheme of the ill-fated Madras Irrigation Company² included, when it began work in 1859, two alternative canals from the Tungabhadra to irrigate land in Bellary. They were known respectively as the High Level and the Low Level Lines of the Upper Bellary Project. The High Level project consisted of a canal from the Vallabhápuram anicut to Bellary (and thereafter to the Hagari) which was to irrigate 150,000 acres and also supply the town and cantonment with water. The Low Level project contemplated a canal from Hósúru to near Bellary (passing below the town) and thence to

Tunga-
bhadra-
Pennér
project.

¹ A list of 24 of these, with particulars, will be found in Mr. H. E. Clerk's Preliminary Report for the Irrigation Commission, 1902.

² The melancholy history of this venture is given in Vincent's monograph recorded in G.O., No. 455 I., dated 10th June 1862.

CHAP. IV. IRRIGATION. the Hagari. The Irrigation Company speedily fell into difficulties and in 1866 was required to agree to complete the Kurnool-Cuddapah canal, which it had already taken up, before beginning other projects. The two schemes were therefore dropped. Since then modifications of them have been several times examined¹ and recently the Irrigation Commission recommended that the possibility of irrigation from the Tungabhadra should be re-investigated. Mr. A. T. Mackenzie was appointed to the duty and has proposed² that a masonry dam some 145 feet high and 4,000 feet long should be made at Málápúram, about three miles above Hospet where the river cuts through the continuation of the Sandur hills. This would hold back the water for a distance of nearly 40 miles and form a lake with an area of 160 square miles and a capacity of about 180,000 million cubic feet of water, or four and a half times that of the As'wáu (Assouan) reservoir. From this a canal would be led along the valley up which the road from Kámálápúram to Daróji now passes, through the Daróji hills to the foreshore of the Daróji tank by a tunnel, thence to Bellary, passing above the town, and thereafter across the Hagari, through the watershed between it and the Pennér, and down into this latter river. Such a canal would command a great part of Bellary, a portion of Kurnool, a corner of Anantapur, large tracts in Cuddapah and more than half of Nellore. Rough calculations of the cost of the scheme put it at between eight and nine crores. Detailed estimates for the project are now under preparation by a special staff of Engineers.

ECONOMIC
CONDITION
OF AGRICULTURISTS.

This chapter may conclude with a few words summarising the bearing which the facts referred to in it and elsewhere in this volume have upon the economic condition of the agricultural population of Bellary. It is hardly necessary to widen the issues by examining the position of the remaining sections of the people because for one thing they are numerically almost negligible and for another the prosperity of the majority of them—namely, those who live by village arts and industries—fluctuates in a direct ratio with that of the agriculturist, the demands for their manufactures declining directly the cultivator falls upon evil days and finds his purchasing power reduced.

It will further clear the ground to leave out of account the bigger ryots—those who own wide acres, employ many hands and are as often as not traders in produce and money-lenders as well as

¹ Mr. Clerk's note in the report above quoted gives details.

² See his preliminary report.

land-holders—and to confine the matter to the class which so largely preponderates among the agriculturists of Bellary, namely, the owners of small holdings and the landless day-labourers from whom they are but one stage removed.

The economic condition of these people, then, depends chiefly upon two sets of factors—those connected with the natural characteristics of their country and those which turn upon their own ability and energy in meeting and counteracting the unfavourable elements in those characteristics.

Except that the Bellary district is provided with sufficient markets and good means of communication with the outside world (the late famine in Gujarât brought large profits to its ryots), its natural characteristics are most inimical to agricultural prosperity. Except in the eastern taluks, the soil is for the most part very poor stuff. The rainfall is light, capricious, and often unseasonable. Owing to the nature of the country tanks are few in number and nearly all rainfed, while channels are still fewer. The proportion of the district which is protected from famine in all seasons is therefore as low as 2 per cent. Except in the western taluks, forests and grazing land for cattle are scarce. There are no non-agricultural industries of importance which would serve as an outlet for superfluous labour in times of stress.

This last factor is not one which it lies in the ryot's power to counteract, but it may be argued that to most of the other natural disadvantages of his environment he could offer more resistance than he does. The soil, it will be said, is doubtless often poor, the rainfall light, the irrigation sources scarce and the supplies of fuel and grass few and far between, but by careful cultivation, digging wells and growing hedges the outlook could at least be improved.

These things, however, mean capital, and in a country where the population is sparse, the agricultural conditions are adverse, and famine periodically eats up any little savings which may have been put by, capital is naturally scarce. As long as a man can barely keep the wolf from the door, he has neither the means nor the leisure to improve his lot, and in this district the wolf is never far away. It is doubtless true that—except in the case of land under wells, which is tilled with phenomenal care and energy—the Bellary ryot's cultivation is too generally of a casual description. He is often content to tickle the soil with the *guntaka* instead of ploughing it. He hardly ever hedges his fields to break the winds which howl across them or to provide himself with fuel and his cattle with fodder; or if he does he generally uses the milk-hedge, which is perhaps the least useful material which could be

CHAP. IV.
ECONOMIC
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OF AGRICUL-
TURISTS.

chosen. He never thinks of selecting seed. He never varies his custom of sowing practically all his cereals with the south-west monsoon, and if this fails he usually does almost nothing with the later rains, though in Anantapur these are largely availed of. He has not introduced any new crops, though in some places (the ground-nut of South Arcot is an instance) such ventures have made the fortunes of cultivators. Even in the case of those staples in the growing of which he possesses great natural advantages—such as the sugar-cane under the perennial Tungabhadra channels and the cholam and cotton on the rich black soils—his casual methods are handicapping him in his competition with others, and leaving the average outturn of his crops apparently stationary for years.¹ His implements are good (and he has adopted the improved cane-crushing mill and the iron plough) but the use he makes of them is to gamble on the chance of getting a crop off a large area by tilling it hastily and imperfectly rather than make more sure, by more careful methods, of a bigger outturn on a smaller holding.

In the collection and preservation of manure, his system could scarcely be more ineffectual, and his practice of driving his cattle nightly into the village has the additional disadvantage of exposing them to the risk of contracting any contagious disease which may be prevalent. His cattle, too, (especially in the cotton-soil country) are few in number and they are purchased at great cost from elsewhere instead of being bred locally. In the same tract goats and sheep are also scarce in comparison with the supply in other districts, useful though their manure would be. In the digging of wells the Bellary ryot is still behindhand, though considerable sums were expended in this direction in some taluks in the last two bad seasons. In general and agricultural education he is backward, and the district possesses no zamindars who might initiate improvements in methods of cultivation. Credit is not cheap—the rate of interest on money loans varying from 1 to 2½ per cent. per mensem and that on advances of grain being 25 per cent. between the date of the advance and the next harvest—but the ryot has few of the *nidhis*, or co-operative loan societies, which are so useful in the southern districts. He is also unaware of the possibilities of emigration as a method of relieving the pressure when times are bad. At the same time he is no more provident than his fellows in the matter of contracting marriages and begetting children.

¹ Many estimates of the former yield of cotton have been made. The Collector's report in Wheeler's *Handbook to Cotton Cultivation* (1862) gives 46 lbs. as the average yield of clean cotton per acre, and the crop experiments for the five years ending 1900-1901 give exactly the same average.

The result is that the average ryot of Bellary is poor. His house is inferior to that of his brother in the south, his household utensils more primitive, the jewels on his women-kind far fewer, he has less luxuries in the way of fruit, vegetables and condiments and he can seldom indulge in the delights of civil litigation. His food supply depends upon the rains of June and July; if two successive monsoons fail his cattle die in thousands; and he himself, as will be seen later, lives from crop to crop and has usually hardly emerged from one famine before he is submerged under another.

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CONDITION
OF AGRICUL-
TURISTS.
