CHAPTER IV.

AGRICULTURE[1].

Husbandmen.

ACCORDING to the 1881 census returns agriculture supported about 260,000 people or sixty-one per cent of the population. The details are:

Kánara Agricultural Population, 1881.

AGE.	Males.	Females.	Total.
Under Fifteen	49,279	45,480	94,759
Over Fifteen	88,644	77,494	166,138
Total ...	137,923	122,974	260,897

From the beginning of the century when British rule was introduced two classes have been connected with the land, large landholders and husbandmen. In some cases the large landholders themselves work the land. But, as a rule, men who own estates including several villages, let their lands either to permanent tenants called *mulgenigárs*, or to yearly tenants called *chálgenigárs*, and set apart a portion of their estate to be tilled by hired labour as a home-farm.

Most of the land is in the hands of Bráhmans, who, except the Havigs and the Habbus, do not work in the fields. In the lowland sub-divisions of Kárwár and Ankola the chief landlords are Shenvis and Konkanis who rarely themselves cultivate. In Kumta Honávar and Bhatkal the proprietors usually let the land from year to year, and are hard and exacting landlords taking from the yearly tenants at least as much as half of the whole produce.[2] Besides Havig and Habbu Bráhmans the chief landholding classes are Sárasvat and Konkani Bráhmans and Naváiyat Musalmáns. Sárasvats are employed in Government service or other literate pursuits and do not cultivate. Naváiyats are large cloth and timber merchants who travel a good deal and make much money. As on religious grounds they scruple to lend money they invest their savings in land which they let to tenants and spend much capital in improving their estates. In Sirsi Siddápur and Yellápur the land is almost entirely in the hands of Havigs, with a few Konkanis, Shenvis, and Lingáyats. Though they realise large incomes from their properties the landowners of Sirsi, especially in Yellápur, labour under many

[1] From materials supplied by Messrs. A. R. Macdonald, C.S., and R. E. Candy, C.S.
[2] Rev. Sur. Rep. 168 of 21st February 1871.

Chapter IV.
Agriculture.
Husbandmen.

disadvantages. They live in most feverish places, labour is scarce and has to be highly paid, and the outlay of capital is considerable. Their gardens yield large profits but not out of proportion to the great labour which is bestowed on them. The owners of gardens are generally Havig or Haig Bráhmans who bring labour from the coast and live in their gardens all the year. They are the best cultivators in Kánara and give the country its special character. They hate change, and are frugal, sober, and hardworking. Their strongly built houses generally stand in a spice garden surrounded by a thicket of brushwood whose leaves supply excellent manure.[1] In Mundgod and Supa, which border on Dhárwár and Belgaum and have few of the features of Kánara proper, much of the land is in the hands of Lingáyats, Musalmáns, Deshasth and Shenvi Bráhmans, Marátha Kunbis or Árers among whom are some families of Desáis. Within the last ten years much of Kánara has been surveyed and settled on the Bombay revenue survey system. All the surveyed lands have been divided into fields or survey numbers which are grouped into holdings or *khátás*. As the rents of these small plots of land are now fixed they can be easily transferred, and already many of the larger estates have been broken into a number of moderate holdings.

Of landholders who till with their own hands the chief classes are Habbu Bráhmans, Halepáiks, Komárpáiks, Bhandáris, Panchamsális, Konkan Kunbis, Nádors, Konkan Maráthás, Árers, Musalmáns, and Christians. Of these, Habbus, numbering about 250 and classed as Bráhmans, are found chiefly in Kárwár. Halepáiks, numbering about 43,000, are found in Honávar and Bhatkal and in the uplands. They are an important class of proprietors, permanent tenants, and yearly tenants or field-workers. Their chief employment is growing rice, though some of the poor are palm-tappers. They are a well-made good-looking people, fond of drink and pleasure, their favourite amusement being attending fairs and cock-fights. They rear fowls and take them for sale to the market towns. Their houses are strongly built with roofs of thatch, and in front of all of them is an open well-swept court with a basil altar. The Komárpáiks, who number about 8700, are a strong well-made race, found in Kárwár, Ankola, and Kumta. Before the English conquered Kánara the Komárpáiks were employed by the chiefs and large landlords as fighting men, sword-bearers, and retainers. Those who distinguished themselves as swordsmen gained the title of *mehtris* or masters which some families still keep as a surname. In the decline of the chiefs' power many Komárpáiks formed themselves into bands and lived by plunder and highway robbery. The establishment of order under the English forced them to take to tillage, but some of the old love of plunder still lingers among them. Most of them are tenants or field-workers, and in Kumta many are cotton carriers. Their favourite employments are drinking, cock-fighting, and attending fairs. Bhandáris, who number about 9800 and are found almost entirely on the coast, are bad husbandmen, preferring to earn their living

[1] Rev. Com. S. D.'s letter No. G-9 of 21st April 1880.

Chapter IV.
Agriculture.
Husbandmen.

as palm-tappers, liquor contractors' servants, and shopkeepers. Their condition is middling; as a rule they are free from debt. Panchamsális, numbering about 2000, are found only in the uplands and chiefly in Sirsi and Siddápur. Some of them are large landholders, a trace of the time when Bilgi was ruled by a Lingáyat chief. In Mundgod and Haliyál there are many Lingáyat husbandmen, who as a class are hardworking, frugal, and sober. They do not differ in essential points from the Lingáyats of the neighbouring parts of Dhárwár. Konkan Kunbis (14,800), Nádors (600), and Konkan Maráthás (3000), many of whom are *vargdárs* or proprietors, are found both in upland and in lowland Kánara. Above the Sahyádris they grow rice, sugarcane, and *rági*. The Nádors are much like Deccan Mális, growing vegetables and selling them in the large towns. They are well nourished and fair, and live in well-built houses, which above the Sahyádris are thatched, but in the Kálinadi valley and other lowlands are often tiled. Their women are much like Bráhman women in their style of dress and ornament. They are hardworking, orderly, and thrifty. In some places they are landowners, but the bulk of them are permanent tenants. Of Árers there are about 17,000. They are found mostly among the Sahyádris and were formerly much given to *kumri* or hill tillage; most of them are now yearly tenants. They are poor but generally free from debt. They are a simple frugal people, very ignorant except in matters connected with woodcraft and sport. They are fearless in beating the forests for big game, and are adepts at tracking and hunting the bison. They are also much used as carriers and road-workers. Their houses are small and simple and their worldly goods are few. Besides these Hindu husbandmen, there are about 5000 Musalmán and about 3000 Christian landlords. In lowland Kánara the Musalmáns are generally lazy and often in debt and their lands mortgaged. They think it beneath them to hold the plough and know nothing of husbandry. In upland Kánara, in Mundgod and Supa, some Musalmáns till their own fields, but not so successfully as Hindus. They are neither hardworking nor thrifty, and spend much on marriages and other ceremonies. The Christians, with few exceptions, are found along the coast. They are skilful husbandmen, but as a rule are tenants and field-workers, rearing pigs and fowls and keeping milch cattle. The men are much given to drink and are lazy and thriftless. The women help in the field and work as labourers. Above the Sahyádris are a few Goanese labourers and a class of Christian Sidis who are husbandmen and work in the Yellápur saw-mills and as foresters.

Of husbandmen who were formerly serfs or rural bondsmen, Devlis about 3200 found in Kárwár, Ankola, Kumta, Honávar and Bhatkal, till lands attached to temples and are employed as temple-servants. Their women work in the fields, perform menial temple services, and act as prostitutes. Above the Sahyádris a similar caste called Kabbers are found at Banavási, Mulge, and Palla. Padtis about 2900, and Devdigs about 3600, are tenants-at-will or hired labourers who work in rice fields and betel gardens. Besides these there are two early and closely similar tribes, Kare Vakkals about 10,000 and Kot Vakkals numbering about 2000.

Chapter IV. Agriculture.

Husbandmen.

They are known by the generic name of Gaudgalus and besides the two main divisions include Gám Vakkals and Hálvakki Vakkals. They are found in the lowlands between Ankola and Bhatkal, and also above the Sahyádris. The men are strong, thrifty, sober, and hardworking. Most of them are day-labourers, but many work as yearly tenants, the landlords being careful not to allow them to remain more than five years on one plot of ground lest they should claim a tenant's right. The women work in the fields and are largely employed in bringing head-loads of grass and firewood from the forests into towns and villages. They are dark and ill-featured, wearing no bodice, and with many chains of beads hanging from the neck over the breasts. From an ornament worn under the chin the robe falls between the breasts half hiding them, and is fixed round the waist hanging in folds over the legs. The hair is twisted into a coil which is worn on the left side of the back of the head, and above the coil a flower of the *kyadigi huvu*, Pandanus odoratissimus, is stuck like a pin. In the hill villages above the Sahyádris Kare Vakkals are found as landowners. Kot Vakkals are labourers in spice gardens. Holayars or Mhárs are few and degraded. They are much given to drink and show no signs of improving. They are labourers or tenants-at-will.

Stock.

All large landholders own bullocks and if necessary lend them to their tenants. Cows of a very small breed are numerous, and buffaloes are sometimes kept. Little or no care is given to cattle-breeding. In lowland Kánara carts are few and the cattle are small and weak. The ploughs are small and the manure is mostly dead leaves with a little straw and cowdung. With rich soil, abundant rainfall, and hardworking husbandmen the outturn would be greater were the tillage less rough, the ploughing less shallow, and the manure less scanty. Above the Sahyádris there are more and better cattle, but owing to the feverish climate the people are sluggish and weakly. The husbandmen do not export the produce of their fields. Dealers come to their farms with pack-bullocks and buy the produce. Sirsi is the centre of the cardamom and betelnut trade, and field and garden produce and spices are exported from Honávar and Kumta. The cultivating classes are well-to-do. The produce commands a fair price and the Government assessment is moderate. The relations between the landlords tenants and labourers are friendly.

Soil.

Below the Sahyádris the arable land consists partly of sandy plains along the sea-shore and the banks of rivers, and partly of narrow valleys among the hills, most of them watered by unfailing streams. The sandy soil called *malalu* or *usutri* is generally poor and much broken by salt-water creeks. The soil in the upper slopes of the valleys is called *betta*, a hard earth made of crumbled iron clay or laterite, which if not constantly worked stiffens into clods and stifles growth. At the upper ends of the valleys a red alluvial soil called *kagdali* with shining particles of mica is often found. Further down the valley, as the hills begin to draw back, a black loose salt marshy earth called *gajini* occurs, apparently of vegetable origin, and near the mouth of the valleys is a still richer soil called *bailu*. The chief products of the sandy plains are rice,

Chapter IV.
Agriculture.
Soil.

cocoa-palms, and betel-palms. Along the coast and on some of the creeks is a valuable sandy or alluvial soil known as *pulan* or *shitta*. It is often covered with drift sand, but when the sand is cleared the loam yields excellent rice, the richest cocoa-palms, and fine cashewnut, and *undi* trees Calophyllum inophyllum.

Above the Sahyádris, except where the underlying iron clay rises to the surface, the soil is good. The best called *kagdali* is a red mould containing very small stones. In some places the soil is a stiff moisture-holding clay. Besides garden land, rice land or *tori* and dry-crop land or *kushki* are found. Rice land, as a rule, yields only one crop which is grown either with or without watering. In some parts much of the rice land yields two rice crops or a crop of rice and an after-growth of pulse. Sugarcane is grown once in three years, fine fields being often seen up the Gangávali valley. The supply of water is the main difference between good and bad rice land. Above the Sahyádris very little water is stored. The ponds are few and small, and the rice depends on the rainfall either on the field itself or on rain water brought from the uplands by small ditches. Most of the well-watered valleys that cross the forests and many level plots of excellent soil lie waste and timber-covered from want of husbandmen and from the sickliness of the air.

Spice Gardens.

Above the Sahyádris garden crops are the staple produce of the west and rice of the east. The coast gardens are very unlike the usual garden tillage in Dhárwár or in the Kánara villages that border on Dhárwár. In the inland parts, as a rule, garden crops are grown only round wells and ponds. But along the coast, if only care and skill are given to it, almost all of the rice land will yield garden crops. Much of the coast land which is assessed as garden land had originally nothing either in soil or in position specially suited for the growth of garden crops. On the coast most of the garden land is given to cocoa-palms, whose proper culture requires much care and skill. A little inland the cocoa-palm is often mixed with the *supári* or betel-palm. Further inland in the valleys at the foot of the Sahyádris and on their lower slopes are the rich palm and spice gardens, which are the special glory of Kánara. Except in Supa in the north, where the gardens are poor, without cardamoms or betel vines, with few cocoa or betel palms, and with plantains as the staple produce, these spice gardens are wonderfully rich and are managed with great skill.[1] They vary in area from a fifth of an acre to ten acres, and may be roughly estimated to average about one acre. Their shape depends on the form of the valley. As a rule they are long and narrow, hid among hills thick with evergreen forests, in deep shady dells watered by a network of runnels. They are guarded by high banks or by a thick belt of forest timber and brushwood. Within the belt is a strong fence and within the fence a second ring of mangoes, jacks, limes, plantains, cocoa-palms, oranges, citrons, pomaloes, apples, *birands* Garcinia purpurea, *otambs* Artocarpus lakoocha, and other

[1] Rev. Survey 451, 8th May 1880. Bom. Gov. Rev. Rec. 879 of 1880.

Chapter IV. Agriculture.

Spice Gardens.

fruit trees. Besides the fruit trees are rose and jessamine bushes, and of vegetables cucumbers and cornered cucumbers, gourds and snake-gourds, radishes, yams, chillies, and brinjals.[1] In the centre of the gardens are rows of betel-palms with black pepper and betel-vines trained up their stems, and cardamom bushes in shady spots between the rows of palms and plantains. Most of the owners are Havig Bráhmans some with divided and some with undivided families. Their houses are on raised sites outside of the garden. The garden work is partly done by debtors who have pledged their labour, but chiefly by gangs of labourers from the Goa, Honávar, and South Kánara coasts who come in November and go home in June. The Havig's family do the house work, look after the cattle, gather cowdung for manure, pick and separate the betelnuts from the husk, clean boil and cut them in half, clean and dry cardamoms, make bundles of newly plucked betel leaves, and prepare and dry pepper. The hired and the pledged labourers are employed in digging and carrying earth to the roots of plants and trees, in fetching *sappa* or green leaves for manure, and in climbing betel-palms to gather betelnuts and betel leaves.

In choosing a site for a betel garden the chief points are soil, position, water, and manure. The best soil is a red soapy clay, damp and easily worked. The garden should if possible face east, as the evening sun often does harm. As the garden must have shelter and leaf-manure, it is important to secure an outer belt of forest and brushwood. The fence, which is five or six feet high, is made of live thorn bushes, the branches being held together by split bamboos fastened to wooden or bamboo posts about six feet high and six or eight feet apart. In some cases the fence is entirely of bamboo posts and is renewed once a year. The fence surrounds the garden and has only one narrow gate. A ditch three or four feet deep and three feet broad surrounds the fence and serves the double purpose of strengthening the fence against the attacks of animals and of draining the garden during the wet months. Inside of the garden the ground is dug into a line of beds about twenty feet wide and surrounded by trenches which run parallel to each other in the direction of the length of the valley, generally nearly east and west. These trenches act as drains and in some gardens drainage is wanted all the year round to give an outlet to underground springs. Soil which is full of underground springs is specially valuable. But spring water if left stagnant does harm, and nothing grows unless the soil is carefully drained. The trenches are about a foot broad, and, according to the moisture of the soil, a foot to a foot and a half deep. The garden must command an unfailing supply of water. The water is commonly brought from springs which abound at the head of every valley. It is gathered in a small pond or reservoir, and from the reservoir is brought by a channel which passes along the upper side of the garden. Water is also brought in channels from the small rivulets of which the country is full. Rich men

[1] The snake-gourd Trichosanthes anguina in Kánarese is *padvala kái*, and the cornered cucumber Cucumis acutangulus is *kire kái*.

Chapter IV.
Agriculture.

occasionally fill the bed of one of these rivulets and turn it into a garden. The hollow of the stream-bed above the garden becomes a reservoir, and a canal is cut outside of the garden to carry off the flood waters. A river-bed garden is costly to make as the filling of the channel is expensive, and as the reservoir and the canal must be strong enough to stand the torrents of the rainy season.

Spice Gardens.

In October young plantain trees are set in rows within two feet of each side of the drains and twelve feet from each other. The whole garden should then if possible be covered with branches of the *nelli* or Phyllanthus emblica; in any case, some branches must be strewn near each young plantain tree, and at the same time the centre channel of each bed must be raised a foot and a half with earth from the neighbouring hills. When the rainy season is over the earth that was heaped in the centre is spread over the bed, and instead of a mound a channel is dug and water is passed along the channel once in fifteen days. In watering the garden the channel is filled, and the water is splashed or scooped from it on the roots of the trees. At the close of the second rainy season, between every two plantain trees a pit is dug a foot and a half square and a foot and a half deep, and, from the nursery where it has been raised, a young betel-palm is lifted with as much earth as possible and planted in each pit. The pit is filled with fresh earth, which is trampled in with the foot, and the space filled with the leaves of the Phyllanthus emblica. In this way the number of betel-palms is gradually increased till the garden is full. Each acre of well stocked garden has 500 to 800 betel-palms and about 300 cardamom bushes. When the garden is full care is needed to have nurseries with a proper proportion of young trees to take the place of those which die or are blown down.

The Betel Palm.

The Betel-palm, M. *Sopári* K. *Adike,* Areca catechu. The nursery from which the young betel-palms are brought is managed in the following way. In February when the betelnuts are fully ripe they are cut and kept eight days in the house. A bed is dug in a shady place and in it the nuts are set nine inches apart, with their eyes uppermost, covered with about an inch of earth. The bed is shaded with dry plantain leaves, and is sprinkled with water once a day. About the end of May, before the rains begin, the plantain leaves are removed and the young sprouts show above ground. In three months more, or after six months in all, the seedlings are half a foot high and are ready for planting. In February, that is about a year after the nuts were first planted, they get a little manure, and during the rest of the dry season they are watered once in four to eight days according to the soil. About two years later, that is when the plants are about three years old and three to four feet high, they are set in their final places in lines under the shade of full-grown plantain trees. Young betel-palms are estimated to be worth 4½*d.* (3 *as.*) the hundred; but they are seldom sold as one garden-owner generally gets what he wants from a friend or neighbour. The betel-palm begins to bear fruit thirteen years after its first or ten years after its second planting. In five years more it reaches perfection and lives fifty to a hundred years. When a palm dies, another from the nursery is put in its place.

Chapter IV.
Agriculture.
Spice Gardens.
The Betel Palm.

To keep a garden prosperous, the soil ought to be manured once in two years. The practice among good farmers is to divide the garden in two, one-half being manured in the first and third and the other half in the second and fourth years. Manuring once in three years is also common. In manuring a garden red clayey soil is dug from the side of the garden and thrown along the middle of the beds between the lines of betel-palms, to a height of eighteen inches to two feet. Round the root of each palm half a large basket of manure is heaped and small branches are laid over the manure to keep it cool. Cardamoms and pepper are always supplied with leaf mould mixed with red soil, and betel-palms and plantains are sometimes manured with cowdung mixed with leaves. The cost of these operations for each acre of garden is estimated at £1 8*s.* (Rs. 14) for earthwork, £1 10*s.* (Rs. 15) for manure, and £1 12*s.* (Rs. 16) for branches, or a total of £4 10*s.* (Rs. 45), that is £2 5*s.* (Rs. 22½) a year if the garden is manured once in two years.

The betel-palm gives little trouble except at two seasons, when the nuts are sprouting and when the nuts are ripening. When the nuts are sprouting they are often attacked by a blight called *kol* caused by sudden changes of rain and sunshine. To prevent the blight spreading, the broad fibrous sheath of a ripe betel-palm leaf is tied over each bunch by a class of men called Hasselrus, who are paid 1*s.* (8 *as.*) for every fifty trees or 16*s.* (Rs. 8) an acre. When this covering is neglected the blight frequently ruins the whole crop. Betel-palms which are too tall and slender to bear a man's weight have their bunches of nuts left uncovered. The bunches of these trees yield five to a hundred nuts, while two hundred nuts are reckoned the average produce of a covered bunch, and in some covered bunches five hundred nuts come to maturity. Each tree usually yields two large or three small bunches. The betelnut harvest lasts during November, December, and January.

In November when the nuts begin to ripen, much care is required in watching and gathering them as the nut loses greatly in value if it is cut at the wrong time. The bunches should be cut before they are ripe, for the ripe nut is used only for seed and by the lowest classes. The Hasselrus who cover the bunches are also employed to cut the nuts. They are very clever at their work. In climbing a betel-palm a Hasselru fixes a rope of plantain fibre round his ankles and under the soles of his feet and sets his feet firm on either side of the stem. He climbs hand over hand drawing up his feet together with a jerk. When he reaches the top of the palm he secures himself by taking a round turn with a rope which he carries in his hand. One end of this rope is tied to the middle of a short board on which the man seats himself and cuts off the nearly ripe nuts, drawing up whatever he wants from an attendant below by a line fixed to his girdle. When he has done, he unties his seat, fastens it round his neck, and sways the tree backwards and forwards till he swings it close enough to enable him to throw himself on another tree to which he again makes fast his seat. In this way he passes over the whole garden without coming to the ground. The fruit of trees that are too tall and slender to

Chapter IV. Agriculture.

Spice Gardens.

The Betel Palm.

support a man's weight is gathered by hooking the head and dragging it to a neighbouring tree. The first class nut is called *chikni*; that gathered a little later is called *betta*; and the last, which has entirely ripened before it is gathered and is used only by the lowest classes, is called *gotu*. The gathering of the nuts costs 8*s*. (Rs. 4) an acre. Within three days after they have been harvested, the kernels are separated from the husks and cut in half. The kernels are generally cut by the women of the house and sometimes by the men. If the work is done by outside labour it costs about 8*s*. (Rs. 4) the acre. Next morning the kernels are boiled for about an hour till the eye of the nut disappears. To give a colour to the first nuts they are boiled in a mixture of *nerlu* Eugenia jambolana and *kaul* Barringtonia racemosa bark and *matti* Terminalia tomentosa leaves in the proportion of two parts of the dye to one part of water. The colour of the nuts of the first boiling is never rich and they never fetch a high price. For the second boiling two parts of the water from the first boiling are added to one part of fresh water. After being boiled the nuts are dried on screens and are ready for the market. The yearly outturn of prepared betelnuts from a first class garden is estimated at as much as $4\frac{1}{2}$ pounds a tree, and from the worst gardens at $2\frac{1}{4}$ pounds a tree. The average is estimated at about $3\frac{5}{8}$ pounds a tree or about 10 cwt. (2 *khandis*) an acre. About three-quarters of this quantity is of second class nuts. When the crop is ready agents come round to the gardens and buy the nuts. They are paid at the rate of 2*s*. (Re. 1) on every *khandi* sold. The price of betelnuts is very variable. At present (1882) it is £24 the ton (Rs. 60 the *khandi* of twenty *mans*).[1] Betelnuts are sent inland in large quantities. From betelnuts and also from the stems of old betel-palms a catechu or Terra japonica is extracted which is largely used in dyeing as it yields a fast brown colour.

Cardamoms.

Cardamoms, *Yelakki*, Alpina cardamomum, are common in the beautiful hill gardens that occupy the western valleys of North Kánara immediately above the Sahyádris. Except that they must have plenty of water, the growing of cardamoms gives little trouble. In a new garden cardamoms are grown from seed and in an old garden from cuttings. The seed is sown in October after the outer shell has been removed. It must be carefully sheltered from the sun and takes three months to sprout. When the seedlings are a foot high they are transplanted, and a year and a half later they are set in shady places among the betel-palms and begin to bear when they are three years old. The seed pods are gathered as they ripen in September and October and are dried four days on a mat which during the day is hung in the sun on four sticks and at night is taken into the house. The pods are then fit for sale. When the whole crop has been picked the plant is taken out of the ground, useless wood and roots are cleared away, and it is again planted in a fresh hole. The year after it has been moved the plant yields no fruit, but in the following year it again bears. After the plant

[1] The betelnut measures are 24 *tolás* = 1 *sher*, 48 *shers* = 1 *man*, 20 *mans* = 1 *khandi*.

Chapter IV.
Agriculture.

Spice Gardens.

has been moved the old stem dies and a new stem springs from the root. The acre yield of cardamom pods is estimated at twenty-eight pounds (1 *man*) in first class gardens, at twenty-one pounds ($\frac{3}{4}$ths of a *man*) in second class gardens, and at seven pounds ($\frac{1}{4}$th of a *man*) in third class gardens. The selling price is about 7*s.* the pound (Rs. 100 a *man*).

Black Pepper.

Black Pepper, *Kare menasu,* Piper nigrum. When the betel-palms are thirteen years old, the garden is planted either with the black pepper vine or the betel-leaf vine which climbs the stem of the betel-palm. The pepper is of three varieties, *kari malisaru, sambar,* and *arsina murtiga,* which do not differ in quality but in yield. Of the three, the *kari malisaru* is the best bearer, each vine yielding as much as three pounds (5 *shers*) a year, but it is not easy to grow as it thrives only in *kagdali* or stony red mould. *Sambar* and *arsina murtiga* grow well in the light-coloured soil known as *arsina munnu;* but *sambar* yields only about $\frac{3}{5}$ths of a pound (1 *sher*) and *arsina murtiga* $1\frac{1}{5}$ pounds (2 *shers*). In August four cuttings of the pepper vine, each about two feet three inches long, are made for every betel-palm. One end of each cutting is set five or six inches deep and the other end is tied to the stem of the palm. The vine wants no further care except tying its branches once a year in May. It bears in six or seven years and lives about twenty-five, so that one betel-palm outlasts three or four sets of vines. The pepper is picked with the help of ladders in March and April. One man cannot gather and cure more than three pounds (5 *shers*) a day. It is picked when the berries are full-grown but not ripe. The pods are piled into a heap in the house and kept for three days. They are then rubbed with the foot, and when the berry is separated from all other matter it is fit for sale. The average yearly yield of each pepper vine is about $1\frac{1}{10}$ pounds, and the acre outturn is about 280 lbs. (10 *mans*) in a first class garden, 140 lbs. (5 *mans*) in a second class garden, and 56 lbs. (2 *mans*) in a third class garden. The selling price is about $3\frac{1}{2}$*d.* a pound (Rs. 4 the *man*).

White Pepper.

A little white pepper is made by allowing the pods to ripen. For five or six days the pods are spread in the sun to dry. When dry they are steeped in cold water and when thoroughly soaked they are rubbed between the palms of the hands till the husk or skin peels off. They are again washed in fresh water and laid in the open air night and day for three or four days till the sun and the dew bleach them white. They are then ready for use and are stored in new earthen vessels whose mouths are stopped with plantain or betel-palm leaves. White pepper is twice as dear as black pepper, but it is in little demand, as it is used only as a medicine.

Wild Pepper.

Besides in gardens the pepper vine grows wild in pepper forests or *menasu káns.* To keep a pepper forest in order the branches of the vines must once a year be tied to the trees, and the trees must be stripped of all climbing plants especially the Pothos scandens and the Acrostichum scandens. Every third year all the bushes in the forest should be cut down; and every fifth year the side branches of the trees should be lopped as the vine clings best round straight slender stems. Where the trees are too far apart, a

Chapter IV.
Agriculture.

Spice Gardens.
Wild Pepper.

branch or a cutting should be planted; and if no pepper vine is near, a shoot or two should be set in the earth near the young tree. When thus cared for the pepper vine lives about ten years. When an old vine dies a young shoot must be trained to take its place. As all three kinds of pepper grow wild in the forest, care must be taken to examine the leaf of the shoot to make sure that it is of the best kind. All kinds of trees are reckoned equally fit for supporting the pepper vine; but where the woods are too thin the *bondubala* is commonly planted because it easily takes root. Fruit trees are not planted in case they should attract monkeys. Vines thrive best on trees of middle size and about four and a half feet apart. The shade of large trees is useful, but the stems are not suited for the vines. To prevent the havoc which its fall might cause, when a large tree is seen to wither, its branches are cut, and a circle round the bottom of the stem is stripped of bark. Under this treatment the tree slowly decays, and, as it is relieved of the weight of its branches, it rots without falling in a mass. Except this rotten wood no manure is used. Probably from the want of tillage and manure pepper raised in forests is inferior to pepper grown in gardens. A wild pepper vine, though much larger, seldom yields more than half what a garden vine yields. A man in one day gathers the produce of twenty trees or rather more than twelve pounds; and at the same time ties the branches which is all the labour required. He climbs the trees with the help of a bamboo ladder, some of which are sixty feet long.

Betel Leaf.

The Betel-leaf Vine, M. *Pán*, K. *Vilyadele*, Piper betel, is widely grown in plantations in valleys close to the main range both below and above the Sahyádris. When grown in gardens the betel-vine thrives best on mangoe trees. The shoots as they grow are fastened to the stem of the trees with cords made from the spathes or leaf-sheathes of the betel-palm. When the plant is two years old shoots which stretch far from their props are pruned. After the third year once a fortnight leaves can be picked for sale or for use. Shoots which wander far from their props are planted and trained on new trees. To avoid injuring the vines the men who pick the leaves climb the trees with the help of ladders. A full-grown betel-vine yields 100 to 200 leaves every fortnight. An acre of spice garden containing 500 betel-palms is roughly estimated to yield yearly about 40,000 betel leaves worth about £2 (Rs. 20) and costing 16*s*. (Rs. 8) to grow. The leaves are generally eaten with betelnut and are largely exported.

Though a fully stocked spice garden yields a handsome profit, to start it requires a large outlay of capital and labour. The first return is from the plantains which begin to yield after the third season. Cardamoms and betel-vines begin to yield after three years, and pepper-vines after six years, but about thirteen years pass before the betel-palms are in full bearing. After this an acre of good betel and spice garden land is estimated to yield £25 to £35 (Rs. 250-Rs. 350) a year, and this return will go on so long as care is taken to plant new trees as the old trees become worn out. Estimates of the cost and profits of a betel-palm and of a betel-palm and spice garden show that in a betel-palm garden the yearly acre cost is

Chapter IV. Agriculture.

about £8 6*s.* (Rs. 83) and the return £12 (Rs. 120), that is a net profit of £3 14*s.* (Rs. 37).[1] In a betel and spice garden the yearly acre cost is estimated at £10 8*s.* (Rs. 104) and the yield at £21 10*s.* (Rs. 215), that is a net profit of £11 2*s.* (Rs. 111).[2]

Field Tools.

The chief field tools are the shovel or *pávda*, the half-pick or *kutar*, the pickaxe or *pikás*, the billhook or *hila*, the sickle hook or *kudugolu*, the rake harrow or *halki*, the clod crusher or *alay*, the plough *nángar* or *negálu*, and the sowing drill-box or *kurige*. Other appliances are the water channel or *kolanbi*, the shallow trough-shaped basket or *sup*, the rice mortar or *ván*, the grass ball or *mura* in which rice is carried, and the wooden bludgeon or *kudti*. The shovel or *pávda* is either rounded or square-nosed. It is used in turning loose soil in rice fields and gardens, is of local make, and costs about 1*s.* 6*d.* (12 *as.*). The half-pick or *kutar*, which is either edged or pointed, is used in opening hard soils; it is generally of local make and costs about 1*s.* (8 *as.*). The pickaxe or *pikás*, with an edge at one end and a point at the other, is used in opening hard stony ground; it is generally of Bombay make and costs about 2*s.* (Re. 1). The billhook or *hila* is of two kinds, a lighter more curved and pointed hook used in cutting grass, and a heavier less curved and more rounded hook used in splitting and cutting wood and breaking cocoanuts and costing about 1*s.* (8 *as.*). The sickle or *kudugolu* has a thin much curved blade, the inner edge being furnished with a row of sharp teeth like the teeth of a saw; it is of local make and costs 6*d.* to 9*d.* (4-6 *as.*). The rake or harrow, *halki*, is of wood, with a six-feet long handle and a four-feet broad head with a row of about twelve wooden teeth; it is drawn either by oxen or by a man and is used in raking together surface litter before the field is ploughed; it is of local make and costs 2*s.* to 4*s.* (Re. 1 - Rs. 2). The clod crusher or *alay* is a plank five feet long and a foot and a quarter broad, with a pole and bullock yoke drawn by a pair of bullocks driven by a man who stands on the middle of the board. The crusher is passed over sprouting rice to break the clods and quicken the growth of the young plants; it is of local make and costs about 4*s.* (Rs. 2). The plough called *nángar* or *negálu* has a pole of porcupine that is cocoa-palm wood about eight

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[1] The details are: The yearly acre return is £12 (Rs. 120) the value of two *khandis* or 1920 *shers* of *supári* at one *anna* the *sher*. The yearly acre cost is £4 10*s.* (Rs. 45) as interest on a capital of £50 (Rs. 500) spent in making the garden, £4 10*s.* (Rs. 45) in three years or £1 10*s.* (Rs. 15) yearly for manuring an acre of garden once in three years, 16*s.* (Rs. 8) for covering the bunches of nuts to prevent blight during the monsoon, 8*s.* (Rs. 4) for gathering the crop, 8*s.* (Rs. 4) for separating the husks from the kernels and cutting the kernels in half, 4*s.* (Rs. 2) for boiling and colouring the nuts, 4*s.* (Rs. 2) to brokers at 2*s.* (Re. 1) the *khandi*, and 6*s.* (Rs. 3) for contingencies, making a total of £8 6*s.* (Rs. 83) and leaving a profit of £3 14*s.* (Rs. 37).

[2] The details are: The yearly acre return is £12 (Rs. 120) for 1920 *shers* of *supári* at one *anna* the *sher*; £7 10*s.* (Rs. 75) for three-fourths of a *man* of cardamoms at £10 (Rs. 100) a *man*; and £2 (Rs. 20) for 240 *shers* of pepper at 2*d.* (1⅓ *anna*) a *sher*, making a total of £21 10*s.* (Rs. 215). The yearly acre cost is, besides £8 6*s.* (Rs. 83) as detailed in the footnote for a betel-palm garden, 8*s.* (Rs. 4) for gathering and drying cardamoms, 10*s.* (Rs. 5) for training pepper vines, 8*s.* (Rs. 4) for pruning and hoeing cardamoms, 10*s.* (Rs. 5) for gathering and drying pepper, and 6*s.* (Rs. 3) for contingencies, making a total of £10 8*s.* (Rs. 104), and leaving a profit of £11 2*s.* (Rs. 111).

Chapter IV. Agriculture.

Field Tools.

feet long, an iron share eighteen inches long, and a handle of cheap timber sloping forward for two and a half feet and then back for a foot and a half. It is worked by one man and is drawn by a pair of bullocks or buffaloes. It is used in rice fields to turn the soil and make it ready for the seed. Hard soil is opened with the half-pick or *kutar* before the plough is used. In loose sandy soil the plough passes about a foot and in hard soil about six inches below the surface. The plough is of local make and costs 6*s*. to 10*s*. (Rs. 3-Rs. 5). The sowing drill-box or *kurige* is used in sowing seed and costs 4½*d*. to 6*d*. (3-4 *as*.).

Other appliances are the water channel or *kolanbi*, made of a half palmyra palm stem hollowed five or six inches. It is used to lead water to cane fields and gardens. For drawing water, the shallow basket swung through the water by two men, the lever and bucket lift or *yata*, and the leather-bag or *kapali* are used.[1] Grain is winnowed in shallow trough-shaped baskets called *sups*, and rice is husked in a hollow piece of wood or stone called *ván* about six inches across and six inches deep, and pounded by two round pestles five or six feet long whose ends are armed with iron rings. When the rice is husked it is laid in grass and the grass is bound with wisps into a ball or *mura* of about ninety-six pounds (16 *kudavs*). The ball is shaped by beating it with a wooden bludgeon called *kudti* about two feet three inches long. Grain is ground into flour between two flat circular millstones, and curry powder is pounded with a pestle and mortar. Cocoanut husks are removed by knocking them against a pointed post called *shula* about three feet high and two inches broad, firmly fixed in the ground.

Arable Area.

As the whole of the district has not been surveyed details of the area of the different classes of soil are not available. The area under tillage is estimated at about 330,000 acres or 12·0 per cent of the whole acreage. Most of the unarable waste is forest clad hill land.

Irrigation.

Rice and garden crops are watered by runnels brought from streams or rivers. On the west coast in the dry season, dams of earth, stones, and tree branches are thrown across streams and the lands near are watered, the dam being removed at the close of the dry season or left to be swept away by the floods. Some places are watered by canals from large ponds or *keris* and small ponds or *kattes*. Where the level of the water is below the field, if not very deep, it is scooped up by a basket hung on ropes and swung through the water by two men. If water has to be raised from a greater depth the lever and bucket lift or *yata* is worked either by one or two men, and, if the depth is still greater, it is drawn by the leather-bag or *kapali* worked by a pair of bullocks. When brought to the surface the water is generally carried to the crop along the hollowed trunk of a palm-tree. The 1881 returns showed 7647 ponds and 24,680 wells, 593 with and 24,087 without steps. In Honávar Kumta and Bhatkal the wells are fifty to sixty feet and in other parts of the coast fifteen to thirty feet deep. Above the Sahyádris

[1] Details are given under Irrigation.

Chapter IV. Agriculture.

the depth varies from thirty to sixty feet. In sandy soil a masonry well ten to twenty feet deep with steps costs about £30 (Rs. 300) and without steps about £20 (Rs. 200); in iron-clay or crumbled trap a well thirty to sixty feet deep costs about £65 (Rs. 650) with steps and about £50 (Rs. 500) without steps; and in the loamy soil along the Sahyádris a well costs about £70 (Rs. 700) with steps and about £50 (Rs. 500) without steps.

Kumri.

In the uplands until lately one of the most marked forms of tillage was the growing of crops on burnt unploughed hill clearings manured with wood ashes. This hill tillage, which was locally known as *kumri*, was chiefly carried on by Konkan Ate and Marátha or Are Kunbis and forest and hill tribes. Up to 1848 there was little restriction and the people cleared any portion of the forests they chose. In 1848 orders were issued forbidding hill clearings within nine miles of the sea and three miles of large rivers, reserving certain trees, and reducing the area under *kumri*. These forest clearings were of two kinds *vargdár* and *sarkár kumri*. *Vargdár kumri* was when the holder of the land had it worked by his tenants and paid a cash assessment of about 2*s*. (Re.1) an acre. *Sarkár kumri* was when the actual husbandman paid for the land he cleared. From 1848 the Madras Government continued their efforts to reduce the amount of clearing tillage and in 1860 clearings of all kinds were forbidden. After the transfer of the district to Bombay (1862) this rule was relaxed and clearing was allowed to a limited extent. Since 1862 continuous efforts have been made to put a stop to this form of tillage, and the area has fallen from 7785 acres in 1863-64 to 844 acres in 1878-79.[1]

During[2] November December and January the patch of hill-side to be used for tillage is cleared of brushwood and the branches of the large trees are lopped and pollarded. The loppings are left till March or April, when the sun and the easterly winds have made them as dry as tinder. When lighted the timber and brushwood burn fiercely, baking the soil three to six inches below the surface. The crop sown is generally *rági*, sometimes pulse or gourds, and occasionally sesamum. In most places the soil is left untouched and the seed is sown in the wood ashes after the first fall of rain. When the plants begin to sprout, a fence of fallen trees or a wattled hedge is raised round the clearing. Little skill or capital is wanted, but constant watching and constant weeding are required. The crop is reaped in the south of the district in October and November and in the north in November and December. The produce is said to be at least double what can be raised under the ordinary modes of tillage. In the second year the clearing yields a small crop and in Supa a still smaller crop is sometimes reaped in the third year. After this the clearing is deserted until the brushwood has grown high enough to tempt the people again to burn it.

Manure.

Garden crops are always manured. Cowdung is used when it can be had, and leaf manure when cowdung fails. In rice lands the

[1] Minute by Sir Richard Temple, G.C.S.I. & C.I.E., Governor of Bombay, 25th September 1879.

[2] From a report by Mr. W. Fisher, Collector of Kánara, 91 of 30th August 1858.

Chapter IV.
Agriculture.

dressing is burnt. In gardens it is heaped round the trees, often covered with earth or sand, and left to decay. Salt was formerly much used for cocoa-palms; ordinary salt is now too dear, but the coarse salt-earth and the mud of tidal swamps are still a valued manure for palm gardens and rice land.

Manure.

In every part of Haiga the cattle are kept in the house at night, and have a daily supply of fresh litter which varies at different seasons of the year. The litter and dung are carefully kept, the grass and leaf litter being stored in separate heaps. It is calculated that for the rainy crop an acre of rice land requires twenty to forty hundredweights of manure altogether worth 2*s.* to 4*s.* (Re. 1-Rs. 2); for the cold weather crop of rice or pulse the same field should have ten to twenty hundredweights costing 1*s.* 6*d.* to 2*s.* 6*d.* (12 *as.* - Rs. 1¼). In November, December, January, and February the litter is dry grass which forms a manure known as *karadada-gobra.* In March, April, and May dry leaves of every kind, except prickly leaves and the leaves of the Anacardium occidentale, are used as litter and form a manure called *dreghina-gobra.* During the six remaining months (June to November) mostly of wet weather, fresh tree leaves are used as litter and make a dung called *hudi-gobra.* This fresh tree-leaf manure is the most esteemed. Wood ashes are stored in a separate pit, and are used for special purposes. As wood is plentiful cowdung is seldom used for fuel, and great care is taken that none of it is lost, women and boys following the cattle while at pasture and picking the droppings.

An average pair of bullocks in soft soil yielding one crop can plough three acres; in soft soil yielding two crops two acres; in hard soil yielding one crop two and a half acres; and in hard soil yielding two crops, one and a half acres.

Holdings.

Before the introduction of the survey the greater part of the land was divided into estates varying from a fifth of an acre to 1600 acres and averaging about 500 acres. Under the survey, rates have been separately fixed on small plots of lands and as these can be easily transferred many changes have taken place. It seems that many of the large estates have long been groups of moderate-sized holdings.

Field Stock.

About half of the plough cattle are buffaloes and half oxen. Though they fatten on the green hill grass during the rains and are fed with hay and straw in the dry season, cattle do not thrive in Kánara. Many are brought from above the Sahyádris, chiefly from Nagar or Bednur in north-west Maisur. But these are small and poor. The field stock in Government or *khálsa* villages, according to the 1881-82 returns, included 45,806 ploughs, 4274 carts, 109,034 bullocks, 111,354 cows, 63,773 buffaloes, 374 horses, 6756 sheep and goats, and 123 asses.

Crops.

As the revenue survey is not completed, no returns are available to show the area occupied by the different crops. Arranged in the order of importance, the chief crops are rice, *bhatta* or *nellu,* Oryza sativa; cocoanuts, *tengu,* Cocos nucifera; betelnuts, *adike,* Areca catechu; black pepper, *kare menasu,* Piper nigrum; cardamoms,

Chapter IV. Agriculture.

Crops.

yellakki, Alpina cardamomum; plantains, *bále,* Musa sapientum; *rági,* Eleusine corocana; great millet, *ken jala,* Sorghum vulgare; *sháve* or *shyáme,* Panicum miliare; jingelly-seed, *volle yellu,* Sesamum indicum; turmeric, *arshina,* Curcuma longa; sweet potatoes, *bella genasu* or *nela kumbala,* Batatas paniculata; hemp, *ganje* or *bhangi,* Cannabis sativa; and castor-seed, *vudla* or *haralu,* Ricinis communis. The chief pulses or *akkadi* are, black gram, *uddu,* Phaseolus radiatus; green gram, *hesoru,* Phaseolus mungo; horse gram, *kuluddha,* Dolichos uniflorus; Bengal gram, *kadle,* Cicer arietinum; white gram, *alasandi,* Dolichos catjang; and peas, *batáni,* Pisum sativum.

Rice.

The staple produce of the district is rice, *bhatta* or *nellu,* Oryza sativa, which on some lands is grown as a late or cold weather as well as an early or rain crop. Rice is grown all over the district, the earliest crops being near Kárwár; the rest of the lowland coast harvest is a little later, then come the upland crops, and last of all the eastern crops. The coast rice lands are divided into *gazni, bailu, kar, majalu, betta,* and *makki banna betta. Gazni* lands are in the salt tracts close along the coast; they yield only one crop in the year. *Bailu* lands are the good rice-plots in the lower valleys which being watered by small streams yield every year two crops of rice or one of rice and one of pulse. The first or rain crop is called *kártika* because it is reaped in the month of *Kártik* (November-December), and the second or dry season crop is called *suggi* in Kánarese and *vaingun* in Maráthi or Konkani, both words meaning harvest. *Kar* or Haiga rice lands are the low fields along the rivers and salt water inlets which are flooded during the height of the rains so that the rice cannot be planted till the water falls. *Majalu* and *betta* are on higher ground; *majalu* yields two crops, one of rice watered from rivulets and the other of vegetables or dry grain; *betta* land has small reservoirs which supply water for several weeks after the rains are over. *Makki banna betta* are still higher lands without rivulets or reservoirs, entirely dependent on the rains and apt to lose the crop if the later rains fail.

Above the Sahyádris most rice plots lie in the valleys on the eastern flank of the Sahyádris. From this the rice lands stretch east a little beyond the boundary of the low woodlands as far as the heavy rain reaches which supplies many small reservoirs with water enough to last till January or February.

All rice fields are in the form of terraces, surrounded by small banks to pond the water when the fields are flooded. These terraces vary from an acre to a patch of an eightieth of an acre according to the steepness of the ground. Cocoa-palms are sometimes grown in rice lands, their thick matted roots forming a valuable support to the embankments. Rice is grown in three ways, dry seed or drilled rice *kurige bhatta,* sprouted seed or *mole bhatta,* and planted seedlings or *nala bhatta.* The dry seed system, which requires less labour and exposure and yields a smaller outturn, is commonest above the Sahyádris. The sprouted seed system is commonest below the Sahyádris, except in the best double crop or *bailu* land and in the marsh or *kar* land where seed cannot be sown. In these lands the planting system is followed with a much larger outturn, but also

Chapter IV.
Agriculture.
Crops.
Rice.

with much more labour and exposure. Especially for the sprouted seed and planting systems buffaloes are better than bullocks from their greater power of standing wet and cold.

Under the dry seed or *kurige bhatta* system the seed is sown as soon as the ground has been ploughed and is damp enough for the seeds to sprout. For this the showers of April and May suffice. The heavy and continued falls of the south-west monsoon, though excellent when the plants have gained size and strength, are unsuited for the sowing season. After the seed has been sown by the drill or *kurige,* the rice field is manured with cowdung and smoothed with the crusher or *karada.* For three or four weeks the rain water is allowed to run off as it falls. After the first week the field is weeded with the hoe or *kunte,* which kills the weeds without harming the sprouting seed. At the end of the second week when the plants are four inches high, the field is worked by the weeding hoe or *niru kunte.* About the end of the third week the field is again weeded by dragging over it a branch of prickly bamboos fastened under a board on which the driver stands. When the rice is six inches high the dam openings are shut and the field is flooded. At the end of the third month the field is drained for some days and the weeds are removed. In the fifth month it is again weeded and in the seventh month the crop is reaped. The ears intended for seed are at once thrashed and dried for seven days in the sun. The rest are piled in heaps for eight days and thatched to keep out the rain. The grain is then either beaten out with a stick or trodden by oxen and for three days is dried in the sun. It is stowed in straw bags, and kept in the house till it can be boiled and husked.

Sprouted Rice.

In the sprouted seed or *mole bhatta* system ploughing does not begin till the soil is soaked. In the intervals between the repeated ploughings the field is kept flooded, and just before each ploughing all but two inches of the water is drained off. Before the last ploughing the field is manured with cowdung, or failing cowdung with tree or bush leaves, which is a very inferior manure. When the last ploughing is over the mud is smoothed with a plank drawn by oxen. It is afterwards harrowed by a large rake drawn by a pair of buffaloes or oxen which turns up the weeds which have been loosened by the plough, and opens the soil for the seed. To prepare the seed the straw sackcloth or matting bag in which it is kept, is steeped in water for about eighteen hours. The grain is then laid in a warm close place where within three or four days it sprouts. About a fortnight after the beginning of the rains the water is drained off the field and the sprouted seed is sown broadcast. On the fifth day when the seedlings begin to show, they are half-flooded with water and every day as they grow the quantity of water is increased, and the field is kept flooded until the crop is ripe. About a month after it is sown and again a little later the field is weeded by the hand.

In the rich double crop or *bailu* land the *kártik* or November crop is mostly, and the *suggi* or cold-weather harvest is entirely, sown with sprouted seed. To prepare *bailu* or rich double crop rice land for the second crop, during October and November, the field which

Chapter IV. Agriculture. Crops.

all the time is kept flooded, is first drained off by a small wooden rake-like tool called *shirula*. It is then manured with cowdung and ploughed and smoothed with the ox-rake. The seed is sown early in December. On the ninth day a little water is given, and, as the plants grow, the quantity of water is gradually increased. The rain water generally lasts till the end of the first month. Then with the help of the lever and bucket-lift or *yata* the field is watered from a reservoir or well or more often from a dammed-up stream.

Rice Planting.

For the planting out or *nala bhatta* system the seeds are first thickly sown in nurseries, from which, after about a month, when the rains have well set in and the field is flooded, the seedlings are planted out. The seedlings are brought in baskets to the field, and, in handfuls of eight or nine, are set along lines drawn by the large rake and thrust by the labourers some inches into the mud. The field is kept flooded and is weeded twice with the hand.

There are twenty-three leading kinds of rice: *pandia* large and small, *kaga, motalgo, belko, ajga, sanmalgi, dabansali, jirgesali, kotambarsali, patni, sorti, kalo mudgo, balari, chitgo, paksal, chintamanisali, kharganaki, kempu kukum kesari, jedu kukum kesari, urutgana, ambemori, somsal,* and *chapral*. In ordinary years the poorer rice is sold at twenty-three to twenty-seven pounds the rupee (Rs. 3 to Rs. 3½ the *man* of forty *shers*) and the better kinds at fifteen to twenty pounds the rupee (Rs. 4 to Rs. 5½ the *man* of forty *shers*). Rice is used by all classes except Kunbis who live near the forests and eat *rági*. The lower classes use the black or cheaper rice and the rich the fine kinds, chiefly the varieties known as *maskati, jorsal,* and *kundápuri,* which come from South Kánara. Rice in husk is sent in small quantities to the Malabár districts mostly from the ports of Kárwár, Kumta, Tadri, and Honávar. Some landed proprietors export on their own account, but most of the export business is in the hands of Váni and Konkani traders. Including the assessment it is roughly estimated that an acre of good rice costs about £2 (Rs. 20) to grow and leaves a profit of about £7 10*s*. (Rs. 75), and an acre of fair rice costs about £1 10*s*. (Rs. 15) and leaves a profit of £2 10*s*. (Rs. 25).

Rági or *Náchni,* Eleusine corocana, is widely grown in the hill forest country and is generally eaten by the poorer classes.

Italian millet, *vavani,* Panicum italicum, is grown to a small extent, both in the hill tracts and in the open country.

Indian corn, *mekke jola* or *musuku jola,* Zea mays, is not regularly grown. Small quantities are raised in gardens for private use.

The seed of some bamboos is used as a grain, especially in times of drought and scarcity.

The Pulses, *akkadi,* grown in North Kánara are black gram, *uddu,* Phaseolus radiatus, and green gram, *hesaru,* Phaseolus mungo, which are raised as a second crop in most parts of the district; and small quantities of pigeon pea, *togari* or *tuvari,* Cajanus indicus; Bengal gram, *kadle,* Cicer arietinum; Syrian lentil, *masur,* Ervum lens; and peas, *batáni,* Pisum sativum, which are grown in Haliyál and Mundgod and in villages bordering on Dhárwár. The acid dew

that gathers at night on the leaves of Bengal gram is esteemed a useful tonic, and in some parts of the country is gathered by spreading cloths over the field at night and wringing out the juice in the morning.

Chapter IV. Agriculture.

Crops.

Oil Seeds.

Of Jingelly-seed, *volle yellu*, Sesamum indicum, three varieties are grown: *bete* or white, *kare* or black, and *kurásani* or dark-red. Oil-seed is not exported. The oil of all three kinds is generally mixed and is in common use both for cooking and for anointing the body. Oil-cakes are given to cattle as fodder, especially to milch cows and carriage bullocks. Of the castor plant, *vudla* or *harlu*, Ricinus communis, two varieties *chiti* or spotted and *dodda harlu* or large are grown to a very small extent. From the large or *dodda* species medicinal castor-oil is made; the spotted seed yields a greater quantity of oil which is commonly used as lamp-oil. The oil is extracted either by boiling or in a mill.

Of Dye-yielding plants, safflower, or bastard saffron, *kusube*, Carthamus tinctorius, whose flowers are used as a red dye, is widely grown in gardens and in parts of the tableland. Terminalia chebula or *alalemara* yields myrobalans which are largely exported; *shige gida*, Acacia concinna, has a bark which is used for dyeing; and *smatti mara*, Terminalia coriacea, has a dye-yielding bark. A very small quantity of myrobalans are used locally. They and other produce, used in dyeing and tanning, go to Bombay, Bellári, and Belgaum.

Narcotics.

Hemp, *gánje* or *bhangi*, Cannabis sativa, is grown sparingly in gardens for the sake of the narcotic called *bháng* which is extracted from its leaves, stalks, and flowers.

Spices and Condiments.

Of Spices and Condiments, besides pepper vines, betel vines, and cardamoms of which details have been given, ginger, *alla* or *shunti*, Zinziber officinale, and chillies, *menasina kái*, Capsicum frutescens, are much grown both below and above the Sahyádris.

Coffee.

Between 1855 and 1860 in several gardens in Yellápur and Supa an attempt was made to grow coffee, *káphi* or *bundu*, Coffee arabica, but its cultivation was unprofitable, and has been abandoned. A few plants are still grown in five or six gardens in the north of the district near Supa.

Roots.

Of Bulbous Roots the sweet potatoe, *bella genasu* or *nela kumbala*, Batatas paniculata, and the yam, *heggenasu*, Dioscorea sativa, are widely grown in gardens; the yam sometimes reaches an enormous size.

Sugarcane.

Sugarcane, *kabbu*, Saccharum officinarum, is largely grown both above and below the Sahyádris. It is of three kinds, *rasal* or spotted, *kare* or black, and *bile* or white. *Das kabbu* grows about two inches thick and six to seven feet long, and yields more juice than either of the other kinds. *Kare kabbu* grows about an inch thick and four to five feet long, and *bile kabbu* about half an inch thick and three and a half to four and a half feet long. The *kare kabbu*, whose molasses are reckoned the best, is most grown on the coast, on river and stream banks, near ponds, and in other places where water is available.

Chapter IV. Agriculture.

Crops.

Sugarcane.

In growing sugarcane the ground is well dug, laid open to the sun for several days, and covered two or three feet deep with leaves and brushwood which when dry are set on fire. To the wood-ashes old cowdung mixed with grass is added, and the ground is again turned and laid open to the sun for two or three days. Fresh cowdung ashes and leaves are again applied, and the ground is finally turned and divided lengthwise into beds two or three feet apart. Each bed has a trench a foot and a half wide and about half a foot deep for the water to run throughout the entire length. The trenches are joined at the ends, so that water let into one of the trenches gradually finds its way into the rest and waters the whole garden. Except in some parts where it is as early as January or February, the season for planting sugarcane is April or May. As soon as the beds are ready, the cuttings which for some days, or even for weeks, have been kept in a cool shady place dipped in cowdung water, are laid in the beds about five inches apart and watered. After it is planted the field is watered every morning by means of a palm-stem channel. In about fifteen days the cane begins to sprout and the watering is daily repeated. When the plants are about a foot high, cowdung manure is added and the ground is cleared of weeds and rank vegetation. This process is continued every month and the beds are raised as the plants grow. When the canes are three feet high each is tied up with its own leaves. This process, which prevents the canes from breaking, is repeated till they reach their full height. Sugarcane is ready for cutting eleven or twelve months after planting.

Molasses.

Almost all husbandmen grow some little sugarcane and make molasses. When the cane is cut, the roots, leaves, and dirt are carefully removed, and the juice is squeezed in a sugarcane-mill. The mill consists of three cylinders moved by a perpetual screw. The force is applied to the centre cylinder by two capstan bars which are worked by hand and require six to ten men at either end. The juice is boiled in iron, brass, copper, or earthen vessels. Lime is added during the process to harden and thicken the liquid. The thickened liquid is either stored in pots or cast into cubical masses by means of wooden moulds. The total cost of raising an acre of sugarcane and of making the juice into molasses is estimated at about £22 (Rs. 220).[1] The outturn of forty *mans* of molasses is estimated to be worth about £20 (Rs. 200), and the value of eight thousand bundles of sugarcane leaves about £3 4*s*. (Rs. 32) more, leaving a net profit of £1 4*s*. (Rs. 12) the acre. This cost of tillage is calculated on hired wages. If, as is generally the case, the landowner himself works, he reaps a profit averaging £4 to £4 10*s*. (Rs. 40-Rs. 45) the acre.

East Indian arrowroot, *kuvegadde*, Curcuma angustifolia, grows wild, and is also cultivated in different parts of the district.

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[1] The details are: £2 (Rs. 20) for seed canes; £3 10*s*. (Rs. 35) for preparing ground; 10*s*. (Rs. 5) for planting; £4 10*s*. (Rs. 45) for watering; 10*s*. (Rs. 5) for manure; 10*s*. (Rs. 5) for weeding; 16*s*. (Rs. 8) for fencing and hedging; £1 (Rs. 10) for cutting; £3 4*s*. (Rs. 32) for pressing; 10*s*. (Rs. 5) for boiling; £3 (Rs. 30) for fuel; and £2 (Rs. 20) for contingencies, giving a total of £22 (Rs. 220).

Chapter IV. Agriculture.

Crops.

Vegetables.

Of Vegetables, the egg-plant or brinjal, *badane kái,* Solanum melongena; the water-melon, *kalangadi kái,* Cucurbita cetrullus; and various pumpkins, gourds, and cucumbers are much grown. Bendy, *bende kái,* Hibiscus esculentus, one of the most popular and wholesome of vegetables, is grown chiefly on the coast. The stalk yields a long silky and pliant fibre which is locally used for cordage and sacking.

Fruit Trees.

Cocoa-palms, *tengu,* Cocos nucifera, are widely grown, especially along the coast. The cocoa-palm is the most valuable of Indian fruit trees. The milk of the young nut is a pleasant and wholesome drink. The kernel of the ripe nut is largely used in native cookery and yields excellent oil. The fibres of the husk furnish the coir which is so much valued for cordage. From the young flowering stalks a favourite liquor is drawn. The stem yields the porcupine wood of commerce, and the leaves are plaited into mats and other articles.[1]

Plantains, *bále,* Musa sapientum, of many kinds are grown in gardens, those on the coast having the best flavour. The plantain is grown not only for its fruit but for its leaves, which Hindus, especially Bráhmans, use as dinner dishes. Its stem yields a fine white silky fibre of considerable length and strength, but it is not used. The jackfruit, *halasu,* Artocarpus integrifolia, grows so plentifully that in the hot season it is given to cattle as fodder. The mango, *mávu,* Mangifera indica; the tamarind, *hunase,* Tamarindus indicus; and the jambool, *nerali* or *jambu,* Syzygium jambolanum, are common all over the country, both in gardens and groves, and grow to a large size. There are many kinds of mango, but the finer sorts are found only in the Portuguese territory and its neighbourhood, and in some European gardens. The commonest local mangoes are *picha mávu,* a stringy mango; *muge mávu,* a large mango; *kadu* or *appe mávu,* a wild mango used only in making pickles; and *jirge mávu,* a small but much prized mango. Grafts from the choicest Goa mangoes, *farnandin, alphonse,* and *monsurat,* are grown by large proprietors.

Of the Orange family the pomelo, *chakkatu,* Citrus decumana, grows best on the coast; the orange, *kittale,* Citrus aurantium, flourishes only above the Sahyádris; the lemon, *shi nimbi,* Citrus limetta, prospers everywhere growing wild in the hills and forests, especially in Supa. Pomegranates, *dalimbi,* Punica granatum, and figs, *anjura,* Ficus carica, are grown to a small extent both below and above the Sahyádris; they flourish best in the drier parts of the tableland. The custard-apple, *sitáphal,* Anona squamosa, and sweet-sop or bullock's heart, *rámphal,* Anona reticulata, together with the sour-sop tree, Anona muricata, are grown in a few gardens, chiefly on the coast. The rose-apple, *jambu,* Eugenia jambosa, is common in gardens, but the fruit is insipid. The papay, *pappái,* Carica papaya, a native of Brazil, is common in gardens. It has the property of making meat hung on its branches tender. The

[1] Details are given in Vol. XV. Part I. p. 58.

Chapter IV. Agriculture.

Crops.

cucumber tree, *bimbali,* Averrhoa bilimb, is small with oblong fruit growing on the trunk and branches. The Indian almond, *badámi,* Terminalia catappa, is found both in gardens and forests. The Belgaum walnut, *akrodu,* Alentris triloba, grows freely above the Sahyádris. The cashewnut, *geru mávu,* Anacardium occidentale, a native of Brazil, is now common in Goa and on the Kánara coast, where it is considered a valuable article of food. A good gum is obtained by cutting the bark.

Bad Seasons.

Though North Kánara has occasionally suffered from a failure of crops the only recorded or remembered scarcity which amounted to famine was in the year A.D. 1806 or the *Kshaya Samvatsara*[1]. This famine appears to have been very severe. Men were forced to feed on roots and on rice husks, and about 3000 persons are said to have died of want. The local scarcity was originally caused by an influx of people from Ratnágiri and the Deccan. It was increased by the want of roads, by the depredations of robbers, and by a rule forbidding the export of grain from Dhárwár. The distress lasted for about fifteen months from January 1805 to March 1806. To relieve the distress an order was issued forbidding the export of rice and directing the purchase of rice by the local officers and its re-sale at moderate prices. The land assessment was remitted, and advances were made to cultivators for agricultural purposes. This famine and the scarcities with which since then the district has occasionally been visited seem to have been due to short rainfall. In 1865-66 parts of the Nizám's country, Dhárwár, Belgaum, and Kánara suffered from the extremely high price of grain which was due partly to short rainfall, and partly to the transfer of a large area of land from grain crops to cotton. In Supa the distress was severe enough to call for special relief measures. The pressure was greatly relieved by the seeding of the large bamboo over fifteen to twenty miles on either side of the Haliyál-Yellápur road. Thousands of scarcity-pinched people from the Karnátak came to gather the bamboo seed. They lived in large camps and were accompanied by their own Váni shopkeepers. The shopkeepers bartered their wares for the bamboo seed at the rate of about forty pounds the rupee and sent the seed to the inland markets where grain was dearest.[2] Though there was no general failure of crops in Kánara, the effects of the great famine of 1876 and 1877 in the Deccan, Bombay Karnátak, Maisur, and Madras were felt for about three years in Kánara. During this famine Kánara relieved about 10,000 famine-stricken people and 3000 cattle from the Bombay Karnátak. These people found employment in Haliyál, Yellápur, and Sirsi in deepening ponds, in repairing roads, and in other public works. The cattle were allowed to graze in the reserved forest. Those who were unable to work were fed at relief kitchens in Haliyál, Mundgod, Yellápur, and Sirsi. In 1876-77 the rainfall was plentiful in June and July but failed almost entirely in the succeeding months, so that, except on the coast where the rice crop was good, crops failed

[1] Colonel Etheridge's Report on the Famines of the Bombay Presidency, 1868.
[2] Colonel W. Peyton, Conservator of Forests S.D.

Chapter IV.
Agriculture.
Bad Seasons.

to some extent, and much distress was felt for want of water. The public health was injured by the influx of famine-stricken people from the Bombay Karnátak to the unhealthy climate of the Kánara forests and many died of cholera and fever. The rupee price of the second sort of rice rose from twenty-eight pounds in 1875-76 to twenty-two in 1876-77. Instead of large exports of cotton and grain, there were grain imports of about 18,000 tons (72,000 *khandis*) to Kárwár and of 18,750 tons (75,000 *khandis*) to Kumta. The general condition of the people was fair, for though the poorer husbandmen suffered to some extent, those on the coast who were better off and whose crops were good, made large profits from the enhanced prices. In 1877-78 rain failed in July and August and was excessively heavy in October. Public health was bad. The rupee price of the second sort of rice rose from twenty-two pounds in 1876-77 to eighteen in 1877-78. The export trade which had almost ceased in 1876-77, revived. In 1878-79, the year of the heaviest recorded rainfall (132·89 inches), the crops were good, but public health suffered severely from excessive moisture. Though the wages of labour showed no change, the effect of the famine was still felt in the price of food grains which, except *náchni* Eleusine corocana, were even dearer than in 1877-78. The rupee price of rice rose from eighteen pounds in 1877-78 to seventeen in 1878-79. In 1879-80 the price fell to twenty pounds.

The crops in some villages are occasionally injured by blights, and by the ravages of rats, insects, and worms. But within the experience of the present generation these losses have never affected the general harvest. In some lowlands near rivers heavy rainfall and a stormy sea sometimes cause floods which greatly damage the crops. In 1831 and again in 1848, owing to tempestuous weather, the Honávar coast lands were flooded with salt water and the crops destroyed.