

have no doubt that in his hands the exhibition will be a thorough success, but we trust that he will not turn grey by the time the exhibition is over.

We commend the exhibition to the patronage of our readers who, we hope, will not only be loyal to their Emperor but to their profession and derive much profit and inspiration from information obtained there first hand from the officers of the department who will all be represented. We should like to take this opportunity to warn our readers against being hypercritical, and to remind them of the multifarious difficulties the organisers have to work under. For one thing the weather may be against them but from what one sees and hears of the preparations, everything spells success, and we heartily wish them the same.

Agriculture in Cochin.*

Cochin State has an area of 1361½ sq. miles (according to the great Trigonometrical survey). It consists of two disconnected tracts—the larger one adjoins the sea-coast and the smaller one-Chittur-is surrounded on all sides by British Territory. It has a coast-line of about 35 miles in length.

The whole of the state can be divided into 3 main divisions—the hills, the plains and the sea-board. The hills which form the eastern portion contain valuable forests yielding good timber and other forest products. Coffee and rubber are grown there.

The plains lie between the hills and the sea-board. They are intersected by many rivers and streams. Here in the plains are

*Extracts from paper read by Mr. I. Ramau Menon, B. A., F. E. S., Dip: Agri: (Cantab), in July 1915 before the College day and Conference.

paddy lands, grazing grounds and mixed gardens. The important rivers are the Ponnani, the Karuvannur, the Chhalakudy and the Alwaye. They are perennial rivers and have a copious supply of water even in the hot weather.

The sea-board is a long and narrow stretch of land lying between the plains and the sea. This is, however, separated from the plains by the backwaters. A good portion of the sea-board is swampy and is subject to floods during the monsoons and to tides from the sea.

The average rainfall varies from 120 to 125 inches per annum and this is distributed from the middle of May to the middle of November. The heaviest rainfall is in June and July. The outlying district of Chittur does not get more than 50 to 60 inches of rain.

The soils in the valleys of the hills are very fertile and contain plenty of organic matter. Some of the best paddy lands are situated in these valleys. The dry lands or 'parambas' are mostly of laterite origin. Good loams occur here and there, but generally soils on laterite rocks become gravelly in character—the inevitable result of heavy rains. In the sea-board clayey soils do occur and these lands are invariably swampy paddy lands.

The total agricultural area of the state is 4,79,975 acres. This extent is classified as follows:—

Wet lands or paddy lands 2·06—2,05,794 acres.

Dry lands 2·74—2,74,181 acres.

Of the latter 1,03,806 are garden lands and 1,70,375 are dry lands. The cultivated land is divided into wet, dry and garden lands.

Paddy lands:—These include the following types. Single crop swampy paddy lands adjoining the backwaters. They are subject to floods and also to tides from the sea. The paddy in this locality stands a certain amount of salt in solution. The success of the crop, however, depends on a steady and copious supply of fresh water brought down by rain or by rivers.

Kole lands:—These are single crop paddy lands. They are cultivated in fresh water lakes from which the water is pumped out by

Persian wheels or power engines. The cultivation begins at the end of December. The harvest is in May. During the monsoons a lot of silt gets deposited in these lakes. The fertility of these soils is thus maintained.

The remaining paddy lands come under one or other of the following types :—Virippu, Mundakan and Puncha.

There are lands in which all the above three crops are raised in the course of the year. A very large extent is, however, double crop—Virippu—Mundakan. Other combinations two at a time are also common.

The first crop in the Malabar year is the Virippu and the first harvest is in August—September. Paddy is sown broadcast in May, soon after the first shower in May. Before the heavy rains the plants attain a height of 10 to 12 inches. Good formers give a liberal supply of a mixture of rotten dung and ashes and green leaves, if available.

Virippu is also transplanted. In this case the stubbles are not ploughed in January. The land will be ploughed only in time for transplanting.

Mundakan is generally transplanted. Puncha is the third crop of the year. This is sown broadcast or transplanted. Cattle manure and green leaves are generally applied to all paddy lands. Green manuring by raising a green crop, application of manures other than cow dung and ashes, improvements in transplanting, prevention of pests are matters in which the Agricultural Department is taking action.

Paddy is the most important cereal grown in the State. Ragi and Millet are also grown. Maize and cholam are not grown on a very large scale.

Among pulses the most important are horse-gram and cow-peas. Pigeon pea is also grown on dry lands along with paddy. Green gram and black gram do not occupy large extents. One notices in Cochin as well as in other parts of the Malabar coast a certain amount of

indifference shown by the ryots towards these pulses and other dry crops. Gingelly is raised on parambas or on paddy lands as a second crop.

Rotations:—The only rotations are—paddy followed by gingelly once in four or five years. Paddy lands on higher levels carry a crop of horse-gram. Paddy in the first year, bannanas in the second followed by vegetables and paddy again is a common rotation.

I now pass on to garden lands and permanent plantations. The important garden products are ginger, pepper, turmeric and other vegetables, tapioca, coconuts and areca nuts. The cultivation of ginger, pepper, turmeric is not carried on in an intensive method. There is considerable room for improvement in this direction. The Agricultural Department is taking necessary steps in this matter.

Coconuts:—The sea-board and the alluvial banks of rivers and backwaters are all studded with coconut palms. Coconuts are flourishing right in the interior also. Cochin produces the finest copra and coconut oil. There is a very large export trade in almost all the important products from the coconut palm; while the number of people engaged in the cultivation of coconuts and in the industries allied to coconut is very large indeed. The ryot does not feel the decreased yield owing to bad cultivation, as he is obtaining better prices for the same quality. Improvements with regard to better manuring and preventive measures against diseases are advocated.

Areca-nut Palms:—These occupy an extent of nearly 15,000 acres in the whole State. In certain localities the cultivation is carried on in a very intensive style. The trade in areca nuts is mostly with the other districts of India. Other crops of importance are ginger, pepper, turmeric, yams, bannanas etc. Tapioca is grown all over the plains with profit. The extent under this crop is gradually increasing. Groundnuts have been introduced and are coming into favour.

Sugar-cane was at one time very largely grown in the State. The cultivation of canes is now reviving. Experiments with Mauritius, Barbadoes, and Coimbatore varieties have been so far successful and

there is no doubt that sugar-cane will become an important crop in the near future. The Agricultural Department proposes to give suitable encouragement to extend the cultivation of this important crop.

Live Stock:—The whole of the West Coast excepting a few localities has been notoriously behind the other districts in the matter of cattle breeding. One comes across with all types of cattle in the country. Moderately good specimens of Nellore, Kathiwar, and cross-breds are seen here and there. The majority of the cattle are, however, mongrel types. Nearly one bullock or buffalo for every 6 acres of agricultural area is found to exist. From an agricultural standpoint the stocking is poor indeed. One disastrous result is that ryots have occasionally to hire animals during the cultivation season. The quality of work turned out is generally poor and the stock of cattle manure must of course be inadequate. Goats are common. Sheep are bred only in a few villages in the outlying Taluk of Chittur.

I have heard it mentioned in certain quarters that west coast is unsuited for cattle-breeding. Cattle brought from other districts are, however, doing very well, even in Mattanchery which has been notorious for unhealthiness.

Implements:—I have noticed that the type of the ordinary country plough varies from district to district. Some of the ploughs are very well adapted to paddy lands. How far the ryot's plough can be replaced is a matter for very careful consideration. It is, no doubt, a difficult matter to lay down any hard and fast rule, especially when we find that the great majority of the ryots are petty farmers and do not farm more than a few acres of land.

Manures and Manuring:—Cattle-dung, ashes and green leaf form the orthodox manures. The quantity applied is however inadequate. Green leaf is getting scarce. Growing a green manuring crop is not generally understood by the people. The advantage of green crop manuring is being demonstrated to the ryots in Government Farms as well as in ryots' holdings. In the coconut tracts fish refuse and

prawnskins are applied to coconut trees. These two substances are available in Cochin in sufficient quantities. Very large quantities are exported to other countries also.

Other substances which could be utilised as manures are the cakes of oil seeds, such as Pungam, Castor, Neem etc. Very large quantities of these oil seeds are sent out of the State. I think it is high time to have some sort of control over the raw-products. Shell-lime is available in sufficient quantities. There are no mineral resources in the State important from an agricultural point of view.

The general economical condition of the Agricultural class is not very encouraging. We have, no doubt, a good many peasant proprietors, but there is also another class of people who have hardly any interest in the initial tilling of the land. A large extent of land is changing hands every year. The cultivating tenant has hardly any capital and it is impossible in the nature of things to invest any money in the shape of manures.

Another feature in the economical side is the indebtedness of the ryot. A good many are in the hands of money lenders who charge very heavy rates of interest. Of late years there has been an unusual increase in wages and consequently the cost of production is greater, while the out-turn is at a minimum.

To better the condition of the Agricultural and Industrial classes, the Durbar introduced Co-operative Credit Societies a year ago. Other ways in which State help is offered are by opening seed depots and by issuing seeds at a small rate of interest and by giving Agricultural advances for such purposes as purchase of cattle, seeds, manures, implements, irrigation applications &c. The rules regarding the issue of agricultural loans are not elastic enough and the result is that the ryot is not enjoying the benefit of the advance offered. Some changes were found necessary and are being considered by the Durbar.

The Agricultural Department and its activities:—An Agricultural Department was organised in the State about half a dozen years

ago. A Central Farm was also opened. A number of experiments was done and the results were published from time to time. Owing to some change of policy the central farm was abolished and Taluk experimental and demonstration farms were opened a year ago.

A scheme for re-organising the Department is under the consideration of the Durbar.

An Agricultural and Industrial Exhibition is being held every year and every endeavour is being made to make the Exhibition as popular and as useful as possible. With a view to encourage improved methods of Agriculture, a few farm prizes have now been offered. The results of the competition will be announced at the time of the forthcoming Exhibition i.e., in next December.

Certain phases of the deltaic agriculture under the Krishna Irrigation System.*

The Krishna Irrigation System extends from Ellore in the north right down to Chinna Ganjam in the south, and from Bezwada to almost within five miles of the sea. Roughly speaking the system commands an area of about one million acres in this tract. The agriculture of this vast area comprises almost exclusively the cultivation of rice. An outline therefore of the main features of this cultivation of paddy in the delta is the purpose of this paper.

Before the introduction of the irrigation system in the early sixties of the last century the whole delta was one open flat dry country of black alluvium or regar loam and was cropped with all the dry crops such as we now see ordinarily raised in black soil tracts. There were of course here and there patches of wet cultivation under tanks which were either rain-fed, or received their supplies from the flood channels diverted from the Krishna. These lands are still known as "mamool" wet though included in the canal system.

*Extracts from paper read by Mr. T. V. Rajagopalachari Dip : Agri. : on 12th July 1915 before the College day and Conference.