

Farming will never be a success unless the farmer  
had more voice in the disposal of  
his produce—P. Morrel.

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A few of Nature's Enigmas in Crop Production.\*

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My claim for bringing this subject before the Agricultural Section of this Congress is based on my intimate contact with land for over a generation and my knowledge of the perplexities, cropping on several occasions gives rise to. My sole object is to obtain a solution for the problems with a view to a correct understanding of the underlying principles for adequate crop production.

2. Most of the crops in the Presidency of Madras, where my sphere of activity lies, are raised in two well marked seasons—the rains and the cold weather, almost corresponding to the *Kharif* and *Rabi* in Northern Provinces. The number of kinds does not exceed 40, though the varieties are legion. Several factors affecting their growth may be stated to be, heat, humidity, wind and rain. It is a familiar cry of the financier that the failure of the monsoon brings on scarcity, if not, famine. This shows the seriousness attending crop production in any one year. One who is interested in the raising of crops ought to be conversant with the conditions above named, and their variation, as obtaining in a particular locality where he wishes to raise crops of his choice.

\* A paper read at the Indian Science Congress in 1925.



3. All land comprised within the limits of this Province may, broadly speaking, be divided into 3—4 relatively well-defined regions.

The long and narrow strip between the Western Ghats and the Arabian sea, which is mostly derived from laterite, is characterised by plants which thrive under very warm and humid conditions. Here the summer is very intense and is associated with the fall, in enormous quantities, of rain, which "not quenches but inebriates". Extreme humidity, very heavy rains, with intermittent spells of bright sunshine favor perennial crops like the coconut, the arecanut and the pepper. Paddy brings joy to the agriculturist only through sufferance of the rain God Varuna. The stately jack, the dwarf pine apple and the coveted mango revel amidst perennial forest conditions. The semi-arid tapioca yields a certain but indifferent food. The delicious banana meets your eyes in every nook and corner.

The second region, which forms the southern portion of the table-land of the Deccan, is identified with its inadequate and uncertain rainfall. High temperatures are the rule, as high as 127° F. being registered in the shade in a few places, resulting in several deaths by sunstroke and heavy infant mortality. Unbearable heat, stillness of the atmosphere, rarity of moisture-loving plants, presence of shortlived vegetation and quick-maturing crops and varieties distinguish this region. Cholan and castor, cotton and tenai, Bengal gram, groundnut and safflower are the favourite crops. The good depth of black soil often untouched by sharp showers keeps the cultivator steadily at work throughout dry weather. Harvest of main crops does not mark the end of the ryot's toil for the year but only indicates a trend in the direction of his activities which find a concrete expression in the culture of cotton and collection of the creamwhite pellets of kappas that keeps millions of spindles and looms in lands distant and near busy going. It is in this tract that the peasant has studied Nature in minutest detail, evolved a type of implements and tools, simple, cheap and most efficient and perfected a system of cultivation and varieties of crops, to the admiration of the modern agricultural scientist and long before the birth of "Dry Farming" in the western states of the central portions of North America. Mark, here the semi-aquatic paddy is absent.

The third region is the region of deltas, i. e., lands at the mouths of several rivers, of which the chief are the Godavari, the Kistna, and the Cauvery. These deltas, formed as they are, by heavy deposits of silt washed down by the rivers from the hills raise abundant paddy crops mostly started with the help of the South West Monsoon but



maturing under the beneficent influence of the North East Monsoon rains. These deltas are dead level plains with little slope and insufficient drainage. The staple crop is paddy which is grown and matures when temperatures are pretty high. Pronounced cold or a distinct fall in temperature kills the plant, as in Godavari where the thrifty ryot would even witness the refreshing waters of the river run down to the sea rather than utilise them for raising a second crop of paddy in December. He deliberately postpones planting to a later day, in January—February, until better weather, locally termed Pyru Gali (South wind), sets in. This wind dries up the land surface quickly and brings vigour to the crops growing, unlike the cold North East winds which had been blowing three months and cease about this time.

Tracts of an intermediate nature are found forming portions of the Circars and parts of the Central and Southern districts. In the former, conditions noted as prevalent on the West Coast exist in a more moderate degree and cropping is done under systems which would, elsewhere, excite ridicule or bring ruin to the cultivator. As instances, may be mentioned the transplanting (dry) of cereals like cumbu, cholam and ragi. and the raising of sweet potato without irrigation. Growing of cotton in summer and in lands which have carried a crop of paddy, to be allowed to mature and to be pulled out before another paddy crop comes on, is an experience, I suppose, new to very many of you present here.

In the latter sub-divisional tract named, dry and wet crops are a fair mixture with other crops, yield of which is assured by a varying supply of water obtainable at low or great depths in the bosom of the earth and occasionally from tanks. Utilisation of such resources however is made for the culture of crops which either require few waterings when raised in summer or the supply of moisture to which, is supplemented by rains which are general during the period of their growth. Crops under this head are groundnut, tobacco, hotweather sorghums, cambodia cotton, sugarcane and certain forms of paddy.

4. In the several tracts referred to, types of crops grown are distinct, such distinctions having arisen as the result of unvaried growth for very many decades under two different sets of conditions, seasonal or cultural. For generations, the environment has been kept scrupulously different, one set from the other and the crops have been raised for such a great length of time that they have come to assume different characters so as to be designated distinct types; may be, one is dry, the other irrigated. The one cannot be and never is cultivated at the same time as or in the same field with, the other.



One is designated a rainy weather crop, a second is termed a dry weather variety, a third is designated a wet land crop while a fourth is associated with dry land alone.

5. The general considerations apart, problems of a purely local nature often arise.

6. It is the unrecorded experience of observant ryots in Madras that there is a definite correlation between the nature and magnitude of fruiting of certain plants and the conditions prevailing in particular periods of the year. For example, any paddy variety planted in June is characterised by undue vegetative growth and comes to maturity only at the sametime as the same variety planted in August. Similarly canes planted in January in certain parts grow for full 14 months while the same varieties mature in 8 to 9 months when planted 3 to 4 months later. But the fruiting capacity of a variety does not show itself when the period of planting to which it is adopted is past. Either this quality beomes suppressed altogether, or the vegetative characters develop at the expense of fruiting, as the result of which the whole crop turns into leaf. Planting or sowing of field crops after a particular date nearer their regular flowering season ends in poor growth or wholesale failure of the crops. Even extra manuring and closer planting do not raise the yield sufficiently higher to compensate for the loss due to late planting. This is well understood by growers. Hence the extreme anxiety of the ryot to plant his crop as early as possible in the season, in order to get maximum grain yields. Experiments with paddy on the Samalkota Farm have confirmed the correctness of this view.

7. Further, the seasons of fruiting are not the same for all kinds of plants. Some flower only in one season, some in the second season and others twice in the year, yet others throughout. The mango and the jack fruit in summer, the orange, in November, certain paddies like Rasangi mature in October, a few like Konamani, in December, yet others like Dalawa, in May. The raintree pods in September and in March. In this part of India at any rate ragi has shown more adaptability so much so that it is grown throughout the year. Maize and Garikasannavari paddy are similarly not confined to any one particular season. Such cosmopolitan character found in certain crops would be welcome in others also.

8. The vegetative characters of plants have received prominent attention at the hands of a few growers and this accounts for the supply of the class of vegetables, known as greens, at all times of the year.



9. A few other observations are the following:—

Kishu, a long term paddy in Japan matured in less than 3 months in the climate of Coimbatore. So also Rasangi paddy, a five months' variety of Godavari became lengthened in its period of growth, while long term konamani and turupu sanna akkulu became short termed. Seeds of Garikasannavari which is a hot weather paddy, do not yield a good crop when sown in the same season a year after. Heavy yields are obtained only when seeds are saved from the crop planted in the main season for this purpose.

In the Vizagapatam District, there are distinct seasonal varieties of ragi, gingelly etc.

In Tinnevely, spiked millet is grown on dry lands in October—November and the variety is noted for its thickness of husk, and is termed a dry land variety. Another variety is raised under irrigation but in dry weather. If this is sown on dry lands it yields no grain. Further the same crops yield very poor returns if at the time of flowering winds are not brisk.

In Bellary, ryots distinguish two classes of sorghums, grain sorghums and sweet sorghums. The latter are raised in cold weather and the dry cold condition of the season seems to have contributed to the development in the sorghums growing in that season, the sweet character not pronounced in the other class of sorghums. In the same way fruits like mangoes and pine apples produced in summer are of superior quality. It is common knowledge that copious waterings or rains turn them sour lowering their quality.

For fodder purpose, cholam and cumbu are sown out of their proper season for grain. Similarly sunnhemp (*Crotalaria juncea*) and Teegapesalu (a *Phaseolus* variety) when intended for green manure purposes are grown in April-May. This is why Gogu (*Hibiscus cannabinus*) is started early in April-May in Vizagapatam after the first mango showers. A longer period ensures more growth which is a desired character in a fibre crop.

10. The several illustrations given above indicate the desire of the ryot to grow his crops at different purposes. He has come to possess the knowledge that there is a definite period at which crops mature at whatever intervals they may be planted. Animal life in the lower orders of creation also seems to suffer from a like defect. It would be well if this learned body would be provoked into thinking of the ways and means of analysing the factors at work so as to enable agriculturists to vary their methods for more varied and increased crop production which is becoming a very acute problem all over the world at the present day.