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DRY FARMING WITH SPECIAL REFERENCE TO PUDUKOTTAI STATE.

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Dry farming as at present understood is the system of farming extensive areas of land purely with the aid of rainfall received in a locality. It mainly consists in the attempt to save all the rainfall of one or more seasons, by different agricultural operations for the use of a crop during its period of growth. In foreign countries where rainfall in some places is not more than 12 inches annually, fair crops have thus been realised by cropping the land every other year.

Under this system great care is taken to keep the land stirred often, even when there is no crop in the field, the objects being, to maintain the soil in good tilth, to make it ever ready to absorb the rain, dew, etc. to the largest extent possible, and at the same time to prevent the evaporation of soil moisture due to atmospheric changes. This method of cultivation in western countries is termed cultivated fallow i. e., laying lands fallow but in a stirred state.

The production of one or more crops without irrigation, in places with 20 inches or less rain, and the cropping in places with an uneven distribution of rainfall, annually amounting to about 30 inches, are considered by some to come under dry farming. The cultivation of *Varagu*, (*Paspalum scrobiculatum*) groundnut, *Cumbu* (*Pennisetum typhoideum*) pure or mixed with red gram, *Ragi*, (*Eleusine corocana*) castor, lablab and sorghum as carried on in the major portion of the Pudukottai State, come under this category. Dry farming also embraces the apportionment of vast areas into suitable blocks, for pastures, or for raising fodder crops and the rearing of live-stock.

For successful dry farming, a clear knowledge of the local conditions i. e., the soil and rainfall, is necessary. A study of the rainfall statistics for Pudukottah, as given below will clearly show that there is no constancy in the amount of rainfall in any month, and the wide variations between years often disappoint the ryots in the pursuit of any definite cropping.

Rainfall at the Pudukottai station from 1921—22 to 1930.

Years.	Total.	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.
1921—22	30·41	6·37	4·29	5 13	5·10	0·42	3·55	0·22	...	...	0·74	3·09	1·10
1922—23.	45·09	1·46	3·91	7·78	5·66	7·88	2·39	10·86	0·18	3 84	...	0·57	0·56
1923—24.	42·46	1·08	0·89	9·54	12·39	0.06	7·58	1·68	...	1·31	0·76	4·60	2·57
1924—25.	35·69	4·72	6·05	5·38	4·06	2·80	1·23	0·69	0·02	2·33	0·32	5·29	2·82
1925—26.	35·53	1·37	5·79	2·28	3·85	10·64	3·24	4·54	0·37	0·27	0·77	0·34	2·07
1926—27.	38·55	0·78	7·08	7·30	7·75	2·39	0·70	1·07	1·78	1·24	2·11	2·87	3·47
1927—28.	26·99	0·27	1·78	3·85	3·57	5·66	1·73	0·75	0·30	0·30	3·28	3·27	...
1928—29.	30·01	4·27	1·01	4·20	3 69	6·33	4·29	0·96	0·11	...	0·95	1·52	2·68
1929—30.	40·47	1·94	2·33	8·77	5·01	5·60	4·72	1·09	0·88	0·41	...	8·40	1·32
1930—31.	49·13	0·96	1·32	3·41	27·82	4·64	1·08	1·01	...	0·02	2·21	3·61	3·55

Total. 374·33 – Annual average 37·43.

It will be seen from the above table that the annual average has increased to 37·43 due to the unusually heavy and sudden precipitations in certain months during the last two years; but the State average works out to 34" per annum for the same decade. Though the average rain-fall received is about 34", due to the peculiar climate and the nature of the soil, 70% of the lands under plough, come under typical dry-farming areas. The major portion of the soil is gravelly ferruginous red loam, full of sand-stones and intercepted here and there with black clayey soil of saline character. The surface is more or less flat, interposed with a few hillocks and rocks. The sun between April and June is unbearably hot and many wells fail to supply water during this period. The climate is usually hot and dry, and the maximum temperature in the summer months rises above 102°F for several days.

"The vagaries of the monsoon" are rather a rule than an exception to this State. Practically an extent of three lakhs of acres out of five lakhs of arable area comes under dry cultivation. The insufficient rainfall during the season (April—June) and the subsequent drought or heavy rains, adversely affect the yield of the dry crops. This freak of the monsoons during the sowing season and afterwards, compels the dry land farmer to be prompt and efficient in his farm operations to ensure a successful harvest.

Principles of dry farming. The principles which underlie dry cultivation are (1) conservation of soil moisture and regulation of its movement in the soil, (2) maintenance of soil fertility, (3) raising of crops suitable to local conditions i. e. with reference to the quantity of moisture available in the soil and the requirements of the crop.

Control of soil moisture. Water is the most important factor in crop production in dry-farming areas. Without moisture in the soil, no crop can be grown anywhere and much less in dry-farming areas. This compels a dry land ryot to pay particular attention to ploughing and preparing the soil to such a tilth as to secure the required amount of moisture. He should therefore see that the maximum amount of water during the rains is absorbed and is preserved in the soil. It is also necessary that the surface soil, thus reduced to a fit condition, is not also washed out by heavy rains or surface drainage. To achieve the objects mentioned above, we should be quite conversant with the several farm operations and their influence on soil water and soil fertility.

Preparation of land and utilisation of soil water. Tillage of the soil is of great importance as a means of absorbing and retaining moisture as much as possible, from the natural sources, for use during the months when the crop-demands are great. The deeper the soil is ploughed and the finer the soil particles rendered, the greater is the depth of loose soil available for retaining large quantity of water for the use of a crop, the surplus also gradually sinking into the layers

below. The shallow depth to which the wooden country plough penetrates, tends to make rain water get into that portion quickly, but the hard layer below does not as quickly absorb it, so that the top ploughed layer becomes slushy and when more rain is received the fertile portion in the surface is sometimes washed off exposing an unfertile layer. Thus a deep and thorough ploughing is essential to prevent surface wash. It should be repeated at least once in three years for successful farming.

Again, the water holding capacity of the soil is increased by raising the quantity of humus in the soil. This decayed organic matter really gives life to the soil and is greatly needed by the soils in this State. It fills up vacant spaces between particles of sandy soil and helps it to hold more moisture. Again, when applied to clayey soils it absorbs rain water quicker and holds it longer in dry weather. It regulates soil aeration, favours root development and hastens the activities of the microorganisms in the soil. Frequent inter-cultivation between crops especially after every rain tends to arrest the growth of weeds and also minimises the loss of moisture and ultimately helps in reaping a better harvest. Even long periods of drought can be tided over, if the cultivators frequently keep the surface soil loose and open, to absorb the available moisture readily. Ryots here, are yet lacking in realising the value of inter-cultivation and of the timely removal of weeds, which as a result of neglect rob the crop of the moisture and the plant food which would otherwise be available for it. These methods are best carried out if the crops are drilled i. e., sown in lines. While big implements and machinery are largely used in farming by the peasants of other countries, our farmers have not reached even a stage when they could use the inter-cultivating implements which need only bullock power. Drill-sowing reduces the seed rate and facilitates the deposition of seeds at required depths to aid uniform growth. Besides, it tends to complete the cultural operations, before the surface soil loses its moisture. The constant stirring of the soil with the bullock hoes between the rows of the crop, enables the farmer to regulate the moisture needs, and thereby get a better crop than under broad cast sowing, when it is not so easy to weed frequently and stir the soil loose with manual labour as often as weather conditions require. It is therefore, necessary that our ryots should change their present methods of sowing and take to drills, bullock hoes, etc. so that they may reduce the cost of production and farm a greater area with less labour. If some careful and enthusiastic ryots are encouraged to follow new methods by awards of prizes or other inducements, such improvement will be quickly taken up by other ryots also and become established in the tract.

The next point to be considered is the maintenance of soil fertility. The continuous renewal of crops year after year from the soil and the

constant tillage operations go to exhaust the plant food in the soil and largely the humus (organic matter). The loss of soil fertility (crop producing power) occurring in nature is so gradual that the depletion of fertility is not realised until the soil begins to give very poor returns. In this State, the *Odayars* are as a rule better cultivators than other classes, and they have realised the value of maintaining the fertility of the soil by manuring. Sheep or cattle may be penned. Judicious quantities of cattle manure or sweepings may be applied. These methods surely increase the organic matter in the soil. Lost fertility can be made good by giving the land temporary rest for some time, when natural agencies bring about decay of organic matter and 'cook' the soil, for later crop production.

By adopting rotation in cropping, the natural productive power of the soil can be also maintained. Rotation means the growing of a given number of crops of different nature, in a regular order, in the same area, to regulate and control the soil fertility. This is done by a balanced removal of plant foods from the different layers in the soil either by cultivating deep rooted crops and shallow rooted ones alternately, in the same field, or exhaustive crops to follow restorative ones. This system often helps the farmer in protecting the crop from pests and diseases and keeping the soil free from weeds. In addition, it also helps even distribution of labour throughout the year. Rotation is a necessity here, since certain crops refuse to yield well after a few seasons.

Selection of suitable crops for dry lands. A crop generally suitable to the place, the cropping season and the local markets is preferred for cultivation; a note on the principal dry land crop in the State will not be out of place here. *Varagu* :—This being the main food crop for the dry land ryot of this State it is extensely cultivated, either pure or mixed with *Cumbu* and groundnut. This crop is at present subject to the attacks of a root parasite locally known as *Kudivirattipoondu*, or *Palli poondu*, (*Striga lutea*) which considerably reduces the outturn. Removing this parasite before it flowers and abandoning for some years the cultivation of cereals like *Varagu* and *Cholam* that are susceptible to the attack, are being advised to arrest the spread of this parasite. It will be a boon to ryots of the State if they could get some strains of *Varagu*, resistant to parasites. *Ground nut*:—This is now being cultivated in all classes of lands dry, wet, and garden, and it extends to 17350 acres. Mauritius nut is the popular variety but it is said to have degenerated in quality and out-turn, perhaps, due to its continued cultivation without rotation and proper manuring. More hollow pods are found in the harvest and the ryots are advised to change the seed and apply a basal dressing of lime to remedy this defect. For late seasons they are recommended to grow bunch varieties which are short-duration ones. The ryots are also

being enlightened on the benefits of using the *H. M. Guntakka* (a modified blade harrow) for harvest, to reduce the cost of cultivation. *Red Gram*:—This is the next important crop and it is usually mixed with *Cumbu* or *Varagu*, and no change in its cultivation is necessary. If the season happens to be late for this crop, other pulses like black and horse gram are recommended.

There are at present 34,000 acres of cultivable waste lands in this State, of which a major portion is suitable for raising plantations like *Senna*, silkcotton, cashew-nut, casuarina etc. As these crops require attention only in their initial stages, and as they are afterwards adapted to dry conditions, efforts are being made to popularise their cultivation here. When the farmer becomes sufficiently conversant with the soil and the seasonal changes in the locality, he may attempt to raise a better crop and try the change. If he finds the change beneficial he can gradually extend the area under a new crop and even tap fresh markets. To be brief, conservation of rain water, prevention of the loss of soil moisture and fertility, go hand in hand in the development of dry farming.

Conditions requisite for their initiation. Though a greater portion of dry fields in this State is not level, but undulating, our ryots carry on cultivation without effecting improvements. While the plants in the elevated portions may suffer for want of moisture those in the lower levels are water-logged and the entire crop consequently results in a poor return. Such defects can be rectified during the slack seasons and fields rendered as level as possible consistent with the drainage. The steep and sloping lands may be divided into small plots under terrace system and the plots suitably bunded and provided with turf vents to prevent erosion. In this State the number of actual cultivators is small in many villages, and of these many have emigrated to obtain a living elsewhere. Those who still cling to their homes, are heavily indebted. Many owners of lands do not live in villages and do not care to consolidate these holdings to the desired extent or adopt improvements. If some enterprising capitalists would reside in villages and demonstrate dry land farming on scientific lines our peasants will follow them. Where extensive areas are available, cultivators and colonists from outside may be attracted to such lands by offering inducements.

THE POULTRY INDUSTRY OF INDIA

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Part I.

India is supposed to be the original home of poultry and it is presumed that the genus *Gallus* originally migrated from India to other parts of the world, although it is difficult at the present time to trace