

“CONSERVATION OF SOIL MOISTURE IN DRY LAND FARMING”

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In tracts where irrigation works are few, either due to the geographical situation of the place or to the want of sufficient finance to undertake major irrigation works—either productive or protective—rainfall is *ipso-facto* the limiting factor in successful crop production. Such tracts as suffer from this initial disability of a geographical disadvantage and handicap, must needs depend on Nature, to send forth her timely showers on parched up lands and crops. To this class, may be assigned the districts of Bellary, Anantapur, Cuddapah and Kurnool—and portions of Guntur and Nellore. The first four districts verily form the ‘Famine zone’ of the Madras Presidency and the scope of this article is to show how best an agrarian calamity can be averted by improving the present agricultural practices and by the application of suitable methods for the conservation of soil moisture.

It has come to pass—as evidenced from the statistics at our disposal—that crop failure as a result of inadequate rainfall, is a matter of common occurrence and a normal crop has been purely an accidental achievement.

In such a tract, therefore, where there are large areas of crops for want of proper supply of water, are limited in growth any improvement in the direction of conserving soil moisture, is a distinct step towards better cropping. One could see in these districts, large areas of uneven and undulating ground—not among waste lands but among cultivated fields. The fields are rarely level; depressions, scours and washes being very common features. There is hardly any possibility of the rain water percolating into the soil to the desired extent, as the lands invariably slope to one or several sides and the little water that is received through scanty rainfall is lost irretrievably through the meandering washes that join the stream below. Loss of soil fertility by repeated scouring and want of optimum soil moisture due to the total wastage of unbundled waters during the rains are the attendant results.

The idea of conserving soil moisture is not new to the ryot of the Ceded districts. The indigenous implements that are in vogue bear a testimony to his early knowledge of agricultural facts. Though serious attempts are not made by him to utilise all the rain water to the best possible advantage we could see here and there several embankments put up along the lower levels of fields. But this after all does not serve the entire purpose, as such bunds only impede the flow of water from the field to the exterior and in a way, stop the speedy

scouring of soil. However, this method is not found to be very satisfactory.

The sources of soil moisture are :— (1) rain, (2) Sub soil water, and (3) atmospheric moisture. Soil moisture is the water held by the soil after the excess of water is drained away. The water acts as a solvent for the plant food present in the soil and conveys it to the roots.

It is a well known fact that a soil on which plants are growing, loses much more water than a bare soil as a considerable quantity of water is lost through transpiration by the plants. Different plants transpire different quantities of water in a given time and the more the number of plants in a plot the more is the loss of water sustained. That is how a thin sown crop gives a better yield in a season of less rainfall than a thick sown crop which fares better in a season of abundant rainfall. It is clear therefore that the first step towards the conservation of soil moisture is to keep the land free from weeds which drain away the soil moisture. Hence the necessity for clean cultivation.

Secondly, it is a popular belief that a soil that is compacted in the surface loses a larger quantity of water by evaporation than a soil kept loose at the surface by tillage. In a consolidated soil, dry winds come in contact with the surface and thereby evaporation of water is expedited. If the surface of the soil is kept under good mulch—the sub-soil water is retained for the use of the crop. The mulch at the top not only arrests the movement of water to the surface, where it would be positively lost by heavy evaporation, but by virtue of its possessing certain hygroscopic properties, absorbs also some moisture from the air. Thus the advantage of a loose mulch at the surface is two-fold. Evidence as regards the advantages of soil mulch, apart from weed destruction, is, however, conflicting.

After a heavy rainfall, one can observe that in many of the fields, rain water is lost to a great extent without its getting into the soil. As most of the lands are uneven and as there are no catches for the water to collect, the water flows rapidly out of the field without its getting absorbed by the lower layers of the soil. If this water is allowed to remain in the field during its flow to a greater length of time, there is some chance for the water to get absorbed by the soil. Thus, if fairly good sized bunds are formed along the contours of the fields, the rain water will be caught in these bunds and will be allowed to flow out gradually. Bunding of sloping lands can help the retention of a large quantity of moisture. These bunds can be formed with a Bund former at negligible cost.

Experiments conducted at the Agricultural Research Station, Hagari, have revealed that banded plots give much better yields than unbanded ones. The results of the "Soil Moisture Experiments"

conducted by the Government Agricultural Chemist at Hagari from the year 1927 to 1934, are conflicting, but some useful data have been collected. In his review of the work done for the last seven years in the conservation of soil moisture, the Agricultural Chemist states among other things that "Bunds are very effective in years of low rainfall, in conserving the water but in years of too much rainfall, the yield was low". Again "deep ploughing once in five years and three years seems to affect the yields such that they vary directly with the rainfall." These observations were made with *Cotton* as the crop.

In regard to the Sorghum crop, (1) "The yields are exceptionally high—in plots where stubbles were removed soon after the harvest of the preceding crop—in years of least rainfall; (2) The bunded plots gave very high yields during the year 1930-31 when there was only 15 inches of rainfall and the yield in this plot was very low in 1933-34 when there was a maximum of 26 inches of rainfall."

One outstanding observation made as a result of these experiments is "deep ploughing once in two years would appear to be the most beneficial one for the yields of cotton, cholam grain and straw and it is not influenced by the amount of rainfall."

Based on the results of the experiments conducted at the Agricultural Research Station, Hagari, in regard to the increased yield obtained in bunded plots and with the knowledge available of soil moisture under dry land farming, it is now proposed to start a number of demonstration plots at a number of centres. The demonstration consists in selecting mostly sloping lands and bunding them into convenient plots along the contours with the Bund former and effecting such other cultural operations as are necessary and comparing the same with a control—which will be entirely in accordance with the existing local practice. This item of demonstration holds great possibilities for the dry land tracts and every attempt will have to be made to take this to a convincing conclusion. The conduct of bunding and ploughing experiments, as a part of the programme of the "Dry Farming Scheme" in the ryots' lands initiated this year at Bellary holds promises fruitful results.

Perhaps—at a future date—when the dreams of Thungabadra project comes true, when the extensive areas of arid waste are superseded by vast sheets of verdure hue, when fodder famine will be a dead letter and an anachronism when Ceded districts wherefrom people migrate for want of work, will be the repository of agricultural labour—bringing in its wake all the wealth and prosperity to many a ryot—when the dry tract of these backward districts is metamorphosed into wet and garden lands—there will not be any more need to tax ourselves with the methods of the conserving soil moisture, but probably we may be faced with a greater and a more menacing problem of draining away excess water to prevent soil alkalinity.