

Variations in Crop Yields

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Introduction: The main aim of all agricultural research workers is focussed on the problem of maximisation of crop production with minimum cost. Evolution of yielding strains, formulation of economical and profitable manurial programmes, utilisation of labour-saving implements, economic use of water for irrigation and tapping to the maximum extent all the available irrigational sources including underground water, have all received their legitimate and proper attention at the hands of agricultural research workers in different parts of the country. Of late a relative study of the merits and demerits of the method of cultivation adopted in different countries has also received their attention. The adoption of the Japanese method of rice cultivation in India is a typical example of this aspect of agricultural research.

Now it is imperative to study the causes that depress the yield of crops inspite of having access to high-yielding strains and all other practical aids and facilities for their proper cultivation. An analysis of the variation of crop yields in different zones will reveal that the main causes for this variation are (i) failure of rains at critical growth-periods of crops, (ii) loss of crops due to pests and diseases and (iii) loss to crops due to weather abnormalities like cyclones, hailstorms, heat waves, frost etc.

Timely Rains: An analysis of the findings of agricultural research workers will reveal the great importance of timely rains in sufficient quantity received in an ideally distributed manner during certain critical growth-phases of the crop. In Australia, data have been collected to prove that half-an inch of extra rainfall at the time of germination of wheat benefits the farmers to the extent of about one million pounds of extra wheat grain.

Cultivation of crops, particularly in rain-fed areas, still remains a gamble with the monsoons. This is due to the failure of rains during critical growth-periods of the crops. The farmers want rains only in small quantities, but at the right time, when their crops are in real need of rains. To explore the possibility as

to how best the needs of the farmers can be met in this direction, the Madras Government propose to launch on a scheme of 'Artificial Rain-making'.

A detailed resume of the various techniques adopted to create artificial rain in different countries is outside the purview of this paper but the techniques include direct spraying of chemicals and dropping of ice crystals in the cloud region, using aircraft and also shooting smokes with various chemicals like silver iodide, calcium chloride, sodium chloride, etc., by using ground furnaces and also by balloon technique. In the experiments to be conducted in Madras State, all the known techniques, with the elimination of aircraft for the time being, are proposed to be tried to study their relative merits under the conditions prevailing in different parts of the State.

Loss to Crops due to Pests and Diseases: The pathologists of the Agricultural Departments in the various States have very effective prophylactic and remedial measures for various pests and diseases. In addition, they have gained a clear conception of the life-history of pests, their host plants, periods of activity and inactivity and so on. Similarly, in the case of diseases too, the origin and nature of damage to crops have been understood clearly. It is now evident that these pests and diseases are influenced considerably by the meteorological factors like temperature, rainfall, humidity, hours of sunshine and wind velocity.

What is now required is an organisation to assess the nature of relationship existing between the meteorological factors and the incidence of pests and diseases on cultivated crops. The Indian deputationists to Japan have stated in their reports that even in such a small country as Japan, there are as many as 276 Agricultural Meteorological observatories. In Japan every Agricultural Farm has a separate staff of at least three Assistants, solely meant for collecting data on the influence of the meteorological factors on the incidence of major pests and diseases on paddy, which is the main crop cultivated throughout the length and breadth of that country. Since data have been collected for nearly three-and-a-half decades, Japan is able to give timely warnings to the paddy growers regarding the onset of epidemics of 'Blast' and 'Stem-Borer', from a knowledge of the existing weather conditions. By getting this advance warning, the farmers are able to take appropriate measures and spray the crop. Such a state of protection to crops and

reduction of their damage by pests and diseases should also exist in every State in India, particularly in Madras State, where the loss to crops due to pests and diseases assumes an alarming proportion in years of adverse weather conditions.

Loss due to weather abnormalities like cyclones, hailstorms, heat waves, frost formation, etc., is not rare in cultivated crops. The coastal areas get periodically cyclonic storms, that cause considerable damage not only to cultivated crops like paddy, cholam, cotton, sugarcane, banana, etc., but also to perennial plantations like coconuts, mangoes, arecanut, etc. During hot summers heat waves and hailstorms are quite common. These weather abnormalities are capable of doing great damage to standing crops. In cold countries frost formation is practically an annual affair and particularly, the wheat growers of the Punjab know what an amount of havoc frost is capable of doing to their main crop of wheat.

It is possible to forecast the occurrence of these weather abnormalities if a network of observatories is maintained in particular localities. To cite a few instances, the observatories at Bombay and Poona were able to give timely warning of the cyclonic storm that struck the Bombay coast in November 1948. By this warning hundreds of lives of fisherman were saved. In addition, the agriculturists in the region had advance intimation of the approaching storm and they too were able to protect their crops to the extent possible. Another instance also may be cited. There is one instrument called 'Grass Minimum Thermometer', used for recording temperature of the air layer in contact with the surface soil. In the Punjab, if the difference between the readings recorded with this instrument on two consecutive days happens to be in the region of 30° to 35° F., immediately the wheat growers are given a warning of frost formation. Then the farmers will take necessary precautions to protect their crops. Even though the harvest of the wheat crop is to be taken up a week later they would immediately take it up on receipt of frost warnings, to get something as yield instead of allowing their entire crop to be completely damaged by frost. Examples like this may be piled up. But one thing is clear, i. e., that it is possible to predict these weather abnormalities, provided an efficient organisation is set up in this direction, in close collaboration with the Indian Meteorological Department. In America there are separate organisations to give warnings for every weather abnormality, including

floods and droughts. Similar organisations should be set up in every State in India also, if the interests of the agriculturists are to be protected properly,

It is thus possible to minimise the damage to crops by timely warnings of the incidence of pests and diseases and onset of weather abnormalities. Further, by enabling the farmers to have some rain at critical growth-phases of their crops, the yields of crops can be appreciably increased. The initial approach to these aspects will be on the sole responsibility of the Government. Based on the experience gained, enlarging the method of approach to give benefit to every cultivator depends on the co-operation from the public. It appears that in Great Britain there are about 4,000-observatories, solely managed by the public. In America the various weather services are mainly run by the public. If the public in India also realise their responsibility and come forward to help the Government, much progress can be expected. Collection of data and dissemination of the various warnings are to be entirely managed by the public, with the technical guidance and help of the Government. In case stimulation of clouds is proved to be a practical proposition every cultivator with an annual income of Rs. 5,000/- and above should come forward to have his own equipment to produce artificial rain. Cultivators with smaller incomes should join together and try to possess such on a Co-operative basis.

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