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Modern Trends in Indian Agriculture

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Rapid advances have been made in the application of scientific principles to Agriculture in our country and there has been large scale modernization of Agriculture in recent years. The food shortage experienced sometime ago was overcome in remarkably quick time and the position is now satisfactory although it warrants no complacency in the face of increasing population and natural calamities like floods and drought. It has been possible to achieve the additional production through increased irrigation facilities, use of manures and fertilizers, improved seeds and improved implements and better plant protection measures. The gap between the researcher and the farmer has considerably narrowed down and the results of research are now quickly conveyed to the farmer through the National Extension Service and Community Development Organization. The innumerable demonstration trials conducted on ryots' fields have carried the results of research to the very doorstep of the farmer who is now showing better appreciation of expert advice.

The use of manures and fertilizers in increased quantities undoubtedly dominates Indian Agriculture as in any other country. Fertilizer production has registered phenomenal increase in the world and newer types of fertilizers are being manufactured. Remarkable improvements have taken place in fertilizer technology and fertilizers are now available in excellent physical condition safe for handling. Our country imported large quantities of such fertilizers and the expansion of fertliser industries in our country capable of meeting the increasing demand of new and improved fertilizers is rapidly taking place. The farmer is now using more and more of these fertilizers especially where there are irrigation facilities, for the research has shown that irrigation agriculture to be successful must be supplemented by liberal amounts of nutrients. New and high grade fertilizers like Urea, Ammonium Sulphate, Nitrate, Ammonium chloride, Ammonium Nitrate, Triplesuper, Hyperphosphate, etc., are popularised. Being concentrated they are required in much smaller amounts and thereby reduce the transport bill. Fertilizer practice has changed considerably. Proper placement of

fertilizers is very well recognized especially in the case of Phospliatic fertilizers. The application of fertilizers through irrigation water is quite new and it is possible to adopt this method with advantage under controlled conditions for horticultural crops. Liquor Ammonia and other fertilizers in poor physical condition, which cannot otherwise be handled satisfactorily, are eminently suited for this purpose. Where employed under controlled conditions this method, is advantageous in that less fertilizers is required, more uniformity in the distribution of fertilizer is achieved and fixation by soil is greatly reduced. Fertilizer mixtures with definite amounts of ingredients for specific crops especially, cash crops are becoming popular. Some fertilizer mixtures are fortified with minor elements in appropriate amounts and in some others insecticides are added allowing no opportunity for pests and diseases.

The research on the assessment of the micronutrient status of Indian soils and their requirements for various crops has not made as much progress, perhaps due to the complexity of the problem and lack of adequate equipment. The micronutrient determination require highly specialised and costly apparatus which only few institutions could afford to have and trained staff in the work. The maintenance of favourable reacation in soil by proper management is essential for the availability of micronutrients and any slight disturbance upsets their nutrition. A satisfctory solution to deal with such a delicate situation appears now possible since the recent discovery of certain organic metal complex compounds known as chelates and chelated compounds. The chelated compounds supply micronutrients and are eminently suited for localised application. In U. S. A. and Britain, the chelated compounds have been successfully used to correct physiological disorders like chlorosis, attributed to trace element deficiency in crops like citrus, garden beans, tomatoes, coffee, etc. on a wide range of soils. These compounds are only now appearing in Indian market and they may prove invaluable in improving the quality of horticultural crops and increasing the yield.

Of all contributions to the advancement of Agriculture the application of Atomic Energy to Agricultural Research is most striking and for-reaching. The radio-active istopes of a large number of elements available as by-products of nuclear reaction are proving to be of greatest value in fertilizer research and plant biochemistry. By using the so-called labelled fertilizers it is possible to obtain answers to problems such as the need for fertilizer. times

of application, amount to be applied and how to apply, in quick time. The advanced techniques such as tracer studies and autoradiography enable us to trace the path and ultimate fate of any particular element in soil or plant material and thereby helps at a better understanding of the complex soil-plant relationship. Investigations on this aspect have advanced very much in some foreign countries and a modest beginning was made about an year or two ago in our country at the Indian Agricultural Research Institute, New Delhi, where preliminary studies with radioactive phosphorus have yielded some useful information on its (P) fixation and availability. As more Research Institutions in the country get the benefit of the material and the technical know-how, the studies can be extended to wide areas and the results will no doubt throw more light on many problems.

It is generally recognized that one of the causes of poor yields in India is due to the poor quality of the seed. By judicious selection and scientific breeding new varieties of crop, of better quantity, more resistant to pest and disease and high yielding, are being continually added to the list. The atomic energy has a useful role to play in this respect also. There are possibilities for producing economic mutants by radiation although it was generally believed that radiation would produce only deleterious effects. For instance in U. S. A. high yielding strains of groundnut and barley, and rust resistant variety of oats, are claimed to have been produced by radiation. In our country the investigations on the radiation effect have made some progress at Bose Institute, Calcutta, and preliminary results are promising. Investigations on the radiation effect on perennial crops like coconut in producing desirable mutant plants is worth pursuing.

Pests and diseases take a heavy toll of crops. Plant protection methods have made good progress and a number of new and more efficient insecticides and fungicides are increasingly used. Weeds are also controlled by weedicides and herbicides.

In any programme of permanent agriculture, conservation of soil is most essential. Due to various causes erosion of rich top soil takes place leaving behind an inert sub-soil. Conservation measures like contour bunding, strip cropping, terracing, afforestation and such other steps are now adopted on a large scale, whenever essential.

The reclamation of saline and alkaline lands has long been attempted by conventional methods like adding soil amendments in the form of gypsum and lime and flooding the land. As a biological approach to the problem, which has hardly received any attention, a beginning can be made by growing plants which remove salinity from the soil and in this respect certain species like Atriplex are very suitable. These species growing in saline areas leave organic matter in the soil, improve the properties of soil and form the nucleus for afforestation which has numerous direct and indirect advantages.

There has been considerable increase in area under irrigation in recent years and more area will be brought under irrigation on the completion of multipurpose reservoirs. The necessity for the economic use of water needs no mention. Losses due to seepage and other causes have to be avoided. Evaporation loss from the surface of the irrigated soils is not taken serious notice of, although in areas like orchards this loss is quite significant especially due to wind in areas unprotected by wind belts. Planting in wide areas of casuarina, sesbania, will greatly arrest wind velocity and minimise evaporation losses. It has been reported from work in other countries that by the use of Ceytel Alcohol, in the form of cakes, the evaporation loss could be reduced considerably. This method can be tried in limited areas in our country.

The progress in the development of improved Agricultural machinery has helped in the mechanization of Agriculture which is clearly noticed. Improved and efficient implements like tractors. bull-dozers, fertilizer drills, etc., are made use for agricultural operations. Modern implements have increased the efficiency and reduced labour requirements.

The loss that occurs during the storage of the crop is next in seriousness to pests and diseases. It is beyond the means of the farmer to have modern storage facilities when he is already over-burdened with increasing indebtedness. In this connection the proposals of the Government of India, to set up in rural areas, during the Second Five Year Plan period, Agricultural Co-operative Societies with sufficient warehouse space and banks to advance loans for meeting immediate agricultural needs, like the purchase of fertilizers and implements, on the security of the prospective crop, will be of invaluable assistance to the farmer. The farmer can keep his produce in safe storage and dispose it when conditions are favourable to him and thus he is protected from the vagaries of market conditions.

Thus it may be seen that much improvement has been achieved in all aspects of Indian Agriculture. But the crop yields are still low compared with advanced countries and there is, therefore, immense scope for further progress. Although the emphasis is shifted to industrial development in the Second Five Year Plan, Agriculture still occupies an important place. In the rapidly expanding economy as a consequence of industrialization there should be an abundance of consumer goods like food and clothing, for any scarcity in them (goods) will result in disastrous inflation. To reach the targets in Agricultural production, namely, 10 million tons or 15% more than the present production for food grains and 25–30% more than the present production for other cash crops, fixed for the 2nd Five Year Plan, it is imperative to strive at the establishment of scientific and improved methods of cultivation throughout the country and we research workers are bound in duty to ceaselessly work for the advancement of Indian Agriculture.