

## RECENT FARM RESEARCH

by  
Dr. M.S. Swaminathan,  
Director, Indian Agricultural Research Institute,  
New Delhi.

The primary stress in the recent research activities of the Indian Agricultural Research Institute is on the standardisation of techniques which would help to maximise output and profits from the existing resources of inputs. It is on the qualitative aspects of input use that the return to the farmer of his investment on seeds, fertilizer and water would depend.. The work done during 1966 at the I.A.R.I. is an index of the pace of progress of such research and the panorama of possibilities now open.

Research on fertilizer and water use has revealed the vast potentialities for increasing the returns from the investments in these two inputs. In rice, it has been shown that the efficiency of utilization of nitrogen and phosphorus can be increased by 100% by broadcasting the phosphate and placing the nitrogenous fertilizer at 5 cms below the surface. Simple changes in the application of phosphorus such as mixing superphosphate with cowdung before application further doubles the extent of utilization of this nutrient. Application of the fertilizer partly through the leaves and partly through the soil leads to a saving of nearly 50% in the quantity for fertilizer needed to produce a specific quantity of output. The application of fertilizers on the basis of soil tests nearly doubles the profitability of this practice. A further increase in the efficiency of use of phosphorus use by plants can be brought about by inoculating seeds of cereals and legumes with micro-organisms.

The immense scope for a better use of water has been demonstrated both in wheat and rice. In wheat, a pre-sowing and pre-harvest irrigation -both not usual practices - have been found to be essential to get the best out of the dwarf variety and fertilizer. Similarly, keeping 2 to 4 cms of water standing in the field throughout the life of the rice plant increases greatly the yield obtained. It is on the basis of such findings that I hold firmly to the view that in rice an additional 10 million tonnes can be produced during 1967 if the existing resources are efficiently used.

The dramatic effect on the yield of a crop plant when a missing nutrient is supplied was clear from the wheat crops raised by the I.A.R.I. this summer in the Nilgiri Hills of Madras State. While in previous years, it was seldom possible to get more than 1 ton per hectare, this year over 3 tonnes per hectare were harvested following the application of adequate quantities of phosphate to the soil. Similarly, the simple technique of growing plants in a ridge-furrow system standardised at the Institute for raising crops in saline soils has opened up new hopes for farming in nearly 5 million hectares in the Punjab and adjoining regions.

Among the new varieties developed during 1966 by the I.A.R.I. and its regional stations, I would like to mention in particular the new dwarf wheat selections S.227, S.307, S.308 and the amber grain mutants of Sonora 64 and Lerma Rajo, several composites and hybrid No. 2385 in maize, the jowar variety S.405 which yielded 5.3 tonnes per hectare in contrast to

5.5 tonnes obtained from the hybrid C.S.H.I, the dwarf bajra variety D.174, which yields 4 tonnes per hectare, the groundnut variety, Asiriya mutwande, a strain originally introduced from Nigeria, and which gives nearly 50 to 100% more yield than the best varieties currently cultivated and the cotton variety PRS.72 which matures in 120 days and which has opened up a rice-cotton rotation in the delta areas of South India. In the case of the composites of maize and dwarf jowar and bajra varieties, the farmer can sow his own seeds. The introduction of dwarf rice varieties like I.R.8, which are photoinsensitive and have a short dormancy period has helped to break the barrier to high rice yields caused by our inability to grow the crop so far under conditions favourable to grain development. The Delhi-Haryana- North Western U.P. region can give very high rice yields during June-October, since the cloudiness of the sky is less in this area, as compared to the monsoon regions of Bengal and South India.

The standardisation of techniques for the exploitation of the water resources in the upper layers of the soils as well as the development of methods for the alleviation of drought are among the other achievements of the year. A new type of tubewell has been devised which leads to great savings in both installation and running costs. The technique promises to be useful for the development of tubewells over a wide area in the Indo-gangetic plains.

While fertilizers, seeds and water have to be applied in appropriate combinations to get high yields, the control of diseases and pests is obviously equally

important. An experiment conducted this year with the hybrid jowar strain CSH.1 showed that in plots given equal applications of fertilizer and water, the yield was 6336 kgs/hectare in material protected against insects and 698 kgs/hect. in these not treated with insecticides. The problem of diseases and pests will assume a magnitude during the next few years which only a few people visualise now. We have had some warning during this year of what is in store in the future. Virus diseases have appeared for the first time in rice; smut and leaf blight diseases became prominent in wheat, a new disease appeared in ragi and several others have been reported in a wide range of plants including the famous grapes of Hyderabad. It is our duty as scientists to warn against the dangers the country will have to face in the next few years, if the quantum of scientific effort needed to anticipate such problems and evolve prior solutions, is not generated immediately.

.....