

The age of alchemy and the genetic  
"FARMERS AND FARMING" destruction of  
by yield barriers.

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A great scientific break-through has recently taken place in increasing the yield potential of the major cereals and millets of India. Geneticists have destroyed the barriers to high yields in wheat, rice, Sorghum, pearl millet and maize. These developments arise from the repatterning of the architecture of these crop plants, so as to make them more efficient in the utilization of sunlight, water and fertilizer. It is unfortunate that due to the drought of the last two years the full impact of these new varieties and hybrids has not yet been felt. An index of the hope they provide for the future is the fact that even under such adverse conditions, several Indian farmers have been able to establish new world records in the yield of wheat and pearl millet. Given a normal season, these new developments in agriculture are likely to have a substantial impact on food production.

New Varieties:

The pace of progress in the exploitation of research results would be clear from the fact that it was only during the winter of 1963 that the Indian Agricultural Research Institute introduced into India the Mexican dwarf wheats. In the winter season of 1966-67, it has been estimated that nearly a million acres of irrigated land had been cultivated with the Mexican dwarf wheat varieties, Lerma Rojo and Sonora 64. There is probably no parallel in the world for such a rapid progress in the assessment, testing, multiplication and spread of new varieties. In wheat, several selections have been made from the material received originally from Mexico which combine high yield with desirable grain appearance and quality. Also, over 10,000 crosses have been made between the Mexican and Indian wheats and there are many new varieties on the breeders' assembly line. Seeds of some of them such as Sona 227, Sonalika, Kalyan 227 and Sharbati Sonora are under large scale multiplication now. In the development of the new varieties, the requirements of multiple cropping

have been kept in view. Thus, Sharbati Sonora is capable of producing as much as 50 quintals per hectare within 120 days. Hence, many farmers have now taken to the cultivation of wheat after rice, potato, cotton and sugarcane.

In rice, the Taiwan variety, Taichung Native-I, is cultivated now in a large area and its high degree of drought resistance proved to be a great blessing in several parts of our country during the last year. Another variety, IR-8, developed at the International Rice Research Institute, The Philippines, has been found in tests carried out all over the country to give 25 per cent more yield than Taichung Native-I. Several Japonica varieties like Tainan 3 and Taichung 65 have also done very well in Kerala and Mysore. ~~These japonica varieties like Tainan 3 and Taichung 65 have also done very well in Kerala and Mysore.~~ These Japonica varieties are highly resistant to bacterial blight and virus diseases. The major drawback with the japonica varieties is the sticky nature of their grains which is not liked by Indian farmers and consumers. This defect is now being corrected and a whole series of new varieties which have a dwarf plant height, and which are efficient in the utilization of sunlight, water and fertilizer will be available from next year onwards. At the Indian Agricultural Research Institute, a fine grain rice variety with the habit of IR-8 is in an advanced state of development. The variety A.D.T.27 developed in <sup>Tamil Nad</sup> ~~Madras State~~ by crossing japonica and indica varieties has helped in improving greatly rice production in the Tanjavur District.

Hybrids of pearl millet, Sorghum and maize have become very popular and the seeds are in great demand. In maize, six new composite varieties have been developed and released this year. Unlike in the case of hybrids, farmers need not buy the seeds of the composites every year but can keep their own seeds. Similarly, high yielding varieties have also been developed in Sorghum and pearl

millet so as to enable wider coverage with high yielding varieties.

The great significance of the high yielding varieties is that they have not only helped to increase the yield and income possibilities of our cereal and millet crops and thereby enabled even a farmer with a small holding to earn a good income, but also that they have become catalysts in initiating a new frontiers' movement in our agriculture and have provided the motivation necessary for the farmer to take to a whole set of new practices. Thus, farmers in the Terai region of Uttar Pradesh organised this year one of the most systematic rat control campaign in the world, in order to avoid damage by rats to their wheat crop.

High yielding varieties of pulses and oilseeds are also under development. An African groundnut variety Asirya mutwande has proved to be very high yielding and last year seeds of this variety were imported from Tanganyika by the National Seeds Corporation. Outstanding varieties of pulses are now in an advanced state of testing in a programme of research initiated in 1966 with the collaboration of the US Department of Agriculture. It is hoped that varieties, agronomic practices and bacterial cultures, which will help to double the average yield of the major pulse crops, would become available next year.

National Demonstrations.

In order to establish close links between scientists and farmers, a National Demonstration programme was started in 1965. Under this programme scientists lay out demonstrations in farmers' fields and show them how to grow the new high yielding varieties. These demonstrations have specific yield targets such as 60 quintals per hectare in the case of rice and 50 quintals per hectare in wheat. The programme has been very successful and during 1967, the Indian Council of Agricultural Research <sup>is organising</sup> ~~proposes to organise~~ 2000 National Demonstrations all over the country on multiple cropping techniques. Each demonstration will aim to grow 2-3 crops and achieve a minimum yield of about 100 quintals per hectare per year. These demonstrations have also helped to establish a feed-back mechanism for transmitting the problems of the farmers to the scientists.

Qualitative aspects of input use :

Recent research is laying stress on the standardisation of techniques which would help to maximise the return to the farmer from his investment on seeds, fertilizer and water. It has been found that even small differences in management practices make a large difference in the yield of high yielding varieties. For example, in wheat the timing of the first irrigation may make as much as 10 quintals per hectare difference in yield, even when the fertilizer dose, the total number of irrigations etc. remain the same. In rice, the depth of transplanting makes a similar difference in the ultimate yield. Hence, farmers need to be informed about the cultural practices they should follow for getting the best return from their investment on inputs and this is being achieved through the exploitation of all mass communication media.

New tools :      Mutations :

\*KHWANA\*  
"13.7.67"