

**HIGH-YIELDING VARIETIES PROGRAMME IN INDIA
PART - I - 1971**

1. The Study

The High Yielding Varieties Programme (HYVP) was the latest of a series of Govt. sponsored programmes directed at the general problems of foodgrains shortage and rural poverty in India. The programme aimed at raising farm productivity and rural earnings. The origin of the High Yielding Varieties Programme (HYVP) can be traced back to the 1959 Report of the Ford Foundation Team on 'India's Food Crisis and Steps To Meet It' and to the efforts of the Rockefeller Foundation in breeding fertilizer-responsive foodgrain varieties for semi-tropical, tropical and monsoon climates. The former resulted in the Intensive Agricultural District Programme (IADP) which attempted to raise farm productivity in well endowed districts by applying a package of inputs consisting mainly of high quality seeds and chemical fertilizers. The programme produced good results. Nevertheless, the programme was not so impressive as to solve the foodgrain shortage in India. The problem was deeply felt during the acute shortage of foodgrains which India experienced in 1965-66 and 1966-67. Reading the exigency of the time, the Union Department of Agriculture, in August 1965, made its pronouncement of a 'New Strategy' of agricultural development; the HYVP was to be its major field programme.

The HYVP was a comprehensive package consisting of agricultural research, irrigation, supply of inputs, (seeds, fertilizers and credit), intensified agricultural extension services, training and supervision. At the field level, it was not a single programme; rather five separate programmes, each designed for a single crop. The crops included paddy, wheat, maize, sorghum (jowar) and millet (Bajra). The distribution of resources between the implementing authorities, State Departments of Agriculture and other agencies was based on the allocation of targets. The programme was incorporated in the Fourth Five Year Plan and was implemented in 1966-67 in selected districts of most of the States. In the years 1967-68, 1968-69 and 1969-70, the Programme Evaluation Organisation carried out three extensive rural surveys to judge the efficacy of the HYVP in infusing resilience to the Indian agriculture. The Study Report, jointly prepared by the PEO and the Australian National University, was brought out in 1971.

2. Objectives

- i) To assess the various measures instituted to administer the HYVP and to provide farmers with adequate and timely supplies of new inputs and, wherever necessary, the credit for purchase of these inputs.
- ii) To take a broad view of the performance of the HYVP in participating villages and on participating farms.

Under these two broad objectives, the following specific objectives were listed for the 1967-68 study.

- a) To assess the spread of the HYVs in different parts of the country and to determine the extent of the spread.
- b) To ascertain the reactions and attitudes of participating cultivators.
- c) To study the problems in the implementation of the programme at different levels of administration, such as State, district, block and village.
- d) To assess the adequacy of the measures contemplated for the production of Seed-Breeders and foundation stock, and arrangements for seed multiplications through the Seed Corporations, State Seed Farms and registered growers.
- e) To examine the methods used to estimate requirements of seeds, fertilizers, pesticides, etc. and the facilities created for adequate and timely distribution of these to cultivators.
- f) To examine the special measures taken to ensure sufficient and timely credit to participating cultivators for the purchase of seeds, fertilizers, etc.
- g) To examine the extent to which extension efforts had been strengthened in the HYVP areas.

The 1968-69 survey retained the same basic objectives with additional emphasis on the programme of research and field trials of the new varieties and the extent to which the farmers adopted the recommended package of inputs and practices. The financial aspects of the HYVP was the main focus of the 1969-70 survey.

3. Sample Size/Criteria for Selection of Sample

States, districts and blocks were selected on the basis of the official targets, while villages and farmers were chosen on the basis of the official lists of participants. The states selected for the 1967-68 survey included those where the selected crop was grown extensively and to which HYVP area targets of 2,50,000 acres had been allocated during the Fourth Plan. In each chosen State, approximately one district was selected for every 50,000 acres targeted for the State by employing the method of systematic sampling with probability proportional to the size of the HYVP target for the crop to be studied. Those States and districts picked up for the 1967-68 study were retained for the subsequent studies as well.

In each selected district, the block with the highest target was selected for the 1967-68 survey. The one with the next to highest target was selected for the 1968-69 survey. Both were retained for the 1969-70 study. A set of three villages was selected in each chosen block for the 1967-68 study and another set of three villages for the 1968-69 study. All the six were retained for the 1969-70 survey. Though the survey design had envisaged a sample of 10 participants from each chosen village which was to be selected through systematic sampling with equal probability of selection from the ranked list. The size of the actual sample, in many cases, fell short of this number for want of adequate number of participants to select the sample from. Moreover, a sample of 5 non-participating farmers was also selected through systematic sampling. The 1969-70 Survey retained all the farmers selected for the preceding two surveys.

4 Reference Period

The 1967-68 and 1968-69 surveys collected data during and for one season only-Paddy, maize, sorghum and millet studies were made in the monsoon (kharif) season and wheat, paddy and sorghum studies were made in the post-monsoon (rabi) season. The 1969-70 survey embraced the entire agricultural year.

Main Findings

Since the sample was small in relation to the coverage of HYVP, drawing wider implications had to be done with caution. Despite this limitation of the study, the collected data remained particularly useful because of the criterion followed for the selection of blocks and districts.

1. In respect of HYV wheat, the official data suggested that its spread went up from over one million acres in 1966-67 to nearly 12 million acres in 1969-70 which further increased to 14.6 million acres in 1970-71. The 1970-71 figure was about 35% of the total wheat area and 70% of the total irrigated wheat area.

2. The sharp increase in wheat output and the area under wheat during the period 1964-65 to 1969-70 (1965-66 and 1966-67 being drought years, the buoyancy confined to the last three years) could only partly be inputed to the HYVP; the other positive influences included higher wheat prices and development measures other than HYVP. The average yield per acre for HYV areas was estimated to be around 787 kgs for 1969-70, which was a little more than double the figure for 1964-65. This finding was conditioned by the untested assumption that the 1964-65 yield had been obtained from those areas sown to local varieties in 1969-70.

3. The participation index for rice estimated from the PEO sample indicated that the adopters of HYVs in kharif showed a decreasing fraction of their total paddy area over the three years surveyed, with a proportion of only 16% in 1969-70. The same showed an increasing trend for the rabi season, the proportion rising to 55% in 1969-70. This was despite the fact that the HYVs were introduced primarily as a kharif crop.

4. The HYV area coverage as given by the estimated participation index of the PEO Survey was low and reached only 8% in 1969-70. However, the official data had given a higher figure of 14% for HYV area coverage in 1969-70. The expectations of the PEO study went in tandem with the official result. No upward trend was discernible during the HYVP years when compared with the base year, 1964-65. The PEO study also showed that there had been considerable inter-district variations in HYVP participation for paddy, that substantial quantities of N fertilizer were applied by HYV adopters for paddy in 1967-68 and that the total output of the crop in 1969-70 was somewhat higher than that in the base year.

5. Despite the broad measure of consistency between the official statistics and the PEO sample results in the case of the hybrid crops i.e millet, maize and sorghum, the official estimate of the HYV area coverage with respect to these crops exceeded those obtained by the P.E.O. using the participation index. The official figures for the proportions of area under HYVs to the total area for millet, maize and sorghum were 10%, 8% and 3% respectively. The corresponding figures emanating from the participation indices of the PEO were 6%, 10% and 2% respectively. These differences could be ascribed to the differences in sample size and the difficulties in attaining precision in official estimates.

6. The total output of millet in 1969-70 was 15% higher than that in the base year, 1964-65. This was due to the greater area coverage and to the increase in average yield during the period. The average yield, in fact, fluctuated widely during the period. The performance of HYVP for this crop did not suggest any significant influence on its yield or output.

7. In respect of maize and sorghum also, the sample evidence suggested that the HYVP exerted no substantial influence whatsoever on their output. The maize output in 1969-70 was well above its base year level whereas the sorghum output did not show an appreciable increase. The average maize yields were lower, but substantial increase in area sown in 1969-70 lifted the level of total output. In the case of sorghum, the average yield decreased and the area sown increased during the period without any impact on increase of total output.

8. The output of the five crops taken together increased by almost 16% during 1964-65 to 1969-70. The increase in the output of wheat during 1967-68 to 1969-70 accounted for 80% of the above increase. The increase in the wheat output might, partly, have been due to increased acreage under wheat. The causality in respect of the remaining 20% output increase in total output contributed by other foodgrains, could not fully be vested with HYVP. Extended crop area and good climate could be other contributory factors. In nutshell, the HYVP left its indelible mark only on wheat, that too within a limited area of India. Its impact on rice, the most important and widely grown cereal was trivial. Same was the fate of the other three hybrid crops.

9. Concealed in this overall bleak scenario, there were localised instances of bright results like the greater success achieved, particularly in Tamil Nadu and

Mysore, for paddy in the rabi season, the steady increases in the proportion of HYV paddy sown in the kharif season in the survey villages of Punjab and Uttar-Pradesh, etc.

6. **Major Suggestions**

The constraints which inhibited the progress of the Programme should be identified within no time and measures to overcome them should urgently be devised.