A NEW TECHNOLOGY FOR DRY LAND FARMING

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The spectacular success of the High-Yielding Varieties Programme in enhancing the yield and income potential of farms with irrigation facilities has generated a mood of optimism in our ability to become self-sufficient in food requirements. At the same time, it has also resulted in the origin of several new socio-economic problems. Among the new problems, the disparity in the relative economic benefits derived from the High yielding varieties by farmers with large holdings and those with small holdings in irrigated areas as well as the growing gap in the income derived by farmers with and without irrigation facilities have aroused wide Government and public concern. The recent budget presented by Shrimati Indira Gandhi aims to convert this concern into an action programme designed to canalise the same tools of science and technology which have brought prosperity to farmers in irrigated areas, to the service of the farmer whose fate is entirely determined by rainfall. Funds have also been provided in the Budget for special schemes for small farmers in irrigated areas and with the growing expansion of agricultural credit, the capacity of the farmer with a small holding to mobilise the inputs necessary for taking advantage of the recent developments in agricultural technology would greatly improve. An immediate enhancement in the productivity of rain-fed areas is not merely a social necessity but is also vital for making the industrial regeneration and upsurge now on the horizon into a reality

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and for avoiding an undue control by weather over our agricultural fortunes. Nearly 84% of the total area of 8 million hectares under cotton is rainfed, the annual rainfall being as low as 25 cm in half this area. 97% of our groundnut crop is raised in unirrigated areas and consequently, the production of groundnut oscillates with the weather. Most of the other oilseeds like Sesame, rape, mustard, linseed and castor as well as all the pulse crops are predominantly cultivated in the dry areas. When a land comes under irrigation, the pulse crop gets displaced and consequently, there has been a steady decline in the per capita availability of pulses during the last 10 years, thereby increasing the incidence of protein malnutrition. The significance of the development of a new technology for dry land farming for eliminating agrarian poverty and unemployment, for stabilizing food production, for banishing malnutrition and for sustaining and accelerating industrial advance is thus obvious.

The earlier efforts in the field of dry land farming were largely restricted to soil and moisture conservation measures. Such steps which could increase yield and income by 10 to 15% failed to exert a catalytic effect on the minds of the farming community and consequently did not catch on. Experience with the High Yielding Varieties Programme has shown that if a striking impact is created on the farmers through a jump of a higher quantum in yield, a small programme can become a mass movement. For example, while the target for 1968-69 under the High-Yielding varieties of wheat was 2.0 million hectares, the actual coverage was over 4.5 million hectares. Thus, what is needed in the unirrigated areas is a

synergistic package of practices which could help to atleast double the best yield obtained now.

Recent research has shown that apart from the limitations imposed by low and uncertain moisture levels, the missing links in elevating and stabilizing yields of rainfed agriculture have been the non-availability of crop varieties of suitable duration and growth rythm, poor plant population, absence of attention to rectifying the defects in soil structure, improper tillage, lack of application of nutrients and plant protection procedures and poor storage and marketing. In addition, problems like fragmentation of holdings and lack of organised supply of inputs made the few steps taken in the past in the field of soil and moisture conservation even less effective than they might have otherwise been. It is based on this experience that a programme for the integrated development of dry land agriculture, employing the same basic strategy as the High-yielding Varieties Programme, namely, capitalising our biological endowments and avoiding climatic and biological hazards, has been formulated by the Union Ministry of Food and Agriculture and for which funds have been provided in the recent budget.

I would like to enumerate briefly the principal components of the new technology. These are: (a) land consolidation and soil conservation, (b) improvements in tillage leading to better soil structure and root penetration, (c) addition of organic matter in the form of plant residues with a view to improving the physical and biological characteristics of the soil, (d) adoption of water-harvesting procedures resulting in storing as much of the precipitation as possible for the use of crops, (e) addition of

plant nutrients through deep placement of fertilisers and foliar feeding, if necessary by air-craft, (f) improving the biological fixation of nitrogen through the use of efficient strains of rhizobia, particularly those which are tolerant to salt and use of pelleted bacterial cultures, (g) the introduction of photo-insensitive and quick maturing crops which are less affected by drought, (h) replacement of a single long duration crop with a series of double and mixed crop rotations from which the farmer can be advised to adopt the one which is most suited to the likely weather pattern during a season and to giving him the maximum income, (i) popularisation of crops like soya bean, high-protein maize, macroni wheat, short-duration varieties of castor and cotton and perennial crops like cashewnut, oil palm and dates which can form the base for small-scale food industries and export earnings, (j) popularisation of grasses like lemon grass, Panicum, Cenchrus and high-protein bajra, and (k) genetic upgrading of the nondescript cattle population by an extensive programme of artificial insemination using superior breeds. While the above would constitute the major ingredients of an immediate action plan, a systematic survey and development of ground water resources should be continued so as to further increase the income potential of agriculture in the dry areas.

For the new strategy of dry-land agriculture to be successful and to secure active farmer participation, the numerous variables involved in such agriculture have to be properly studied and understood. For example, the soil in many of the low-rainfall areas has a highly compacted zone just a few centimeters below the surface which prevents the infiltration and movement of water as well as the proper growth of roots. In such soils, the replacement

of the desi wooden plough with a good iron plough would be of much value. However, if this replacement is to take place, the first requisite is the improvement of the health and stamina of the bullocks. Thus, if in 1971 it is proposed to introduce the practice of deep ploughing in a village, high-protein fodder - bajra and other high quality fodder crops should be introduced in 1970. Human nutrition is equally important and ignoring such interactions has often been the cause of failures of several projects in the past. A book summarising the recent research data on dry-land farming published by the Indian Agricultural Research Institute was released on February 21, 1970 by our President, Shri V.V. Giri. The recent budget which places emphasis on both dry land agriculture and nutrition would help to initiate a new era in our agricultural evolution wherein agricultural development is not merely regarded as a means of achieving food self-sufficiency but is deployed as a powerful instrument of economic growth and rural prosperity.

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