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IMPROVING DRYLAND AGRICULTURE

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India is a very vast country with a great diversity of natural endowments such as soils, climate, ecological regions, flora and fauna. When we review the growth in food grain production from the planned era of development, it is clear that Indian agriculture is progressively moving up in spite of troughs in food grain production in some years. This has been largely due to the massive application of science and technology in the field of agriculture jointly by the Government and our farmers. This has helped in the transformation of Indian agriculture from a subsistence farming into a commercial one leading to self. Sufficiency in food grain production. The growth trend indicates a good deal of improvement in our capacity to withstand the effect of the fluctuations of weather on food production.

Our agricultural growth has two dimensions-horizontal and vertical. During the early phase, efforts were made to enhance production by increasing the area under cultivation. It increased from 119 million hectares in 1950-51 to 143 million hectares in 1984-85. We can increase this area to 150 million hectares by the tum of the century.

The vertical growth in productivity was made possible through the use of improved seeds, increased use of irrigation water, chemical fertilizers, plant protection chemicals and efficient management of these resources. The net area under irrigation increased from about 21 million hectares in 1950,51 to 39 million hectares in 1980-81, and we expect to achieve a target of 87 million hectares by 2000 AD when the full potential is expected to be realized. The fertilizer nutrient consumption increased from a paltry 0.1 million tonnes in 1950-51 to 7.8 million tonnes in 1983-84.

Our future challenges are great. Our food grain requirement for a projected population of about a billion by the turn of the century has been estimated at 225 million tonnes. Our demands on other agricultural products and raw materials such as fibre, fodder, fuel and timber would be tremendous. Keeping these challenges in view, the Prime Minister has called for a critical review of our land-use policy and a substantial increase in agricultural production.

Dryland Agriculture

To realize the projected demands of food grains and the other items of basic need, productivity increase in agriculture should be achieved in both irrigated lands and drylands. I have no doubt that increasing focus on the irrigated command area development programmers in the coming years for efficient use of irrigation water and arresting water-logging and salinization will go a long way in increasing productivity from the irrigated areas and in providing a cushion against troughs in production.

The rainfed dryland areas lie mostly in the central and western parts of the country between latitudes 12^0 and 28^0North, bounded longitudinally by a line passing through Deher Dun and Hyderabad in the east and in the west by the national borders and the Western Ghats. Nearly all the districts in this region have less than 25% irrigated land and most have less than 10%. The mean annual rainfall varies from 350 to 1,400 mm and approximately the regions having low, medium and high rainfall constitute one-third each of the cultivated area.

At present, drylands contribute up to 45% of the cereals and 75% of the oilseeds and pulses to the total production in the country. Yet, the yields are very low and are characterized by wide seasonal fluctuations. Periodic droughts, flash floods, soil erosion, poor quality of drinking water, malnutrition, low income and unemployment are characteristic features of the drylands.

To provide the research back-up for increasing the productivity of crops from drylands and to improve the quality of life in the rural areas, the ICAR initiated in 1970 the All-India Co-ordinated Research Project for Dryland Agriculture with the assistance of the Canada International Development Agency.

The project primarily aimed at identifying the means to increasing and stabilizing crop production in the drylands of India. To achieve this goal, the following three objectives were set out:

1. To identify simple and easily implementable practices for increasing the productivity of drylands least by 100% in the farmers' fields.
2. To find out means to decrease the fluctuation in yield due to the vicissitudes of weather.
3. To conserve and optimize the rational use of natural resources, land and water (rainfall), at the farmer's level.

The research efforts by the project have already generated information on the first two objectives mentioned above. I am happy to note that the present emphasis is in refining the available crop production techniques and properly utilizing the natural resources and the improved technology on a watershed basis.

It is very satisfying to know that through the sustained research efforts of this project, the ICRISAT and other research institutions in the country, it has been demonstrated that the drylands are capable of producing 150 to 300% of the present level of production.

About 3,250 trials conducted by the Dryland Project on the farmers' fields during 1976-80 show that improved land management alone increased yield to the tune of 15%. The use of improved seed increased yield by 40% while moderate levels of fertilizers alone increased yields by 50%. But what is very important is synergism. A judicious combination of these three factors have indicated a 135% increase in yield over different seasons, crops and situations. Seed is a very important catalyst in programmer, and all-out efforts are being made by the Government to supply the needed seeds of high-yieiding varieties and hybrids to the farmers. A similar effort is also being made to promote fertilizer use in the dryland agriculture.

Dryland crops depend on rains for water. These lands are generally slopy and shallow and hold less water. Among the constraints that affect production in drylands, the important ones are (i) Environment, (ii) Resource management, (iii) Limitations of draft power, (iv) Transfer of technology, and (v) Availability of credit and marketing facilities.

(i) **Environment.** It broadly includes the climate and soil factors. Efficient crops and cropping systems have been identified by the project and its co-operating centres. Efficient intercropping and even double cropping systems are also identified for different agro-climatic regions in the country. These have been tested by researchers on real farm situations in association with the extension agencies and

found very efficient. But in the real farm situations we have been witnessing changes in the crops and cropping patterns. About 8.7 lakhs of medium to shallow black soils sown earlier with sorghum have now come under sunflower in Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu. Another 10 lakh hectares of medium to black soils, particularly of Madhya Pradesh, have gone to soybean from either kharif fallows or crops like sorghum. New areas are coming under pigeon pea (red gram), replacing sorghum. Today, these changes constitute a small percentage of the total cropped areas. But over the years, it might become phenomenal. All this is happening more out of economic considerations and labour problems. While the Government would make efforts to provide incentive prices to coarse grains as well as to other dryland crops, the researchers should intensify their efforts to develop a technology to diversify farming and stabilize production. What is very important is to provide several alternatives to the farmer so that he can have a choice, keeping his various requirements in view, as well as the risk involved due to weather aberrations.

(ii) **Resource management.** Farmers in the dryland areas are very poor and cannot afford to make capital investment on soil and water conservation. Investigations of the Dryland Project indicate that with an investment of about Rs 4,000 to 5,000 per hectare some permanent improvements in land treatment and on-farm water harvesting can be made on a watershed basis.

In order to extend the benefits of the improved dry-farming technology on larger operational areas, the Union Ministry of Agriculture has identified 5,000 watersheds. Successful implementation of these programmes demands a cadre of professionals who can conceive, plan and implement the development of land and water resources in rainfed areas. The commitment of the State Governments and institutional agencies is equally important. The ICAR will provide the expertise to this programme and meet the training requirements by strengthening the Central Soil and Water Conservation Research and Training Institute and its regional stations. It is in this context I feel that the upgradation of this project as a Central Institute is timely.

In the Seventh Plan, the Government intends to provide through a Technological Mission better weather-forecasting service and management strategy in dry-farming districts, This would demand closer operational linkages between Indian Meteorology Department,

Department of Space, Department of Agriculture, Department of Rural Development, the ICAR and agricultural universities.

(iii) **Limitations of draft power.** In dry-farming areas there is a general constraint in the availability of adequate farm power, The average farm power availability in the country is estimated as 0.31 hp/ha from animal sources. Where mechanization has not spread, the availability of farm power is around 0.4 hp/ha. On the other hand the desired farm power requirement is estimated as I ph/ha. Since the dryland farmers have to depend mainly on human and bullock power, the wide gap in the requirement and availability is obvious. This factor is mainly responsible for the majority of the dryland farmers being not in a position to adopt timely sowing and placement of seed and fertilizer in the moist zone essential for optimum plant population and to ensure weed-fee crop stand through intercultural operations. The yield increase by adoption of these agronomic practices would be more than additive. The advantage of timely sowing alone has been estimated to the tune of 25% increase in yield.

In the regions where we have been able to achieve high production, the increase has been associated with the supplementation of traditional farm power sources with electro-mechanical sources like tractors, power tillers and electric motors, along with matching implements for critical operations. In the dry-farming areas, where farm operations have to be carried out in time under severe field conditions, still more efforts have to be made to supplement the farm power needs with electro-mechanical power sources. Since a vast majority of the farmers are small and marginal, they have to be served on custom hire-service basis. The State Department of Agriculture, Agro-Industries Corporation, Co-operatives and private agro-service centres have a great role to play in this direction.

(iv) **Transfer of technology.** Effective communication of the improved technology calls for an aggressive extension system. I am glad that the potentials of the improved technology are demonstrated by the scientists themselves, away from the research stations, in farmers' fields through National Demonstrations, Operational Research Projects and Lab-to-Land Programmes. The Teachers Training Centre and the Krishi Vigyan Kendras have to play a leading role in the dissemination of improved technologies to the extension functionaries and the farmers.

The Project work indicates that by training the farmers though the concept of 'learning while doing' there could by yield increases up to 100%, and still greater increases can be obtained with 'spot guidance' during the crop season. The Training and Visit Extension System will have to be geared for this task, particularly for meeting the training needs of small and marginal farmers.

(v) **Availability of credit and marketing facilities.** We cannot afford to leave our farmers resigned to the belief that once poor, ever poor. With adequate credit support, a vast majority of our frames could be economically uplifted with gainful employment prospects by adopting improved agricultural technology.

Conclusion

Although mobilization of credit to farmers has taken a fillip in the recent past, the institutional credit support to dryland farmers is far from adequate. The importance of this service through banking institutions and co-operatives need hardly be over-emphasized in the context of the poor resource base of the dryland farmer and the risk involved in dryland farming. Improve in credit support to the dryland farmers could be thought of by measures such as differential lending rates, conversion of short-term loans to medium-term loans in contingent situations, a mix of lending components in kind and cash for custom service, etc. In fact the whole structure of credit and input supply and marketing should be geared and reoriented to the best advantage of the poor dryland farmers so that they can soon usher in a green revolution in the brown drylands.

References

www.crida.org.in

www.icar.org.in

Principles of Agronomy by Reddy & Reddy

www.fao.org.in

www.manage.in