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SWAMINATHAN K.S.

Our Agricultural Future.
• Our agricultural progress since independence has been characterized by a relative stagflation of agricultural growth, the next 30 years marked by a sustained development of modernization of land and labour based on the introduction of packages of technology, seeds, etc. The beginning of the eighties gave rise to the development of in our agriculture, viz., the creation of the organised sector. Farmers organised to agitate for issues like exploitative marketing facilities and fertilizer distribution. These are but a few of the many other factors which also merit consideration. We consider these above five more important from the point of view, the following five factors:

(a) The impact of population on the size of the land holding as well as on the productivity per day and per unit of land and water.

(b) The social engineering aspects of the efficiency of management of small farms as measured by productivity per day and per unit of land and water.

(c) Diversification of labour use leading to a gradual withdrawal of as many landless labour families as possible from the routine operations of farming to subsidiary occupations leading to increased earning and less drudgery;

(d) Safeguarding the renewable nature of agricultural operations by protecting the soil and water and conserving genetic variability in plants and animals;

(e) Enlarging home and external trade in agricultural commodities on lines which will protect the interests of producers and consumers.

(c) (i) The size of holdings

Projections made in the Planning Commission for the next 50 years from now-on are about 1231 or 1775 million. It is now planned for improving female literacy, economic emancipation of women and for widespread voluntary adoption of the small family norm, it should be possible to contain the population size at 1231 million in AD 2030-31. We will then need to produce 955 million tonnes of foodgrains to meet a per capita requirement of 225 kg per year. It should not be difficult to produce this quantity of foodgrains, since we are now reaping the benefit of only about 25 to 30 per cent of the production potential available even at current levels of technology.

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The age structure of our population is such that a large number of young people will need opportunities for gainful employment. Currently we are a nation consisting predominantly of young persons but the dependency ratio will gradually decline (Table 1). In other words, we should strive to avoid not only famines of food, but also famines of jobs. Without jobs the purchasing power needed for buying food will not exist. Being a large country, we should also be prepared for local disasters arising from natural calamities. Agricultural strategies should hence aim at elevating and stabilising food production and generating opportunities for gainful employment.

Size of operational holdings

The rapid growth in population resulting in increasing fragmentation of holdings is making the size of operational units smaller and smaller. The size of an operational holding has now reached about one hectare in States like Uttar Pradesh and Bihar. Therefore, the number of families which have to make a contribution for achieving a specific production target is increasing. The size of the landless labour population is also growing. While in a State like Punjab, foodgrain production increased between 1960-61 and 1976-79 by 8.01 per cent per year, this growth was only 1.19 per cent in Orissa. The annual growth rate for total agricultural production for Punjab during the period 1952-53 to 1969-70 was 6.6 per cent as against 0.7 per cent for Bihar. Minimising regional disparities and extending the benefits of new technology to all classes of farmers, therefore, become areas of priority concern.

Another major issue facing us now is the whole area of land reform and agrarian structure. Land reform has so far been mainly looked at from the point of land ownership, land ceiling and security of tenure. For enabling small and marginal farmers to produce more, land reform will have to be given an ownership-comm-production-interpretation covering steps which will facilitate the more efficient use of land. For example, without land consolidation and levelling, it is difficult to make best use of the benefits which farmers derive from our investments in technology. Hence land reform in our country should include steps not only relating to the distribution of available land resources among all sections of the rural community but also measures such as consolidation of holdings, land levelling and soil health care which are essential for sustained agricultural productivity. Land ownership and land productivity should both become integral components of the reform measures.

An important constraint under conditions of small holdings with individual land ownership is the difficulty of achieving a high level of farm management efficiency. For example, if two neighbouring farmers adopt totally divergent approaches in the field of pest control, the farmer who wishes to achieve high levels of production may have to resort to a larger number of sprays of pesticides than would otherwise have been necessary. Hence a challenge to development planners and administrators dealing with small farm conditions lies in introducing suitable packages of services which can help to introduce a community/area approach in management wherever this is necessary. Extension strategies should be re-oriented to promote collective endeavour among farmers living in a watershed or command area in fields like water conservation and use, plant protection and post-harvest technology. This will call for greater efforts in the field of social engineering as applied to the promotion of community action.

For optimum efficiency, a blend of cash and non-cash inputs will be necessary. Area based services are best provided by farmers' own organisations supported by appropriate training, credit and marketing assistance from Government. The organisation of community nurseries in crops like rice where transplanting is done, the introduction of rotational distribution of water in the command areas of irrigation projects so that all farmers in the command area get equal quantities of water and the supply of credit and the needed inputs before the sowing season in properly organised credit-input supply village fairs are examples of the approaches which have been found useful.

Learning from successes is equally important in programme formulation. If Punjab made striking advances in crop production after the release of dwarf varieties of wheat and rice, this is because the State already possessed the substrate requirements essential for new technology to find widespread adoption. Four of the major technology diffusion substrate needs which Punjab possessed in mid-sixties were: owner cultivation, land consolidation, rural communication and rural electrification. Roads and energy supply are exceedingly important inputs.
Also paddy straw being poor nutritive quality could not support a profitable subsidiary occupation like dairying. Today we can substitute the staple will not get a high price in contrast to commercial crops. Also paddy and prosperity go together. This is because of the following factors:

(a) Post-harvest technology designed to produce value-added products in the village;

(b) Institutional devices for helping small farmers and artisans like the organisation of Horticultural Estates, Aquaculture Estates, etc. which can help to generate additional employment and to promote producer-oriented marketing; and

(c) Careful assessment of the additional opportunities available for promoting cottage and village industries.

I would like to cite an example as to how we can bring about a radical change from past notions. There is an old saying with a new one, viz. “paddy and prosperity go together”. This is because paddy being a basic staple will not get a high price in contrast to commercial crops. Also paddy straw being poor in nutritive quality could not support a profitable subsidiary occupation like dairying. Today we can substitute the old saying with a new one, viz. “paddy and prosperity go together”. This is because of the following factors:

(i) Paddy yield can be doubled or trebled by using improved technology;

(ii) Paddy straw can be suitably fortified with urea and molasses and made into a complete food for animals. Such fortified and chemically treated straw could be used in small-scale dairy enterprises based on high yielding cross-bred cows;

(iii) Rice bran oil can be extracted and de-oiled bran can be fortified and utilised as animal feed; there is at present a large gap both between the potential and the actual quantities of rice bran used for oil extraction and between the quantities used for extraction of edible grade bran oil and the total quantities used for oil extraction;

(iv) Solar grade silicon could be extracted from rice husk and used for the manufacture of photovoltaic cells. Also, rice husk can be used for manufacurance of cement and generation.

In other words, rice-based farms become catalysts of change in rural areas. Based on careful techno-economic studies, Estates based on rice farming could be organised in areas where the dominant crop is rice. A similar exercise can be done in other crops. What we now produce is just not 133 million tonnes of foodgrains but about 400 million tonnes of total dry matter. Are we using the remaining 270 million tonnes of plant material properly?

The two immediate requirements for enhancing agricultural incomes are: first, organisation of small farmers both for improving farm management efficiency through community action in water and soil conservation and management, post control and post-harvest technology and for ensuring that the producer gets a high proportion of the price paid by the consumer; secondly, a well-planned programme of diversification of employment and income generation opportunities in rural areas so that a part of the farm labour can get absorbed in the secondary and tertiary sectors. This will call for a more detailed planning of the scientific utilisation of local resources.

Protecting renewable base of agriculture

In the ultimate analyses, our agricultural future will depend upon how fast and how well we are able to protect the renewable base of land and water-based professions. Today agriculture provides 40% of the national income and over 70% of jobs, only at the cost of about 10% of the total commercial energy use. The growing threats to our agriculture arising from deforestation, soil erosion, siltation of rivers and reservoirs, salinization and other forms of desertification are well known. Generosity has also to be guarded against, since it will lead to our losing the fruits of thousands of years of natural and human selection. In every developmental project, we must have a monitoring mechanism which will provide us with continuous information both on their positive and negative impact. For example, in irrigation projects we can measure the positive impact in terms of additional production per units of water, land and time and additional income and employment generated. There is no purpose in just giving figures on area under irrigation, without accusing us of neglecting other rehabilitation, siltation and erosion. The public health aspects should also receive equal attention, since there is growing evidence that irrigation projects could also lead to the spread of vector borne diseases like filaria.

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and malaria. Other health problems like skeletal fluorosis observed in the Nagarjunasagar project area also arise. Climate impact studies of irrigation projects will need careful monitoring. This is why ecological security will have to be an integral part of a national food security system.

**Enlarging trade in agricultural commodities**

In view of the low consumption base in the country, we find that ever small increases or drops in production causes either gluts or uncomfortable shortages necessitating imports. Fall in prices generally harms only the producer since the extent of deep in prices when the crops are good generally tends to be higher at the level of the producer. In contrast, retail prices have the tendency and form of lane fertilizers to the farmer is remunerative and assured. To higher at the level of the producer. In contrast, retail prices have the tendency to move up. The best fertilizer to the farmer is remunerative and assured. Marketing. For marginal farmers, the most profitable form of land use will be the cultivation of vegetables: flowers and fruits. Horticultural products being perishable require greater marketing and processing support. This is why a Committee appointed by the Ministry of Agriculture recommended the establishment of a National Horticultural Board and the promotion of production, processing and marketing on cooperative lines.

We have to increase both production and consumption. Input-output pricing policies have to be tailored to achieve this dual aim. When agriculture moves forward, more and more farmers will have commodities to sell. Small and marginal farmers will, however, have only small quantities for the market. Hence produce-oriented marketing becomes essential for ensuring them a fair return. The Rural Godown Scheme of the Ministry of Rural Reconstruction was designed for this purpose. Its implementation needs improvement, since a national grid of rural godowns can help to prevent distress sale by farmers and panic purchase by affluent consumers.

Unless agriculture becomes a commercial activity, rural stagnation will continue. We need more influx of brain and money in rural India. We should hence capitalise upon our competitive advantages. The Sixth Plan provides for the stepped up of the export of agricultural commodities. Security of supply, quality of product and competitiveness of price will determine whether we can succeed on capitalising on our considerable "green power".

The year 1982 has been designated as a year of national productivity drive in agriculture, industry and infrastructural facilities like transport, ports, etc. Fortunately the gap between the computed and actual productivity is high in most activities. For giving meaning and content to the productivity movement, it will be necessary to identify the precise constraints responsible for the gap. For example, in the field of irrigation where we are wisely making a major investment, it is essential that the physical engineering features of the project and agricultural development are closely linked right from the planning stage. Studies by the Second Irrigation Commission (1972) and the National Commission on Agriculture (1976) have shown that the following are some of the major deficiencies in the major and medium irrigation projects:

1. Need for modernisation of the pre-plan and early planning to provide water at the outlet delivery points to farmers at the right time and in right quantity.
2. Lack of adequate drainage resulting in waterlogging conditions due to excess water used in irrigating crops as well as due to soil factors.
3. The absence of a distribution system within the outlet and the non-introduction of rotational distribution of water to the farmers.
4. Inadequate attention to land consolidation, levelling and all other aspects which can promote an integrated farm management of water.
5. Lack of anticipatory research on optimum water use particularly in black soils with considerable moisture retention capacity.
7. Poor co-ordination between the concerned organisations in the command areas.

If we attend to the numerous small projects implementation which contribute to productivity, we should be able to increase production substantially even from the available irrigated area. For example, the farmers of unirrigated shed area and the pool should work together to become a joint venture will largely deep can impact the stages of project so the confines of