

Some Insights Into Agriculture Development Today

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Indian agriculture, once stagnant, has now entered a dynamic phase. The simple, self-contained family pursuit is thus enormously externalized. As such, the backward and forward linkages happen to be very strategic. But, these linkages form only the "necessary conditions" for development.

Agriculture is serving today two eminently important purposes -- creating wealth and providing livelihoods. The farming community, too, has evolved into two distinct entities – a small segment of out-going, venture-some and enterprising farmers capitalizing the emerging opportunities, and a large majority of inward-looking, resource-poor and conformist farmers just seeking security of livelihoods. While the first group is able to quickly avail the economic incentives provided, the latter seems to be groping in a confused world to find a direction to their efforts.

Development in agriculture becomes a reality, in a substantive measure, only when the bottom segment of the farmers become capable of availing the economic opportunities. The capacity building of this vast majority alone will amount to creating the "sufficient conditions" for development. Till then, agriculture development would remain a stunted process.

Recently, I had an opportunity to sit through the deliberations arranged to present the latest Karnataka Development Report to the Deputy Chairman of the Planning Commission. Several senior scientists and administrators, including a former Minister for Education, who help and guide the development ventures in the State, participated. The Deputy Chairman took an active interest in the discussions.

This Report attempts to review all aspects of development in the past two decades, and highlights the strategic adjustments required in the future. It consists of 18 Chapters, organized into five Volumes, namely (1) Dynamics of Growth and Development, (2) Drivers of Development, (3) Social Dimensions of the Development Process, (4) Sectoral Perceptions for Development, and (5) Vision for the Future.

The speakers, making presentations on different aspects of development in the State, frequently referred to the importance of agricultural sector, stressing the necessity of a 4 percent growth rate in agriculture for ensuring the desired 8 percent growth in GDP. Among the major constraints besetting agriculture, repeated mention was made of the declining agricultural productivity, instability in dryland farming and persisting rural poverty.

My interest was primarily in agriculture. As such, I managed to secure a copy of the Volume IV, which contains Chapter 14, on "Agricultural and Allied Sectors: Need for Re-Engineering." I was keen to see the thrust of the Report in terms of the development constraints identified, and the measures indicated to address them.

The Chapter is indeed a product of an extensive effort. It makes some wide-ranging observations, based on some implicit assumptions. An important point that gets recognized early in the Report is that the share of agriculture in the GDP is steeply declining, while the rural population remains high, and the rural incomes remain low. But, it is also noted that agriculture in Karnataka has made some tangible progress, even in the face of several formidable limitations. For instance, the proportion of the irrigated area remains small. A vast proportion of farming in the State is conducted under rainfed conditions, the annual rainfall often remaining inadequate or ill distributed. The utilization of the new technologies, which are mostly suitable for favourable farming situations, is substantial but not adequate. The infra structure facilities required for a market-oriented agriculture, which is a growing trend, have yet to become adequate. The research and extension systems have not kept pace with the dynamics of the sector.

As adjustments that are warranted for supporting the agriculture development process, certain measures are emphasized in the Report. Enhancing capital formation, and public and private investments are most prominently indicated. Rapid development of the infrastructure facilities receives an enormous stress. The need for re-gearing the research and extension systems, both public and private, is pointed out. The Report puts its faith, illustratively, on the emerging high value production ventures like dryland horticulture, floriculture and sericulture, as well as IT and BT.

It was evident that these proposals are based on certain overall observations, analyses and conclusions pertaining to the agriculture sector in Karnataka. They are intended to strengthen the development base and process, in terms of backward and forward linkages. The underlying rationale, clearly, is that these are the pre-requisites, as farming becomes increasingly externalized and gets integrated with the larger economy.

At this point, I realized that the focus here is basically on the “necessary conditions,” as linkages, to facilitate an efficient process of development, based on the macro level perceptions. It also occurred to me that if due attention is devoted to the “sufficient conditions” as well, derived from the micro level perceptions, the development process would become enormously more adequate and effective. The foregoing are some aspects of the micro world of the farm population.

In this paper, **the focus is deliberately placed on dryland farming**. Not that irrigated farming is less important. It is, in fact, a more productive segment in the farm sector, though it remains small in size and suffers some in-efficiencies. But, dryland farming is not only a larger part of the sector, but also serves as a means of livelihood for a huge majority of the population. This apart, the incidence of poverty is more stark and wide-spread, here. More over, even a marginal productivity improvement in dryland farming will amount not only to a big rise in the sectoral output but also means a betterment in the life of rural people. Further, when dryland farming moves forward, irrigated farming will not lag behind.

Some salient micro perceptions

The farming goals are changing. In the country as a whole, the farming system is changing in many ways. This is basically for the reason that the very purpose of farming is in transition, over the years. Farming is no more a pursuit for subsistence. There has been a vast transformation, arising from both the development initiatives, and the autonomous trends. This change is taking place in discernible phases.

The occupation in the past was mostly in the form of **family farming**. It was entirely a self-contained system, with the seed coming from the previous harvest, manure from the farm wastes, and labour from the joint family, while the produce was meant primarily for the family consumption. The occasional surpluses, caused by favourable seasonal conditions, were saved for a lean year. Then, faced with an enormous food deficit, in the early years of Freedom, the country had to move into **surplus farming**, making use of the Green Revolution technologies. Here, in addition to some of the modern farm practices, production inputs like seed and fertilizers also came from outside the farms. At this stage, surpluses entering the market did not create any price slumps, since the supply most often remained below the effective demand.

During this period, rural society was also moving away from barter economy into money economy, as the system of village services and rural artisans began decaying. As such, all farmers, big and small, started taking to some kind of **market farming**, seeking cash incomes to meet family expenses on one hand, and to purchase the farm inputs on the other. There were broadly three kinds of market farming ventures. One, a large number of small farmers, occasionally using purchased inputs, produced commodities mainly for the local *shandies*. Two, a small number of elite farmers took to high-tech specialized farming to produce exportable commodities of international standards, against known demands. Three, a considerable number of mid-size farmers with a good access to technology, resources and political power began producing huge surpluses of common commodities, unmindful of the limitation of market demand. It is mainly they who created the well-known market gluts and price slumps.

Then, the recent trends of liberalization, privatization and globalization are now pushing farming into international market competition. Thus, **commercial farming** has become inescapable. Here, farming has to be conducted as a business. The saleable farm surpluses will have to face global

competition not only in the international market, but even in the domestic market. In this context, the farm output for the market must be competitive "both in quality and in unit price". Particularly in doing this, we suffer from two great handicaps -- we have a small-farmer agriculture, which denies us the benefit of *economies of scale*, and the bulk of our farmers have yet to acquire that kind of **managerial abilities** that are required in conducting farming as a commercial business.

As of now, Indian farming is still a dual-goal pursuit, serving the purpose of both food security and income security, for the farm families. All the same, Indian farming is increasingly becoming dependent on external factors like technical information, production inputs, price support and market facilities. Consequently, the success in farming now depends, not only on the farmer himself but also on the farm externalities, much of which is beyond his comprehension, let alone his control. Hence, the new development approach must help farmers to understand the nature of the larger economic world, of which our farming is becoming an integrated part, and to learn to survive in the new environment.

Green Revolution and Its Impact

A brief look at the gains and losses accruing from the Green Revolution, in broad terms, will serve here as a useful backdrop. With Freedom, we inherited a serious food deficit, along with a stagnant agriculture, embedded in traditional practices. It was a mixed farming system with livestock and tree crops as common components. It was entirely organic farming, pursued as a family occupation with subsistence as its goal.

But, in meeting a threatening food scarcity, Indian agriculture had to move rapidly. Vigorous efforts in the form of the Grow More Food Campaign were mounted in the wake of the War years, with emphasis on expanding irrigation and mobilizing local manurial resources including oil cakes. Its impact, however, was limited. But, by the mid 1960s, a new era dawned on the agricultural scene. New biological material in the form of hybrids and high-yielding varieties in major food crops entered the farm front. Simultaneously, high-grade, complex fertilizers also became available. Availing these powerful inputs, progressive farmers, in favourable farming situations, began making history by doubling the crop yields. This innovation has come to be known generally as the Green Revolution, based on the "seed-fertilizer" technology, mainly impacting crops and yields in traditional farming. Within about two decades, the country not only achieved food sufficiency, but was also able to produce modest surpluses for buffer stocks and token exports.

In retrospect, what were the major gains? Primarily, the mental horizon of the Indian farmer got considerably widened. Millions of "illiterate Indian farmers", steeped in tradition, living in isolated communities, were found to be capable of accepting the most advanced farming technologies of the day, and adopt them with a fair degree of efficiency. The farm sector benefited from the sophisticated crop varieties, fertilizers and pesticides, as well as advanced agronomic operations and managerial practices. Thus, the farmer, the farming and the farm-support services were able to move beyond the traditional systems.

But, what were the losses? Of course, there were some losses that were inevitable, and some more that were avoidable. The localized, self-reliant family farming system yielded place to the surplus-producing, externalized farming system. In setting his farming goals and making decisions on the production practices, the farmer lost a good deal of his independence. Also, at the same time, some of the sound traditional practices like mixed farming, mixed cropping and crop rotations gradually yielded ground to systems of mono-cropping. Thus, once for all, farm families became dependent on the larger economy and outside world, for making a living.

Then, what are the things overlooked? In making a hurried progress, the Green Revolution lost sight of many critical aspects of a healthy farming system. As the end-users of the natural farm resources as well as modern technologies, farmers were rarely guided, in an adequate measure, beyond crops and yields. Thus, due attention was not given to matters like conserving, developing and judicious utilization of the natural farm resources, maintaining adequate environmental support to farming, planning production of saleable surpluses and dealing with externalities including management of marketing operations. Also, as subsistence farming moved into surplus farming, then into market farming, institutionalization of several phases of agricultural development became critical, but was hardly given the needed attention by the Green Revolution.

When all this is put together, it becomes obvious that the Green Revolution was essentially a yield-

enhancing modern production technology, and nothing more. On the other hand, a more comprehensive agricultural development approach should have devoted attention, simultaneously, to natural resource management on the farms, and to build a more adequate environmental support to farming. Also, attention was required to strengthen the backward linkages including dynamic research and extension agencies and input supply systems, along with the forward linkages including economic incentives, market infrastructure, agro-industries and domestic and export trade facilities.

Farm production base degenerating

Land-man ratio narrowing. India happens to be one of the most populous countries in the world. In the last fifty years, its population has grown more than three-fold. The rural population alone has increased from 280 M to 742 M. Meanwhile, for the country as a whole, the total land area and the cultivated area have almost remained the same, at 329 M ha and 142 M ha, respectively, with only about 30 percent of the sown area having irrigation. This situation has been putting a tremendous pressure on the natural resources, in terms of land-man ratio. As such, of nearly 116 M farm holdings in 1995-96, around 71 M were marginal, 22 M were small and 21 M were medium and only 2 M were large. The farmland per capita, which was 0.46 ha in 1951, became 0.26 ha in 1981, and around 0.15 ha in AD 2000.

Vegetative cover shrinking. India, as a subcontinent, has 15 agro-climatic zones. Depletion of key natural resources like soil, water and biodiversity is taking place in all these zones. The inadequate forest cover, against a norm of 33 percent, is a matter of concern. As per the State of Forest Report 1999, total forest cover was only 19.39 percent. Out of this, dense forest (40% crown density) was 11.48 percent and open forest (10-40 % crown density) was 7.76 percent, while mangroves was 0.15 percent. Even the rest of the non-arable land is largely depleted of its vegetation. Point here is not merely the lack of sufficient plant cover, but, more importantly, loss of biodiversity, in addition to the impaired microclimate and bio balances, and loss of soil, rainwater and organic matter.

Land productivity declining. On account of extensive loss of vegetative cover and poor conservation efforts, farmland has suffered severe erosion. According to one estimate, annually, about 5300 Mt of topsoil is being eroded, which is about 12 t/ha/year. In the process, the three major plant nutrients of nitrogen, phosphorus and potassium, ranging from 5.4 to 8.4 Mt, are also lost, every year. Further, there is one to two percent loss of storage capacity in the tanks and reservoirs, per annum, due to silting.

There is another view of the productivity loss in farmlands. Degraded land in the country is put at 187 M ha. It is estimated that soil degradation due to water erosion is about 148 M ha (57%), to wind erosion is about 13.5 M ha (4.1%), chemical degradation is about 13.8 M ha (4.2 %) and water logging is about 11.6 M ha (3.5%). The cumulative effect of this degradation of natural resources further leads to an enhanced exploitation of the declining resources by an expanding population.

Water resources dwindling. Assuming that the amount of annual rainfall received, on an average, remains the same, the competing demand for water, a limited resource, is constantly increasing on account of a growing population, changing life styles, expanding irrigation and enlarging industrial and urban sectors. The water-use efficiency, particularly under the public irrigation systems, is considered to be very low, at 30 percent. The over-exploitation of ground water in many regions, beyond the limits of recharge, is posing serious environmental problems.

Even then the management of rainwater leaves much to be desired. R.S. Paroda, for instance, opines that, while the country has a fairly adequate rainfall, water harvest and utilization patterns have not been sufficiently evolved. The picture is this:

- Annual rainfall 400 M ha m
- Rainwater going into rivers 186 M ha m
- Rainfall on farm lands 160 M ha m
- Rainwater before and after crop season 40 M ha m
- Rainwater available for harvesting 24 M ha m

The combined effect of these various aspects of the farm sector is something that should influence the formulation of a more comprehensive agricultural development approach. While it has to be readily conceded that all these different factors can hardly be tackled together, or simultaneously, one has to keep in view their inter-relationships, so that combining or sequencing the development efforts

would have an add-on effect, over a period of time.

With the unabated population growth, fast-changing life styles and easy access to powerful technological tools, the manner of **resource utilization** in agriculture is rapidly changing. Extensive exploitation of ground water is a case in point. In the last one generation, in many areas, groundwater levels have fallen from about 10 m to 200 m. Farmers ending up with dry wells is becoming far too common. This has several consequences. Dead investments are on the increase. Viability of commercial farming is threatened. Availability of drinking water is becoming a serious problem. Tree vegetation has come to suffer, since the root zone of about 10 m is getting drier every year. Tragically, this is entirely a man-made crisis.

Farmers feel trapped in farming

Rural aspirations are rising. In the last fifty years, the isolation of village communities is getting reduced, with improved road links and transport facilities, increased literacy levels and expanded media reach. Along with this kind of greater exposure to the outside world, the expectations of rural people have also risen, particularly with the rural youth. Many have even begun to feel that they have been denied a fair share of the public good. Thus, the effect of a “shrinking world” is becoming conspicuous. The mindset of the farmers too is changing, regarding the farm work as a drudgery, and farming itself as non-paying occupation. Farm life seems to have lost all its former glory.

Development support weakening. Technology is often seen as the engine of growth. Indeed, it was the new agricultural technology that powered the Green Revolution. But, by the 1990s, the outflow of new technology of a substantive nature, in major crops, from the public research centers, began dwindling. Even though some new technologies did emerge in the case of subsidiary enterprises like poultry, dairy, sericulture and vegetables, they were hardly of benefit to the majority of farmers. This is often attributed to slackness in the research and extension systems, mainly due to lack of policy focus and development thrust.

Of course, “leaps and lags” are common in research outflow. But, in the wake of the Green Revolution, the pace of development need not have slackened so much. There was plenty to be done as follow-up work, in the wake of the Green Revolution. The full potential of the new technology had not been tapped in many cases. Adaptation of the new technology to the less-endowed farming regions still remained to be attended. Also, while the Green Revolution technology had only the “crop-yield” focus, diversification of farm enterprises offered an enormous scope for further development initiatives.

Further, investments in the farm sector, both public and private, markedly declined in the later years of the 20th century. Beyond achieving food security, as seen earlier, there were a good many things to be done in the agriculture sector, with farming moving towards market orientation. The status of soil, water and vegetative resources could have been in a better shape today had timely attention been paid to their conservation and development. Similarly, building up more adequate and dependable backward and forward linkages should have received greater attention.

Rural economy lagging behind. In the early stages of development planning, it was the anticipation that, with a rapidly expanding economy, some of the surplus rural population would get absorbed into the industrial, trade and service sectors, thus improving the land-man ratio in the farm sector. But, this did not happen as expected, due to the undiminished population growth, on one hand, and the industrial sector becoming more technology-intensive rather than labour-intensive, on the other. With shrinking farm holdings and rising production costs, farming became a less remunerative occupation. Rural employment also did not expand very much. As such, rural income levels remained far behind the urban incomes.

Meeting the WTO challenges

Trade between countries is the focus of WTO. It is not so much the production matters. Relative to the trade in farm commodities, there are three basic elements in the Agreement on Agriculture (AoA) that govern the transactions -- production subsidies, export incentives and import tariffs. Recently, India removed the quantitative restrictions (QRs) altogether. Thus, today we face a free trade situation between countries, of course, as manipulated through the domestic support and import levies.

It is seen that the developed countries presently enjoy an unmatched advantage under this arrangement. In simple terms, having expanding economies relative to shrinking farm sectors, with

dwindling farm populations and declining farm share in GDP, they are in a position to provide heavy domestic subsidies. But, this is not the case with the developing countries, like India. As a result, developing countries are faced with a situation where highly subsidized foreign farm goods enter their domestic markets, which they seek to counter mainly with import levies, within mandatory limits. One graphic example reported in the media, soon after Cancun meet, was that a specific farm commodity costing \$10 in the developed countries, compared to \$7 in the developing countries, was supported with a \$5 subsidy to make it competitive, internationally.

There is another, more general point. Farm commodities compete in the market, on the basis of their **quality and cost**. These attributes are not imparted to farm goods, after they arrive in the trade sector, but in the farm sector, where they are produced. Therefore, for Indian farm goods to be competitive, appropriate attention has to be devoted to **production management** in the farm sector itself. It was not a matter of concern to the Indian farmer, so far. But, to ensure **competitive quality and cost** in farm goods, farmers must now strive to gain the necessary knowledge and required managerial abilities.

But, here, the average Indian farmer is hardly on the track. Look at the **cost factor**. It is here that the concept of "level playing field" of WTO needs to be extended beyond the trade sector, into the production sector. Everybody knows that Indian agriculture is made up of small farmers, with about 78 percent having less than 2 ha of farmland. Then, how can these small farmers compete in the market place with the Western farmers having more than 200 ha of farmland? How can these farmers avail the **economies of scale**? Thus, in terms of attaining competitive unit costs, there is no level playing field as of now.

Let us look at the **quality factor**. The Western farmer, in the post-war years, has steadily moved towards specialized farming as a commercial venture. He now manages farming almost as an industrial undertaking. As such, he has become far more competent as a farm manager. He enjoys a highly **dependable input supply system, technical services and market infrastructure**. Moreover, he has become a part of well-established network of farmers' associations that strive to protect their common interests. In comparison, the Indian farmer, most often, stands alone, deprived of this kind of support. As a result, as a manager of farm business, he remains essentially a traditional farmer, just moving into market farming, and is nowhere near a competent, Western commercial farm manager. Hence, the quality factor is not yet within his reach.

In this background, it is obvious that the average Indian farmer is handicapped in meeting the international competition, in the absence of strenuous efforts for adequately equipping him for this purpose. Hence, the future agriculture development approach should necessarily focus on **preparing the farmer as a manager** of commercial farming, build adequate **infrastructure needed for commercial farming system** and, at the same time, promote **producers' associations** not only to protect their interests but also to overcome some of the limitations of small holdings, through strategic cooperative efforts. This is, indeed, a tall task; but there is hardly any other alternative,

Survival requires efficiency

An overview at this point will be useful. Farming is all about generating certain goods we need, through selected biological processes, harnessing the available natural resources and applying the production technologies evolved for the purpose, either traditionally or scientifically. In recent years, however, we seem to have devoted more attention to production inputs and technologies, and not so much to management of natural resources. This has begun to hurt our farming capability, in the later years.

When it comes to natural-resource management, the primary users of soil, water and biodiversity are the farmers and farming communities. The conservation and development of the on-farm resources is the direct responsibility of farmers, whereas the responsibility for off-farm resources, outside the reserve forests, is that of the farming communities and the village institutions. For the present, there are marked deficiencies in the management of these resources on the farms and more so around the farms.

In the case of on-farm situations, efficiency has to be increased on two fronts. One, the care and management of natural farm resources in terms of soil management, water use efficiency and biomass production, as of today, leaves much to be desired. Two, there is considerable room to

improve the productivity in many chosen farm enterprises, by way of upgrading resource-use efficiency, along with fuller utilization of the potential of the new technologies. Hence, the attention, now being devoted mainly to crops and yields, must be intensified and extended to farm-resource management also.

Adequate environmental support to farming in semi arid regions is very critical. Off-farm vegetative cover helps in better management of rainwater, as it softens the impact of rainfall and impedes surface flows, thereby reducing erosion and increasing infiltration. It improves microclimate, and enhances atmospheric moisture. It serves as a source of biomass for use as fodder and manure. In addition, it improves the biological balance between crop land and the surrounding areas, with increased bird, bee and insect populations. But, farm surroundings today stand depleted of their vegetative cover.

Since farming is no more a simple family pursuit, and has become a prominent production sector in the national economy, there are other phases in the development process that require serious attention. Present-day farming has become dependent on many external factors. It has to be supported by certain backward linkages like supply of production inputs and new technologies. Likewise, it needs forward linkages in the form of roads, transport, store-houses, processing and market facilities. A stage in agriculture development has now been reached where the on-farm efficiency critically hinges on the adequacy, dependability and cost-effectiveness of these linkages. Further, in the long-term interest of agricultural growth, a conducive economic climate has to be created by way of credit support, remunerative prices, insurance and strategic subsidies.

Farmers' associations and village organizations are of critical importance to development. Since top-down approaches have failed in the past, promoting farmers' initiatives in development may prove better, as in the case of self-help groups. This effort is very necessary for enabling farming communities to become sensitive to market forces, capable of cooperatively planning commodity production goals and organized to deal squarely the hostile, outside forces. Thus, the ability to work together as producers' associations to make joint decisions and act cooperatively will become a strategic necessity in the future. Since **comparable economies of scale** are unattainable for the Indian farmer, he must find ways to achieve the quality and unit cost in his farm outputs through managerial improvements, cost reduction strategies and cooperative actions.

Farmers taken for granted in development

Agriculture development is not an undifferentiated, 'single phase' process. A closer look will reveal that it is made up of two independent, but inter-related phases - the production phase on the farms, and the enabling phase beyond the farms. The policy makers and programme implementers operate most of the time with the impression that creating the enabling conditions, through specific externalities, as backward and forward linkages, is an adequate impetus for agriculture development. The expectation is that these incentives and opportunities will function as the "pull" and "push" factors, motivating the farming communities to enhance their farm production and their production efficiency.

This assumption is valid, but not entirely. The farming communities are not homogenous social systems. They are made up of, in classical terms, innovators, early adopters, early majority, late majority and non-adaptors. As such, those who really make use of these incentives and opportunities are the innovators, and resourceful farmers. They happen to be a small fraction of the farming community. But, the bulk of our farmers are not like them. They are mainly resource-poor, traditional farmers.

It is relevant here to recognise one more feature of the agriculture sector. It has a two-fold function. One is **generation of wealth** in this primary economic sector. This is the role performed by those like the elite farmers. Second is **providing livelihoods** to the rest of the farm population. This is the purpose served by assisting the resource-poor farmers. Hence, in the agriculture development approach, the livelihood goal is as important as the wealth creation goal.

While considering the production phase in agriculture development, it is essential that certain realities are taken into consideration. **Farming, after all, is what farmer does. What he does is based on what he knows, what he believes and what he manages.** When we take this viewpoint about farming, we come to the realisation that the ultimate **decision-maker** in farming is the farmer himself.

All others, including the policy makers, development agencies and support organizations are just **the enablers and supporters**.

The elite farmers, who are information seekers, will be able to make use of the development incentives and opportunities mostly on their own. But, the non-elite farmers, whose welfare is the **core objective** in development, have to be ensured of the farm-door extension and support services. Thus, there is a **huge capacity building task**, at the centre of the agriculture development venture. But, this very significant matter has hardly got the policy recognition, as yet.

As indicated earlier, farming is an enterprise that requires **management**. It is easy to accept that the kind of managerial ability required for commercial farming is not the same as what is required for subsistence farming. This means that, as the farming pursuit undergoes a transformation, the **managerial competence** of the farmers must also undergo an upgradation. Further, it is not difficult to accept that while the elite farmers are quick to find ways to improve their managerial skills, other less endowed farmers, may not be able to do likewise. The implication is clear – agriculture development strategies must have a strong component of **capacity building** in the case of the middle and bottom segment of the farming communities. The movement in agriculture development, therefore, must begin by enriching the farmers' knowledge and understanding, helping them to adopt the necessary new attitudes and empowering them with the required managerial abilities.

Then, what are the aspects of farming, in terms of capacity building, that must find a place in the agriculture development approach? There are five prominent aspects that must engage our attention, at the present stage of development. For the most part, it is the dryland farming that is kept in mind here, since it is the bulk of the farm sector and supports the majority of the population, apart from the intensity of poverty that resides in this segment. They are the basic tasks in which every farmer has to strive to improve his understanding, insights and operational abilities.

(1) Modifying the cropping systems drastically. The new generation of farmers have lost sight of the importance of mixed farming, mixed cropping and crop rotations. They have settled for mono cropping despite all its maladies. Also, the crop production practices have become distorted. In the place of 8-10 cart loads of manure per hectare in a year, they have come to use only 3-4 cart loads, every 3 or 4 years. This has led to their over-dependence on chemical manures. Thus, both in terms of crop combinations and crop sequence, as well as in the production technologies, the present generation of farmers require widening of their horizons and deepening of their insights.

(2) Conserving the natural farm resources efficiently. Farming thrives, under a given climatic condition, on the basis of proper management of soil, water and biodiversity. Neglect of the basic farming practices pertaining to soil and water conservation, improvement of soil fertility levels and maintenance of adequate biodiversity is something that the contemporary extension services has not given adequate attention.

(3) Improving the environmental support to dryland farming : Under semi arid conditions, successful farming requires adequate ecological support. Good vegetation around farmlands will result in better micro climatic by way of impeded wind flows and higher atmospheric humidity, resulting in lowered surface evaporation. Availability of organic wastes increases to be used as compost manure. Measures to improve rain water conservation in non-arable lands serve to reduce soil erosion and increase ground water infiltration. The bio relationships with crop land improve by way of increased bird, bee and insect population.

(4) Understanding and handling externalities/market operations. All farmers, big and small, have gravitated into a "marked world", today. They have to learn to survive and thrive within this changed economic reality. Farmers should be able to handle the buying and selling operations as competently as they produce the farm commodities. For this, today, they have to be adequately knowledgeable about the larger world in which they live, the external forces that impinge upon their farming and their well-being, and the ways in which they can effectively handle these forces to their advantage.

(5) Acquiring appropriate managerial abilities: The simple management abilities of the subsistence farmer have to be today, upgraded, in one go, for him to become above-average manager of farm business. Involved here are his abilities to achieve optimum production efficiency, in addition to achieving competitive quality and cost-effectiveness in the farm goods he produces. Apart

from this, he should gain abilities in having the strategic understanding of his market world, and to conduct his buying and selling operations, competently.

Indicative development approaches for the future

A review of the past serves as a critical input in planning for the future. While the achievements made so far are to be duly recognized, it should be realized that “more of the same” might not take us very far. Therefore, assessment of past gains and lapses, along with identification of future needs should be treated as a necessary exercise. On this basis, it is possible to visualize six major areas of attention in future approaches to agricultural development. And, here are some ideas about how to go about doing things we need to do, especially in building the “sufficient conditions” for development.

(1) Campaigns to mainstream farmers in the development process

Under the T&V system, agricultural development was seen as a prescriptive approach. Farmers were generally seen as beneficiaries of development rather than partners in development. The vast mass of rural population was rarely seen as a reservoir of creative abilities. Participatory approaches, in working with people, seldom went beyond exhortations. But, the hard reality is that this development task, involving vast geographic areas, large masses of people and huge production goals, cannot be achieved merely through occasional contacts of public agencies like the extension service. These agencies are also in no position to influence policy makers or development planners. In fact, a large part of agricultural development is meant for enabling farmers to make progressive adjustments in farming practices, basically through their own efforts. For, none else has a greater stake in farming or farm resources than the farmers.

Today, the farmer’s world has been suddenly globalised. The farm events that take place in far away Europe or America or Australia have begun to affect the Indian farmer. In this situation, the farmer needs help in several ways. He should know the nature of the new world into which he has been delivered. He should know the specific issues that impinge upon his ways of living and making a living. He should also know the appropriate means and methods by which he can make strategic adjustments in order to survive, and to thrive. This is indeed a gigantic task of building awareness, sensitizing and empowering our enormous farmer population.

Development focus: Through systematic campaigns, mainstreaming farming communities into the development process by (1) building their awareness regarding the changing agro-economic environment; (2) sensitizing them to the issues that affect their farming pursuits; and (3) motivating them to recognize the need for making substantive adjustments in farm management and economic considerations.

(2) Capacity building for farming communities

The fact that the end-users of the natural resources, including soil, water and bio-diversity, are the farmers as individuals, groups and communities has to be regarded as the key factor. They are also the end-users of agricultural technologies and development infrastructure, while all others in the development process are enablers and facilitators. As such, through systematic extension programmes, farmers, farming communities and village organizations have to be prepared for action in helping themselves.

With regard to both farming and the farm environment, in the face of vast and rapid changes, it is essential that farmers not only become aware of the changing times but also become competent as managers of resources and technologies. But, this requires strategic reorientation in development policy and operational thrust. It is high time that this shift in the development focus is given due attention.

There are three basic considerations here. One, farmers should make far more efficient efforts to conserve, develop and utilize the **on-farm natural resources** of soil, water and biodiversity. The gradual impoverishment of farm lands due to erosion, over use of inorganics and mono-cropping are too glaring to be missed. In the case of rainfed farming, soils are becoming shallower, sandier and poorer in productivity. Under large irrigation systems, water logging and salinisation are becoming serious problems. Thus, the need for better soil as well as rainwater management has to get greater development attention.

Two, it is seen that mono-cropping practices have entered into present-day farming practices,

aggravating pest and disease problems and distorting the nutrient levels in the soil. As such, alternative **cropping patterns** have to be adopted. As in the traditional dry farming systems, it is necessary to practice more careful choice of crops, cropping patterns and crop production practices.

Three, in semi arid areas, particularly in dry farming, **vegetated surroundings** are critically important for several known reasons. Therefore, it is necessary that the farming communities and village institutions are harnessed to devote attention to manage the common lands and waste lands to develop vegetation as well as to conserve soil and rainwater. For this purpose, farming communities have to be adequately prepared and supported. This involves systematic extension work to motivate people, train activists and enable organizations.

Development focus: Moving beyond awareness building, technical and development services have to be provided to farmers' groups, communities and organizations for improving (1) on-farm production activities, (2) on-farm resource management, and (3) regenerating off-farm environmental support to farming.

(3) Improving water-use efficiency – ground water first

On the Deccan Plateau, the rainy season lasts hardly five months. The rainy period is made up of about 80 days. The annual rainfall on the plains is around 600 mm. With the shrinking forest areas and depleted vegetation on the non-arable lands, rainwater infiltration has sharply declined. Under these circumstances, heavy extraction of ground water, all the 365 days in the year, for growing water-intensive crops, is very unwise, to say the least. While there is some regulation in place with regard to spacing bore wells, there is none at all with regard to ground-water extraction. There should be enough emphasis on conjunctive use of groundwater with rainfall, growing less water-intensive crops. There should be a ban on bore well irrigation from February to June every year.

Development focus: In order to conserve ground water, reduce ecological damage, and ensure drinking water availability all through the year, it is necessary to regulate groundwater use under the bore wells, modifying (1) rainwater management in the terrain (2) cropping patterns, (3) water-management practices under canal irrigation and (4) periods of irrigation under bore wells.

(4) Redesigning development support to market farming

Market farming is a growing trend. The policy and development support required for market farming is distinctly different from what was required for subsistence farming as it moved into surplus farming. At that time, the market demand usually ruled above the market arrivals. But, in the subsequent days, market demand for many farm commodities has become a limiting factor. As such, the market farming ventures require an entirely different kind of policy and development support.

First of all, farmers, who have been practicing farming as a family activity for ages, should now be prepared as **managers of market-farming systems**. This requires on their part, not only a new orientation but also a new managerial ability. Thus, capacity building in the case of lead farmers, from whom others may learn, has become a dire necessity.

Second, a more crucial factor is that farmers now require **production-planning** ability. They should be able to take decisions regarding what to produce, when to produce and how much to produce based on anticipated market demand. This calls for their understanding of the market as a mechanism and the behaviour of the markets they have to deal with, in terms of the demand and supply pattern and in particular the price levels.

Then, third, for the production planning exercise, farmers need the **relevant database**. This database must cover two aspects. Since major market commodities are produced in identifiable agricultural regions, for every commodity a **local database** is required covering the area planted, production achieved and prices received, for at least the past three years, season-wise. Similarly, for the same commodity, 3-year **market information**, season-wise, is required covering the main markets reached, market arrivals and prices obtained.

Another prerequisite for this exercise is arrangement for the farmers to undertake **joint planning of commodity production** in the region. Since, in our situation, most farmers are small farmers, individually they make little impact on the market. Therefore, it is meaningful if production planning is

done on a regional basis by groups of farmers as **commodity associations**. Such groups can deliberate and decide, for a given commodity, how much to produce and when to produce, by sharing the production goals. Combining the local data with market information, analysing and arriving at relevant conclusions, the commodity associations will be better placed to decide upon the production targets.

Fourth, is the need for building the required **market infrastructure and facilities** in the region. This should include the input-supply system that is not only adequate but also dependable and accountable. The technical services for market farming should not only include production technologies but also knowledge of farm economics and farm business management. Further, storage, transport and processing facilities are also required. Without planned and cost-effective forward and backward linkages, market farming will not become viable. This matter is yet to receive adequate attention in the policy and development circles.

Development focus: As the market farming trends take shape and progress, the requisite policy and development support has to be reformulated, encouraging, among other things, (1) group approach to commodity production, (2) training in business farming, (3) ensuring the required database for production planning and (4) developing dependable linkages and infrastructure.

(5) Institutionalizing development processes

The need for building organizational support to the development process may be considered from two viewpoints. Development is a matter of bringing about desirable changes in the existing situations. For these changes to be durable, promoting suitable social structures is necessary. A good illustration is the recent practice in watershed development projects, where participatory methods are adopted and local farmers' groups are organized during the project period, for post-project management of improvements. In the context of market farming, promoting producers' associations, in particular, assumes strategic importance.

There is another consideration. As farming becomes externalized, changing from subsistence to market orientation, it becomes increasingly dependent on outside sources for technology, credit and production inputs, as well as on market facilities for disposing of the commodities. Here, private commercial organizations and public service agencies have to come into play to sustain changes in the farming systems. They have also to be made more dependable.

It cannot be denied that past development efforts have devoted considerable attention to these issues. But, the point is that what has happened so far is more in the nature of isolated, problem-solving efforts, and not in the nature of anticipated preparatory action. The argument is that market gluts and farmers' suicides could have been reduced to some extent, if not totally avoided, had there been a vision-based approach, rather than a fire-fighting approach in institutionalizing support to agriculture.

Also, it is a matter to be noted that institutionalization of development is not something in the nature of providing technical service to farming communities, but is a matter of skillful social engineering. It should be a focused effort on the part of competent development functionaries.

Development focus: A key component of the approach to future agricultural development should be proactive, vision-based (1) creation of local institutional structures to support changes in the farming and community systems and (2) institutionalizing effective local backward and forward linkages.

(6) Creating conducive economic climate

Farming is no more a "way of life". It has become a dominant rural economic activity. Today, it requires money investment and has to bring back cash returns. Therefore, it requires an economic environment that is far different from what it was in the past fifty years.

Present day farming entails more risks than what policy makers usually take into account. It is an occupation that very much depends upon the behaviour of the monsoons. Crop yields again depend on seasonal conditions, apart from adequate rainfall, in escaping pests and diseases. Even when yields are good, remunerative market prices may elude the farmer, since favourable seasons may

result in heavy market arrivals above the prevailing demand, leading to price depressions. Further, as farmers today are using many purchased inputs, poor-quality supplies is another risk they face. Therefore, the kind of economic support provided for agricultural development should be such that it offers reasonable protection to farmers against these risks.

No doubt, farmers even today are offered production credit, support prices, crop and animal insurance and farm subsidies. In times of crisis relief is also extended. But, the main problem is the adequacy and the manner of dispensation of these assurances. They are rarely accessible to farmers in time.

Development focus: Further rationalization of economic support to farming on a long-term basis is necessary (1) to cover the risks in farming, (2) to improve access to economic support provisions to needy farmers and (3) to build a commodity price-stabilization fund, where farmers' contributions are suitably matched from public finances.

In conclusion, it is to be emphasized that all efforts in agriculture development must be directed at improving the stability and sustainability in farming. While building sustainable agriculture is a complex and long-term task, it is very necessary. In broad operational terms, **sustainable agriculture is simply that kind of agriculture, which seeks to conserve, develop and utilize the natural resources on and around the farms in such a manner as to meet human needs year after year, and generation after generation.** In pursuing this goal, due attention has to be devoted to irrigated agriculture as a means of wealth creation, and dryland farming as a means of ensuring livelihoods to the huge proportion of the farmers. For this, in the overall development strategy, it is essential that attention is devoted as much to building the "sufficient conditions" as is given to building the "necessary conditions" for development. This means that, in agriculture development, **human resource development must be a goal, beyond the production goal.**

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