

Agriculture in The Ninth Plan¹

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Introduction

There is much that is of concern in Indian Agriculture as we enter the Ninth Plan. Agricultural fixed capital formation required to finance growth is no where in sight. Fixed investment which had reached a level of 8.63 % of agricultural GDP has gone down to 8.55% in 1994/95. This is happening at a time when area growth has stopped and investment requirements are high so that agricultural intensification can only proceed through larger investment in land, water and yield improvements. The crisis of channeling larger loanable funds through declogging rural credit lines continues.

In the short run wheat stocks are below requirements for the first time after more than a decade. Wheat prices rose by more than 10% in the last agricultural year and rice price by 7.2%. In the first four months of this agricultural year, wheat prices rose by 18% over the same period last year and rice price by 9.4%.

Per Capita income in the State of Bihar in the last five years has fallen and that in U.P. is constant. Apart from West Bengal, agriculture in the Eastern Region is not doing well. The rural male worker current daily status unemployment rate-the only major indicator of unemployment-measuring disposition of labour time has gone up from 4.58% in 1987/88 to 5.64% in 1993/94, an increase of 23%. Canal irrigation has stopped growing.

In the Ninth Plan:

- (a) Land scarcity will become an acute feature of the Indian agricultural and rural economy and judicious use of land and water will be central to the growth process; India facing for the first time population densities of the East Asian type;

¹ Dr. Rajendra Prasad Memorial Lecture delivered at the 50th Annual Conference of ISAS held at Vigyan Bhawan, New Delhi on 19 December 1996.

- [26] Rao, J.N.K. and Scott, A.J., 1996. Quasi-score tests with survey data. *Proc. Survey Methods Sec., Statist. Soc. Canada* (in press).
- [27] Rao, J.N.K. and Skinner, C.J., 1996. Estimation in dual frame surveys with complex designs. *Proc. Survey Methods Sec., Statist. Soc. Canada* (in press).
- [28] Robinson, J., 1987. Conditioning ratio estimates under simple random sampling. *J. Amer. Statist. Assoc.*, **82**, 826-831.
- [29] Royall, R.M., 1970. On finite population sampling theory under certain linear regression models. *Biometrika*, **57**, 377-387.
- [29] Sarndal, C.E., Swensson, B. and Wretman, J.H., 1992. *Model Assisted Survey Sampling*. Springer-Verlag, New York.
- [30] Singh, D., 1968. Estimation in successive sampling using multistage designs. *J. Amer. Statist. Assoc.*, **63**, 99-112.
- [31] Skinner, C.J. and Rao, J.N.K., 1996. Estimation in dual frame surveys with complex designs. *J. Amer. Statist. Assoc.*, **91**, 349-356.
- [32] Sukhatme, P.V., 1935. Contributions to the theory of the representative method. *J. Roy. Statist. Soc., Supp.*, **2**, 263-268.
- [33] Sukhatme, P.V., 1954. *Sampling Theory of Surveys with Applications*. Iowa State College Press, Ames, Iowa.
- [34] Sukhatme, P.V. and Seth, G.R., 1952. Non-sampling errors in surveys. *J. Indian Soc. Agric. Statist.*, **4**, 5-41.
- [35] Tikkiwal, B.D., 1951. Theory of Successive Sampling. Unpublished thesis for Diploma, ICAR, New Delhi.
- [36] Tikkiwal, B.D., 1993. Modelling through survey data for small domains. In: *Small Area Statistics and Survey Designs*, Central Statistical Office, Warsaw, 129-155.

- (b) Community and cooperative land and water development schemes; and self-help and other credit and marketing arrangements will be critical to the achievement of food security and agricultural output and employment requirements;
- (c) Institutions supporting agriculture will have to adjust to relatively faster growth of non-cereal and non-crop based activities;
- (d) The sector will have to engage in cost reduction and diversification in first-stage processing of agricultural produce like sugar refining, cotton ginning, agricultural storage and vegetable and fruit processing, if it is to maintain its momentum in the increasing access of agricultural surpluses to regional, national and global markets, and in view of all these requirements; and
- (e) Private and public investment in agriculture will need a very substantial increase.

Population, Land and Work Force

According to Planning Commission estimates population figures are expected to go up from 856 million in 1991/1992 to 938 million in 1996/1997, showing an annual average growth rate of 1.8% (Table 1). If the growth rate remains around 2%, this figure will go up to 955 million. According to current indications the actual figure will be in between these two figures since the death rate has fallen below even the 2000 target, but the birth rate is below target, hence population growth will be around 1.9%. If the population growth rate further declines, as postulated by the Planning Commission in the second half of the decade, the estimated population will be around 1016 million in 2000/01 and in any case will be below the rate of around 2% as estimated by the current U.N. projection, of around 1042 million in that year. If India is able to achieve a population growth rate of around 1.6% in the decade 2000/01 to 2010/2011, its population will reach 1171 million, if the Planning Commission projections are used as a base. Even if this target is exceeded the figure will be less than 1224 million as estimated by the U.N. These projections have not incorporated the detail of the 1991 census. The Registrar-General's Working Group on Population Projections set up conventionally by the Planning Commission, will have to firm up these alternative conjectural projections, in terms of underlying fertility, mortality and expected life span behaviour, by age-group and rural-urban categories.

The other major category needing examination in this kind of perspective is the land or resource base of the economy. The Planning Commission has correctly projected that the net area sown or arable land of the country will

Table 1. Land and Water Resources in Perspective

Sl. No.	Variable	1991/92	1996/97	2001/02	2006
0	1	2	3	4	5
1.	Population (millions)				
	a. Planning Commission ² estimate	856	938	1016 ¹	1099
	b. UN (FAO)	874 ¹	955	1042	1130 ¹
2.	Net Area Sown (mn. hec.)				
	a. Planning Commission estimate	140	141	141	141
	b. Revised		141	141	141
3.	Gross Area Sown (mn. hec.)				
	a. Planning Commission estimate	182	191	197	203
	b. Revised	183	191	197	205
4.	Gross Irrigated Area (mn. hec.)				
	a. Planning Commission estimate	76	89	102	114
	b. Revised	64	78	92	107
5.	Cropping Intensity				
	a. Planning Commission estimate	1.30	1.35	1.40	1.44
	b. Revised	1.30	1.35	1.40	1.45
6.	Gross Irrigated Area as % of Gross Area Sown				
	a. Planning Commission estimate	41.5	46.9	51.7	56.1
	b. Revised	35.0	41.0	46.0	51.0

Source: Perspective Planning Division, Planning Commission, FAO, Agriculture Towards 2010, Rome.

Revised projections are tentative and are by the author.

Note: 1. Interpolated or extrapolated from implied trends.

2. Planning Commission estimates are for Eighth Plan and will be revised for Ninth Plan.

remain constant at 141 million hectares. Growth in net area sown at around 1% annual in the early period of planning fell to around 0.6% and then to 0.3% in subsequent decades and is now not growing at all. It is reasonable to assume that the geographical area of the country or the extensive land frontier for exploitation has reached its limits. This is an important issue, the implications of which are not being realized with the urgency they deserve, since at a basic level resource constraints of a more severe kind faced by certain East Asian economies are now being approached in India. Organizations, communities, households and individuals will have to grasp this fact and live with it.

The intensive frontier for land use, however remains. It has been known for example that cropping intensity depends on irrigation. Thus gross cropped area or harvested area has been shown in the past to be strongly determined statistically, in an econometric sense, by net irrigated area and irrigation intensity. This fundamental relationship can be used to project the intensive resource base of the economy. Table 1 shows that by the end of the next decade India would have used up most of its balance water reserves, with the irrigated area reaching around 114 million hectares by 2010.

Recognizing these problems I am happy that we have persuaded the Finance Minister to introduce an Accelerated Irrigation Benefit Programme in the Annual Plan for this year. Rs. 800 crores have been provided for large irrigation projects where substantial achievement can be expected - say in completing a section of the canal systems in the next two or three years and Rs. 100 crores for delivering water to the field in the next two agricultural years. These programmes will be strictly monitored. More important a blue ribbon commission has been set up with the following terms of reference :

- a. To prepare an Integrated Water Plan for development of water resources for Drinking, Irrigation, Industrial, Flood Control and other uses;
- b. To suggest modalities for transfer of surplus water to water-deficit basins by inter-linking of rivers for achieving the above objectives;
- c. To identify important On-going Projects as well as New Projects which should be completed on priority basis together with phasing;
- d. Identify a technological and interdisciplinary research plan for the water sector with a view to maximize the benefits;
- e. To suggest physical and financial resource generation strategies for the water sector; and
- f. Any other related issue.

The projections assume a vastly improved performance on the land and water management frontiers. It needs to be remembered that the balance ground

water reserves towards the later half of the Nineties will be more and more limited. A very dramatic effort will be needed to harvest and carefully use the available water. Otherwise, the projected increase in cropping intensity will simply not take place. Cropping intensity increased from around 1.18 at the beginning of the Seventies to around 1.3 in the early Nineties. In the next two decades, this effort needs to be considerably strengthened, so that cropping intensity can increase from 1.3 to 1.5. Harvesting of rainwater, recycling water from agricultural drainage systems, more judicious use of water for cropping, will all be required. Non-agricultural use of water will have to be far more economical.

Another way of looking at the severe land constraint is to see that a net area sown per person will go down from around 0.17 hectare to around 0.10 hectares. Gross area sown per person currently around 0.2 hectares will even, if cropping intensity increases very rapidly, go down to around 0.15-0.18 hectares.

It has been shown elsewhere that limited cooperation in water use has been successful in many watershed projects in resolving the land constraint. The same is true of lower level surface irrigation systems. Community involvement is also important for judicious management of aquifer systems and ground water use. In many cases, land management questions are equally important and are inextricably linked with water management, for example, land shaping in hill slopes and on farm investment in irrigation commands.

A meeting of Ministers of Water Resources will be convened in January 1997 to discuss these issues.

The technology interface is important, both for land and water management and for cropping and non-crop farm systems that are optimal, in this class of issues. While a lot of research has been done and is available, the real issues are policy rules for fast replicability of existing knowledge and success stories. Community institutions have to be at the heart of this process. ICAR, its centre and sponsored institutions, have not easily participated in this process.

This kind of development is simply not possible if the functional literacy skills of the farm population are not improved and if the peasant who works on the land, does not have rights to make improvements on it. There are a number of significant examples where based on local initiative, educational and training institutions led to knowledge based growth in rural areas. These include the Charota Vidya Mandal at Vallabh Vidyānagar (later Sardar Patel University), Dharamasthala Educational Trust (efforts of Veerendra Heggade) and many cooperative sponsored institutions in Maharashtra (for example the Pravara

Educational Trust at Loni). Recognizing the importance of such efforts, Government of India¹ have set up a National Council for Rural Institutes. The ICAR and its affiliates must be one of the major thrust institutions in this effort and its educational and extension wings must sponsor, accredit and support the effort.

The Government's Basic Minimum Services Programme also has the same objective. It consists of the following programmes which need integration with our agricultural strategy:

- (i) 100% Coverage of provision of safe drinking water in rural and urban areas.
- (ii) 100% Coverage of primary health service facilities in rural and urban areas.
- (iii) Universalisation of primary education.
- (iv) Provision of public housing assistance to all shelterless poor families.
- (v) Extension of mid-day meal programme in primary schools to all rural blocks and urban slums and disadvantaged sections.
- (vi) Provision of connectivity to all unconnected villages and habitations.
- (vii) Streamline the public distribution system with focus upon the poor.

At each agro-climatic level educational, health or connectivity strategies will have to be integrated with agricultural and rural development strategies. Take the Plateaux and Central Hill agro-climatic regions extending from Districts like Kalahandi in Orissa to Coorchauroh and Chandrapur in Western Maharashtra and including large tribal Districts in Madhya Pradesh, the growth strategy is to conserve the rainfall of around 50 cms. through watershed programmes and to follow through with a forest conservation and optimal cropping patterns. However the female literacy rate in this region is less than 15% and so no technology oriented strategy is possible without remedying this. A distinguished Vice Chancellor from an agricultural university told me that "sowing" dates were decided by the local "Bhuva" (witch doctor) rather than the agricultural scientists of the region.

1 See Rural Educational Policy Statement, Rural Educational and Development Policy Statement, May 27/28, 1995 Government of India have now set up a National Council for Rural Institutes, inaugurated by the Prime Minister at Hyderabad, 3 December, 1995, see Department of Education, Ministry of Human Resource Development, Government of India, The National Council of Rural Institutes, Memorandum of Association and Rules, 1995.

Community organisations are essential for both aspects as at best cooperation is an educational process and limited sharing of rights on land and water is a way out of landlessness and rack renting. It becomes difficult if not impossible to channel structural and limited subsidies and priority credit, to the kind of activities described above, if the land rights of the tiller of land are not clear and enforceable. Collateral needed by financial institutions for example, becomes very difficult to organize, if tenancy arrangements are not recorded. Cooperative arrangements provide a way out. Even when farming and other economic decisions are left to the initiative of the peasant, and the signals of the market, for well defined purpose, for example, land shaping, acquifier management, lower land water delivery systems or even specific marketing, quality, grading or input supply requirements, the peasant can cooperate. Self-help cooperatives with well defined objectives can then become the crucial interface between the country's manpower, its limited natural endowments and regional and global markets.

While developing macro-economic parameters for the Ninth Five Year Plan, emphasis will continue to be laid on the growth of the agricultural sector. If the overall GDP growth rate is visualized at 7% per annum, then the growth in the agriculture sector will have to be around 3.5% to 4% per annum in value added terms. The precise contours of growth in agriculture sector will be highlighted in the Agricultural Sub-Model of the Ninth Five Year Plan. However, as a preliminary observation, it could be stated that growth in agriculture sector would emanate from improvements in the per hectare yields of crop sector. It is also visualized that diversification and modernization of the various sub-sets of the agriculture sector would gain momentum in the Ninth Plan and the dynamics of agricultural growth would emanate from growth in non-food grain sectors, e.g. cotton, oil seeds, sugar cane, fruits and vegetables, spices, plantation crops, etc. along with the development of fisheries, animal husbandry and dairying.

On the assumption that per capita income during the Ninth Plan period will continue to show annual growth of around 4%, greater emphasis on diversification of the non-food grain sector involving crops like sugar cane, oil seeds, cotton, fruits and vegetables seems inescapable. Also the output levels in the non-crop based agriculture would rise faster due to (a) increasing flexibility of resource use; (b) response to changing demand conditions; and (c) the technological changes. In fact, these variables would determine the growth process in the economy during the next decade.

The assumption regarding faster growth of non-crop based agriculture is supported by the annual growth rates of output visualized for the Eighth Plan

which have been highlighted in the Technical Note on the Eighth Plan, in which agriculture was visualized to grow at an annual rate of 3.25% in value added terms, fishing at 5.45%, textiles at 5.87%, wood and paper products at 7.63% and leather and rubber products at 16.03%. This structure of output is in tune with the structure of demand anticipated for the economy during the Eighth Plan period.

The other major development that has taken place is fast growth of agricultural exports. It has been estimated that while a growth of 15% plus annual in agricultural export may be difficult to sustain in the long run - a growth path of around 12% annual in dollar terms should be aimed at. The output implications of even fast growth of exports are marginal in an economy of India's size, given the magnitude discussed earlier, but in selected regions, the impacts on income and employment can be high and the technological implications any way can be important both on agricultural production and processing and distribution¹.

Components of Development Strategy for the Ninth Plan and Perspective

In the Ninth Plan, the strategy of development has to be mobilisational in the sense of reaching out to those regions or sections of people who have been by-passed in the process of development and has also to aim at efficiency of resource use in areas and sectors which have already been developed. Supply side efficiency and technological transformations have to be inter-woven with the economic process of production potential and in this process meet the demands of those who are currently left out of the process of development². In working out the production potential in the agriculture sector, the approach of agro-climatic planning, which emphasises both land and water development strategies at the sub-regional level, is to be vigorously pursued. This approach sets specific targets for projects like tank irrigation, water-shed development, modernization and completion of canal system and diversification of cropping sequences in different agro-climatic regions of India.

For attainment of output targets in various sectors/sub-sectors in the Ninth Plan, investment levels have to be increased in critical sectors like agriculture, rural development, industry, power, tele-communications, transport, etc. With

- 1 See Y.K. Alagh, *India's Agriculture Trade with the Asian and Pacific Region*, in U.N., ESCAP, *Assessing the Potential and Director of Agriculture Trade within the ESCAP Regions*, U.N., New York, 1995, pp. 225-36.
- 2 Alagh, Y.K. (1995) *Foreword to the Revised Edition of Indian Development Planning and Policy: A Re-evaluation*.

increased public investment in infrastructural facilities, private and community investment is also likely to crowd in.

The trend in real investment in the agriculture sector is disturbing and has to be reversed. Fixed capital formation was 8.63 per cent of agricultural GDP in 1984/85, but is only 8.55% in 1994-95 at 80/81 prices. Even if the agricultural ICOR is around 3, a 12% rate of fixed capital formation is necessary. Increasing levels of investments in the agriculture sector have to be brought about through increased public investment in irrigation, rural communications and schemes for prevention and control of land and water degradation. The decision of the Central Government to set up a Rural Infrastructural Development Fund as announced in the Central Budget for 1995-96 will help in financing the on-going rural projects in backward areas. The Cooperative sector has to participate in increased investment activities in the various sectors of the economy. Certain NABARD studies show the self-help cooperatives for decentralized development can generate self-sustaining employment and income but such efforts would require initial refinancing support from outside. Training, infrastructure, including roads, quality control and processing facilities need to be set up around large agro-processing or export home demand areas in each District. The RIDF must meet this challenge, so that benefits of liberalization reach our small farmers.

Integrated water-shed development projects would need to be closely monitored. Various soil and water conservation technologies will need to be energetically pursued to raise productivity in the marginal and rainfed land holdings. Improved water management strategies in irrigated and assured rain-fall areas will have to be pursued. As per preliminary estimates, the share of gross irrigated area in gross cropped area is likely to be 46.4% by the terminal of the Ninth Plan. Emphasis will continue to be laid on diversified agriculture and crop intensification will be propagated with crop intensity reaching the level of 1.40 by 2001-02.

The output structure in the Ninth Plan needs to be so designed as to be conducive to the generation of 8-9 million employment opportunities per year. Emphasis will be laid on high employment elasticity activities like (i) animal husbandry, fisheries, horticulture, etc., (ii) sugar, fish canning and preservation; tobacco products and cotton ginning. For those who are left out on the agricultural and rural growth process, the Government is committed to an Employment Assurance Scheme.

In order to achieve the various output levels and to sustain the growing and well-diversified economy in the Ninth Plan it is necessary to evolve judicious public policies towards investment and technology which can mobilise

latent resources which are lying unutilized in the economy and can unleash wider processes of agricultural growth and decentralized developments linked to national and world markets. The perspective plan in the Ninth Plan may therefore amongst other strategies have to:

- (i) institutionalize the Accelerated Irrigation Benefit Programme for completing large and medium irrigation programme;
- (ii) operationalize the strategy of perspective planning for the water sector, being worked out by the special Commission set up for this sector;
- (iii) raise fixed investment in the agricultural sector to at least 12% of agricultural GDP; work out the private investment inducing aspects of public investment in the water, land development, agricultural technology and research and agricultural markets sector;
- (iv) carry forward the agro-climatic planning strategy;
- (v) complete the process of agricultural economic reform, including tariff reform, removal of trade bottlenecks, rural credit reform and liberalization of the cooperative sector; and
- (vi) work out the institutional support base for small farmers and employment for landless labourers.