INDIAN AGRICULTURE-RETROSPECT AND PROSPECT*

by

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I feel honoured to have this opportunity to pay homage to the memory of Dr. Rajendra Prasad. He was born in 1884 in the district of Saran, Bihar. He was one of the brilliant alumni of the Calcutta University. In 1920 he joined the non-co-operation movement launched by Mahatma Gandhi and since then he was an active worker of the Indian National Congress. During 1946 he acted as the President of the Indian constituent assembly. He was the first President of Republic of India. He continued in this high office for the successive terms from 1950. Prior to this he served as the Union Minister for Food and Agriculture for a brief period. He was a true disciple of Mahatma Gandhi both in better and spirit.

Dr. Rajendra Prasad was the President of Indian Society of Agricultural Statistics for 16 years from its inception. It is well known that his keen interest was Agriculture and Rural Development particularly for the uplift of the rural peasants of India not only when he was our Union Minister and the President of India, but also during the days of national struggle for freedom. Today's problem in rural India requires dedicated service of leaders of his calibre, if our promise of social justice is to be translated into a semblance of achievement.

I have chosen the topic of my lecture as 'Indian Agriculture—Retrospect and Prospect' which I feel would have a great bearing on the interests that were so dear to Dr. Rajendra Prasad.

1. The 1981 census has shown that India's population continues to be predominantly rural. Seventy seven per cent of the population lives in rural areas. Population growth and agricultural

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development in India are interdependent. Before the present century population growth was small and uneven. At the begining of the 17th century, population of India was 100 million by the middle of 18th century the number rose to 130 million, at the middle of 19th century it had reached 150 million. Since then India's population has grown steadily but the rate has been high after 1951 when it stood at 361 million. According to 1981 census the population reached 684 million *i.e*, an increase of 136 million in the decade 1971-81. The percentage of urban population to total population has increased from 11 per cent in 1901 to about 20 per cent in 1971 and to about 24 per cent in 1981. India's population base is so large that it is doubtful if the country will reach in the foreseeable future the degree of urbanisation associated with the western countries. India's economy is basically agricultural and agricultural production constitutes the single largest economic activity. Agriculture accounts for about 45 per cent of net national product.

2. Three major phases can be identified in our agricultural evolution since the begining of this century. The first phase is from 1900 to 1947, the second is from 1948 to 1979 and the third phase has begun in the eighties. The first phase was marked by a near stagnation in farming as is clear from the growth rate of about 0.3 per cent per annum achieved in agricultural production during this period. The situation did not go completely out of control owing to the fact that the population growth rate during this interval was meagre.

3. Indian agriculture during the second phase put up a valient effort to life itself from the stagnation of which it was for half a century prior to independence. Following steps were taken for expediting the process of modernisation of agriculture (*a*) Spread of technologies based on scientific research (*b*) extension of wide range of services and (*c*) adoption of public policies in land reform, pricing, procurement and distribution.

4. In India agricultural production constitutes the single largest economic activity in the country. The growth rate of agricultural production has been estimated at 2.81 per cent per annum during the period 1967-68 to 1978-79, even though the annual growth was stipulated at 4 per cent per annum in the plan document. For the same period the production of food grains has increased at the rate of 2.77 per cent and of cereals at 3.05 per cent. For wheat the growth is 6.02 per cent where as for rice it is only 2.64 per cent,

2.07 per cent of jowar and near about zero for bajra and maize. For barley the growth rate is negative—1.95 per cent. Since crops represent different regions, the differential rates of growth reflect regional imbalances. All India average growth rate of population is little over 2 per cent but in certain areas growth rate of food production is even less than this. In these regions people are poorer than other affluent regions.

5. During the same period the output of pulses has grown at the rate of 0.54 per cent much less than the growth of population. This has led to a chronic scarcity of this nutritionally important group of food grains resulting in high prices and decline in our nutritional standards. Per capita availability of pulses has come down from 69 gms per day in 1961 to 48 gms in 1978. The growth rate of oil seeds during the period was 1.67 per cent which is below the population growth. Consequently the supply of edible oil has worsened over the years.

6. The impressive pace of increase in India's rice production recorded during the early seventies has shown distinct signs of a slowdown in recent years. Given the limited impact of the new technology and the decisive influence of the monsoon on the overall size of the crop, a rise revolution analogous to the break through in wheat appears to be a distant prospect.

7. Though India ranks second among the paddy growing countries of the world, the yield per hectare in India at 2049 kg continues to be very low. It is not only lower than the developed countries' average of 5079 kg and world's average of 2750 kg per hectare but also of the developing countries average of 2207 kg per hectarce. Developments in the rice economy do not permit complacency. Serious problem still come in the way of higher production and productivity in the traditional rice growing states of India. Increasing rice production to its potential level calls for significant step up in research efforts accompanied by an efficient extension service, a larger use of balanced fertiliser and improved farm practices. Per capita availability of food grains to-day remains what it was in 1860-61 *i.e.* 171 kg a year.

8. An exaggerated picture is being painted of what has already been accomplished in the last two decades during the hey day of green revolution both by the scientists and bureaucrats. One Swallow does not make an Indian summer, nor would one Punjab—which with 3.5 per cent of the cultivated area produce 10 per cent of the grain—make a permanent nation wide green revolution.

9. In the years to come *i.e.* in the third phase it will be more difficult to keep pace with the rising population and maintain the per capita availability. From land utilisation statistics it is clear that the possibility of bringing more land under the plough is difficult. Therefore all additional output will have to come from increased yields per hectare. This seems to be more difficult now than it was last 20 years back.

10. Regarding other crops the production of cotton has increased with a growth rate of 2.71 per cent, production of Jute has grown at 1.51 per cent and mesta at 4.72 per cent. Their position may be considered satisfactory. While we have made some significant strides in crop production, our progress in live stock sector is dismal. I shall mainly confine myself mostly with crop production.

11. A state wise review of the situation shows that during this period food production in Punjab has risen by over 75 per cent in Haryana, Maharashtra, Gujarat and Rajasthan food production has increased between 40 to 45 per cent while in Orissa 4 per cent and in Kerala 1 per cent. Five states account for 30 per cent of the nations' total food output, all other states which contribute 70 per cent of the grain are near or well below the all India figure of 28 per cent output increase since 1967.

12. The differential growth rates of two characters namely food and population have led to imbalances in food availability, incomes and levels of living in the rural sectors of the states. The new agricultural strategy has made worthwhile impact only on one fourth of the cultivated area, at least half the country has remained outside the pale of green revolution and another one fourth has derived only limited benefits from it. The real danger to Indian agriculture is that we fail to draw correct lessons from past failures; on the contrary we always try to paint a rosy picture of the whole situation.

13. The question arises, is modern agriculture which is productive also efficient? A look at the history of agricultural development would reveal that the major emphasis so far was laid on breeding improved strains. The geneticists rose to the occasion and gave a wide spectrum of new varieties which transformed the country to a great extent. The marvel could be achieved through maximum use of fertilisers, pesticides, irrigation water and a combination of cultural practices. The net work of fertilisers and pesticide manufacturing organisations made such an impact that consumption

outstripped their production capacity and a shortfall had to be made up through imports from foreign countries. Naturally only comparatively rich farmers could procure their required quantity of fertiliser. Starting with almost the same base before the advent of the new yielding varieties, Assam today uses 3 kg of fertiliser a hectare against Punjab's 108 kg a hectare. This is a glaring example of in equal use of fertiliser.

14. The technology of 'new seeds, fertiliser and pesticides and water' as a package is the basis of modern agriculture. Energy crises has already appeared on the horizon on a large scale. The fertiliser and pesticide prices have increased exhorbitantly. The effect has been that there are outward signs of stagnation. The question that arises : can we make agriculture less energy intensive ?

15. The solution has to be found in the third phase of agricultural evolution. The solution lies in the rational analysis and combining good features of the latest inputs with the well accepted age old practices. Fuller exploitation of renewable and locally available resources, greater use of indigenous materials for plant protection, better water use efficiency, introduction of farm tools and machines to reduce human energy as well as development of management system based in agroeconomic principles are some of the lines of approach, aimed at energy saving. The third phase which begun in eighties should lay emphasis on energy saving methods, on marketing and trade and on institutional frameworks which could minimise the handicaps of small and marginal farmers and maximise the benefits for intensive agriculture *offered by small* holdings.

16. A careful look at the problem of imbalances to agricultural growth—would reveal that one of the vital differences between areas that have done well and those that have not is the wide disparity in the land—man ratio. Average holding in the four best states, Punjab, Maharashtra, Gujarat and Rajasthan ranges nearly between five and eight hectares. This is to be contrasted with the average of one hectare per holding in the entire gangetic plain covering U.P., Bihar and West Bengal. In fact 70 percent of the holdings in this region are in the category of 0.4 hectares while large holdings are negligible. Irrigation is usually impossible to organise. Due to fragmented and widely dispersed plots and inadequate supply of water, it is impossible for the poor farmer to engage in meaningful agricultture. Technology and extension packages that developed during this period were tailored strictly to suit the demands of the better off areas and

their larger farms, to the detriment of small farmers. The average farm holding was 2-6 hectares in 1961. It came down to 52.3 hectares in 1971 and to 2 hectares in 1976. Within five years (1971-76) the number and area under marginal holdings of below one hectare jumped by over 20 percent and of small farms below 2 hectare by about 10 percent. What is needed is a whole sale change of perspective and not merely dotes to the small farmers. Consolidation of holdings is an all India problem. Only it is more acute in the eastern region because of the extreme smallness of agricultural farms.

17. It is rather unfortunate that while nearly three fourths of the cultivated area is unirrigated and half of it will remain unirrigated for a long time almost all scientific efforts has been concentrated on irrigated agriculture. Two Ford Foundation experts have shown how of the 142 varieties of rice released by research institutions since 1965 "only three had been bred and two local selections made for rainfed upland conditions and three bred and four selections made for rainfed low land flood prone conditions. The rest were bred for controlled irrigated conditions." They have also estimated that for a rice crop of $ 8.5 billion, India was spending a bare $ 3 million or 0.035 per cent of the crop value on research and that too mostly on irrigated rice—while nearly two thirds of the rice land in the country is unirrigated. It is necessary to use natures' versatile resources to discover and breed local specific varieties of grain and derive optimum yields from any cultivable land.

18. During the second phase of evolution *i.e.* during the last three decades the objectives of agricultural research and development was to achieve self sufficiency in food. During the third phase the goal would not only be to further improve productivity and stabilise and diversify production but also to conserve it and to generate rural employment and enhance consumption by increasing the purchasing power of the people. High yield cum stability in production system will have to be developed ensuring maximum utilisation of available resources in soil, water and sunlight. Land use planning, water shed management approach and farming system approach to maximise returns and minimise risks would be some of the approaches for efficient utilisation of resources. Special attention will have to be paid to strengthen research in pulses and edible oils, to improve production potential and to develop location specific technology in these crops so as to help production of these crops by about 50 to 100 per cent in the eightees. Maximisation of biomass production,

partitioning it along economically remunerative path ways recycling organic wastes and efficient use of cultural energy to food energy would be some of the complementary objectives.

19. At the end of last decade the country accumulated buffer stock of 20 million tons of food grains which the planners found themselves illequipped to preserve or use gainfully either for growth or equity. In the country 300 million people are living below poverty line. The coexistence of such huge stocks of food grains along with wide poverty and unemployment clearly indicates that something has gone wrong not only of growth in agriculture but that of entire economy. The 1980's will have to resolve these contradictions. Food grains are available but at a price which nearly half of the India's population can not afford to pay, inspite of subsidisation of consumption and even a larger subsidisation on production. The gains of growth in agriculture have not reached them. The investment of nearly Rs. 25000 crores have by passed the poor farmers. It should have been our specific objective to see that these poor farmers benefited and not the affluent ones who would have reaped the fruits of these investments any way because of their entrepreneurship and head start that they have in the socio economic life of the country. Agricultural development has taken care of the rich farmers and neglected the majority of them who should be our concern during 1980s'.

20. What is required is to change the direction of investment. In the Sixth Plan out of the total public sector plan outlay of Rs. 71000 crores, allocation for minor irrigation is only Rs. 1400 crores. The establishment in India has created certain myths about planning and it ensures that investments are always tilted in favour of upper classes. The low investment in minor irrigation is one of the indications of this tilt. Although Rs. 7000 crores have been provided for major and medium irrigation projects but hardly anything for farm ponds.

21. There are indications that the moderate momentum gained during last 20 years is petering off. The Governments' hope of achieving a 4 per cent growth rate during 1980-85 to hit the grain target of 154 million tons is rather slender.

22. In order to achieve the twin objectives of self sufficiency of food and commercial crops and increasing the employment and income of the farming community, a suitable agricultural plan should be drawn up. It is a fact that during the last thirty years in each

plan document sufficient financial allocations were provided and plans were formulated for the development of agriculture but unfortunately we are still far away from achieving the two main objectives. There may be various reasons for this failure but I feel at no time sufficient emphasis was given on the statistical requirements for agricultural planning.

23. The agricultural resources are determined by physical conditions on the one hand and the ability of man to use and improve these conditions on the other. So diversified are the resources and the uses that man makes of them and so numerous and complex are the problems related to their development that it is hardly possible to systematically identify and classify every resources for purposes of appraisal. The three basic agricultural resources are soil, rainfall and sunshine. Utilisation of these resources depends upon number and quality of human resources, the level of agricultural technology, availability of capital resources and the like.

24. Land with its characteristics is an important agricultural resources. For purposes of appraisal land can be classified on the basis of present use ;-(*a*) agricultural area which include arable land, land under permanent crops, permanent meadows and pastures (*b*) forest land (*c*) unused but potentially active land. Arable land can be further classified according to major use. Essential to the study of productive capacity of land are maps based upon a knowledge of the soils and the yields obtained with various crops and types of live stock in each region. Such maps together with a knowledge of the local economic and institutional structure provide a solid basis for development programme. This is totally missing at present.

25. In appraising land, one will study the current land use and then on the basis of expected developments in technology, human and capital resources, he will decide on the most profitable use of land. In large countries like India land used and land capability studies at national level are difficult, it is necessary that land appraisal is done at regional level.

26. Man has not yet fully utilised the power of water especially so of the surface water, most of which flows down to the sea or goes underground. Appraisal of water resources should take into account quantity of water that can be put to the most productive uses in agriculture especially so in irrigating land and in producing hydro-electric power. It is not done at present.

27. Human factor is important in agricultural production. Human resources fulfil two rolesl abour and management. The productivity of labour depends upon education, training, age, sex, health, tradition, climate and the like. Appraisal should be based on classification of available human resources according to their present employment and productivity.

The statistics on total available labour force, employed under-employed and unemployed and the expected increase in their numbers are necessary for appraising labour resources. We do not have current and detailed data base for human resources.

28. Lack of availability of capital in right amount, at appropriate time and at reasonable terms has stood in the way of economic progress. In appraising this scarce resource one will have two types of estimates—one for value of existing agricultural capital and another for new investment in agriculture. The estimates of fixed and working capital will need to be made. Technology is a dynamic resource and its appraisal is linked with the use of other resources such as land, labour and capital. This is often termed 'appropriate technology' which we have failed to develop yet. Management is an important aspect of human resources. In agriculture, however, management is vested in the millions of farmers who operate in small size farms. It is difficult to get reliable estimates of productivity of this factor. Extensive crop cutting experiments should be undertaken for this purpose.

29. In India there is a significant dearth of knowledge about natural resources—maps, inventories for land, soils, mineral deposits and geological formations, surface and ground water hydrology, ocean resources and in—share fishing areas, forest resources and others. Deficiencies in national resource inventories place a significant constraint on the alternatives that can be opened for agricultural development investments. In this country unfortunately we never tried to evolve a sound data base of our national resources. Relevant statistics for the same are not available. Planners relied more on theoretical models with inadequate data than on statistical methods based on detailed information both at macro and micro level for making projection, forecast and targets.

30. At present there are a number of gaps in data relating to agriculture as well as some problems in respect of comparability, reliability and time liness of available data. These should be remedied and also a new plan should be drawn up for the collection of data in

new areas. Before that is done we should be clear about two questions—one agricultural policy decisions, as they are made today, seriously hampered by lack of timely and accurate data ? To policy makers at various levels in the Ministries, Planning Commissions etc., put to any analytical use, the available data in arriving at their decisions ? If they do, how sensitive are their decisions to the data output ? So long as policy makers are either not aware of or do not insist upon the analytical use of data in rational decision making and so long as data collection remains largely a byeproduct of routine administration, improvement in the data base of the Indian economy is likely to be very slow.

31. The Indian Council of Agricultural Research is an open body at the national level with principal mandate to promote aid and co-ordinate research in the areas of agriculture, animal science, fisheries, and agricultural engineering. The triple function of research, education and extension is carried out through 34 Central Research Institutions, 1 National Academy of Agricultural Research Management, 5 Project Directorates and 56 All-India co-ordinated Research Projects under the council and 21 Agricultural Universities located in the state sector. The statistical complement for the huge infrastructure is rather inadequate. It should be strengthened. Further, in decision making processes statisticians should have a bigger role. Future prospect of agricultural development can be brighter if the present prospective is modified to a certain extent and a new direction is given by the agricultural scientists.

32. **To sum up :** The weather and the international environment do not account fully the gap between performance and promise. There are other shortcomings wnich are within our control and which we have to remedy ourselves.

33. The first and foremost is the fact that irrigation potential is not fully utilised and yield rates over vast areas are below what is attainable with know technology. In the area of agricultural developments the major shortcoming is in the fact that much of the development is concentrated in a few areas of the country and that the weaker sections have not benefited in full measure. We have a strategy for the irrigated areas and much has been achieved but now we have to work for an increase in the pace of development in other areas like rain fed plains, the drought prone areas and hill areas.

34. The problem of population growth is very vital. Many of the gains of our past efforts have not been reflected in a visible

improvement in per capita living standard because of population growth. Without an attempt at fertility control all our efforts at improving the income of weaker sections may come to nought.

35. We are entering a more difficult and more challenging phase of our agricultural evolution. Success here after will depend upon our ability to increase the *average yields of a farming system* by reducing the gap between potential and actual yields in fields of small and marginal farmers and in dry farming and neglected areas.

36. Jawaharlal Nehru, our first Prime Minister said. 'We certainly attach importance to industry, in the present context we attach for greater importance to agriculture and food and matters pertaining to agriculture. If our agricultural foundation is not strong then the industry we seek to build will not have a strong basis either'.

37. We are struggling to get out of the morass of poverty and to reach the stage where growth becomes relatively spontaneous. The present phase of agricultural evolution will lead us to that stage.

APPENDIX

TABLE 1

Food Grains : Targets and Achievements

Plan	*Target*	(*Million tonnes*) *Achievements*
First	63	67
Second	82	82
Third	102	72
Fourth	129	105
Fifth	126	131

TABLE 2

Growth rates of Food Grains Production and Population

States	*Food Production (1960-61 to 1978-79)*	*Population (1961-79)*
1. Andhra Pradesh	1.69	1.68
2. Assam	2.36	3.00
3. Bihar	1.92	1.69
4. Gujarat	3.56	2.34
5. Haryana	5.33	2.34
6. Karnataka	3.40	1.91
7. Kerala	1.39	2.19
8. Madhya Pradesh	1.67	2.36
9. Maharashtra	1.77	2.19
10. Orissa	1.19	2.19
11. Punjab	8.01	1.69
12. Rajasthan	2.97	2.37
13. Tamil Nadu	1.83	1.52
14. Uttar Pradesh	2.79	1.68
15. West Bengal	2.72	2.34
All India	2.77	2.01

TABLE 3

Targets of Production during Sixth Five Year Plans 1980-85

Crop	*Assumed base level 1967-79 (Trend Estimates)*	*Plan Target 1984-85*	*Compound Growth rate of col. 4 over col. 3 (percentage per annum)*
(*A*) Food grains (Million tonnes)			
1. Rice	51.24	63.00	4.2
2. Jowar	10.88	12.00	
3. Bajra	5.28	5.80	
4. Maize	6.23	6.80	
5. Ragi	2.85	2.70	
6. Small Millets	1.83	1.90	
7. Wheat	35.64	44.00	4.3
8. Barley	2.30	2.90	
Total : Cereals	116.25	139.10	
Pulses	11.62	14.50	4.6
Foodgrains	127.85 or (123.00)	153.60	3.8
(*B*) Oilseeds (Million tonnes)			
1. Groundnut	6.12	2.80	
2. Castor seed	0.24	0.80	
3. Rapeseed & Mustard	1.91	2.40	
4. Sesamum	0.49	0.55	
5. Linseed	0.56	0.55	
Total : 5 Major Oilseeds	9.32	11.10	
6. Niger seed	0.10	0.20	
7. Safflower	0.23	0.35	
8. Soya Been	0.40	1.10	
9. Sunflower	0.15	0.35	
All Oilseeds	10.20	13.10	5.0