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Introduction :-

India has one of the largest and institutionally most complex agricultural research systems in the world. Historically, the Indian agricultural research system is the zenith of a process which started in the 19th century and which resulted in the establishment of the Imperial Council of Agricultural Research on the recommendation of a Royal Commission on Agriculture in 1929. Since then there was a stupendous evolution of agricultural research in India.

The main events in the history of agricultural research in India can be grouped into the following seven categories :-

1. Establishment of agriculture departments and agriculture colleges,
2. Establishment of the imperial council of agricultural research,
3. Initiation of commodity committees,
4. Project for intensification of regional research on cotton, oilseeds and millets,
5. Initiation of all India coordinated crop improvement projects,
6. Reorganization of ICAR, and
7. The development of agricultural universities.

Among these, first three could be listed under the development of agriculture in the colonial era, whereas the next four were prominent in the post-colonial era.

Agriculture, as the backbone of Indian economy, plays the most crucial role in the socioeconomic sphere of the country. Indian agriculture is a diverse and extensive sector involving a large number of actors. It has been one of the remarkable success stories of the postindependence era through the association of Green Revolution technologies. The Green Revolution contributed to the Indian economy by providing food self-sufficiency and improved rural welfare. The role of national agricultural research system was imperative in the context of Green Revolution.

AGRICULTURE DEVELOPMENT PLANS IN INDIA :-**1 FIRST FIVE-YEAR PLAN (1951-56) :-**

Indian agriculture was given the highest preference in the First Five-Year Plan during the years from 1951 to 1956. The Plan was largely concentrating on the increasing agricultural production and strengthening of economic infrastructures like irrigation, power and transport as after independence, there was an acute food shortage faced by the country.

Hence to solve the food problem priority was given to increase production of food grains. There was a remarkable increase in agricultural production during the First Plan period. A good monsoon was supportive in the success of agriculture during the First Five Year Plan period. The production of foodgrains increased from 54 million tones in 1950-51 to 65.8 million tones at the end of the Plan I. The targets sent out for the Plan were almost accomplished. Even in some cases, the targets exceeded.

2 SECOND FIVE-YEAR PLAN (1956-61) :-

In the second plan, emphasis was shifted from agriculture to industry and only about 21 per cent of the actual plan expenditure was spent for agricultural development. There was a shortfall in the production of all crops. However, sugarcane was an exception as its production had increased during the period of Second Five Year Plan. As a result of the disappointing agricultural production; the country had to import food grains from overseas to prevail over the food scarcity. During this Plan, an inflationary situation started emerging in the economy of India.

3 THIRD FIVE-YEAR PLAN (1961-66) :-

After the hard times faced during the Second Five Year Plan regarding the agricultural production, the objective of the Third Five-Year Plan was to achieve self-sufficiency in food grains and to increase the agricultural production to meet the needs of industry and export. As a result, the plan accorded higher priority to agriculture

and irrigation than to industrial development. Moreover, the Plan targeted to increase overall agricultural production by 30 per cent. Nevertheless, the success achieved during the period of the Third Five Year Plan was highly unsatisfactory. The food production increased only by 10 per cent as against the target of 30 per cent. Consequently, the country has to import Rs. 1,100 crores worth of food grains to meet the domestic demand.

THREE ANNUAL PLANS (1966-69) :-

During periods of three Annual Plans, a high preference was given to minor irrigation. This was followed by adoption of a high yielding variety programme to increase agricultural production and productivity. Thus, this period is considered crucial for Indian agriculture as the green revolution took place during this period and the Government set up Agricultural Prices Commission to assure minimum support prices to farmers. The Food Corporation of India was made responsible for maintaining buffer-stock to surmount fluctuation in the supplies of food grains and their prices.

4 FOURTH FIVE-YEAR PLAN (1969-74) :-

The Fourth Plan had two objectives in the agricultural sector. Those are To provide the conditions necessary for a sustained increase of food production by about 5 per cent per annum over the decade 1969-78 and To enable a large section of the rural population including small farmers, farmers in the dry areas and agricultural labourers to participate in the process of agricultural development and share its benefit. The Green Revolution introduced during the annual plans had a good result. However, still the actual production of food grain was 104.7 million tones in 1973-74 as against the targeted increase of 129 million tones.

5 FIFTH FIVE-YEAR PLAN (1974-79) :-

During the Fifth Plan, Rs. 8080 crores (nearly 21 per cent of the plan outlay) was made for agricultural development and irrigation². The Fifth Plan accorded priority for the spread of High Yielding Variety (H.Y.V) cultivation, greater use of fertilizers, pesticides and insecticides to increase agricultural production. The Plan further provided special emphasis on Small and marginal farmers, Dry farming technique, Evolving H.Y.V. seeds for other crops like paddy, Social conservation measures on saline and alkaline soils and for desert land reclamation. During this Fifth Plan, there was a considerable increase in the production of food grains. But the output of pulses and oil-seeds, paddy remained stagnant and caused substantial adversity for the common man.

6 SIXTH FIVE-YEAR PLAN (1980-85) :-

The Sixth Five-Year Plan recognised that the growth of the Indian economy depends significantly on a rapid growth in agriculture and rural development. The main objective of the Plan, therefore, was to increase agricultural production, Generate employment and income opportunities in rural areas and Strengthen the forces of modernization for achieving self-reliance. Further, the plan aimed at accelerating the pace of the implementation of the land reforms and institution building for beneficiaries. The Sixth Plan was officially held as a great success particularly due to its success on the agricultural fund.

7 SEVENTH FIVE-YEAR PLAN (1985-90) :-

The Seventh Plan aimed at an annual average increase of 4 per cent in agricultural production. The Plan allocated Rs. 39,770 crores for agricultural sector which is 22 per cent of the total plan outlay³. The major programmes adopted during the plan were, a special rice production programme in the eastern region, national water-shed programme for rain-fed agriculture, national oil-seed development project and social forestry. Regrettably enough, the first three years of the Seventh Five Year Plan encountered poor monsoon. As a result, agricultural production received a set-back during these years. However, it increased sufficiently during the last two years for which the agricultural production recorded a creditable growth of 4.1 per cent in the Seventh Plan.

8 EIGHTH FIVE-YEAR PLAN (1992-97)

The basic objectives of the Eighth Five-Year Plan were To unite the gains already achieved in agricultural productivity and production during the last 40 years; To protect agricultural productivity and production in order to meet the increased demands of the growing population; To enlarge the income of the farmers; To create more-employment opportunities in the agricultural sector; and To step up agricultural exports. 22 per cent of the total plan outlay amounting to Rs. 93,680 crores was allotted for agriculture and irrigation. The Plan targets a growth rate of 4.1 per cent per annum for the agricultural sector. Thus, during different plan periods, the Government has accorded vital importance to the agricultural sector and has tried to increase the agricultural production and productivity through different policy measures like the special rice production programme, initiated by the Government in Assam, Bihar, Orissa, West Bengal and eastern Uttar Pradesh, National watershed development programme which gives emphasis on dry land horticulture, optimal cropping system, firm forestry and fodder production. Here, the aim is to develop areas under dry land agriculture which are characterized by low productivity and high risk.

9 NINTH FIVE YEAR PLAN (1997-2002):-

As noted in the ninth plan, the future economic and social development of the country was in substantial measure reliant upon the technological improvements in agriculture. A massive application of science and technology would enable Indian agriculture to face the serious challenges of food security and ensure a place for value added Indian agricultural products in the global markets. The plan recognized the immense opportunities offered by technological revolutions in the field of molecular biology, biochemistry, physiology, Geographical Information System, systems analysis, revolution in informatics, remote sensing etc. The objective of the plan was to tap the potential of science and technology to improve the living conditions of the poor. It was increasingly difficult to obtain any sizeable incremental production from the conventional Green Revolution areas. The concept of a second Green Revolution came during this period. For the second Green Revolution, it was necessary to make the grey areas green i.e., to make the unproductive areas productive. Hence, a major support for the rainfed areas, especially in Eastern and arid peninsular India would be necessary. Public sector research and technology missions (as for instance the mission on oilseeds) on various crops would play a crucial role in improving the crop production. The plan emphasized on how to reduce the yield gap between the lab and the field, particularly in the case of dryland crops which is an important challenge for agricultural research & technologies.

10 TENTH FIVE YEAR PLAN (2002-2007):-

The agricultural development was a core element of the Tenth Plan, since growth in this sector was likely to lead to the widest spread of benefits especially to the rural poor. As cited in the plan, the first generation of reforms concentrated on the industrial economy. Reorganizations in the agricultural sector were neglected. Hence, this must change in the Tenth Plan. One of the areas that needed attention was the development and dissemination of agricultural technologies. Over the years India has developed an extensive system of agricultural research centres and extension services. There was reason to believe, however, that the quality of the agricultural research efforts has weakened while the extension system has virtually collapsed. Strengthening of the agricultural research and development system, with special emphasis on bio-technology, and a significant improvement in the degree of sophistication in the technology dissemination methods were found to be essential to achieve rapid and sustained growth in agricultural productivity during the Tenth Five Year Plan. A radical renovation of the extension services was also the need of the time.

11 ELEVENTH FIVE YEAR PLAN (2007-2012):-

The analysis by the Steering Group for the Eleventh Plan has identified technological change (using yield potential of varieties of major crops released by the National Agricultural Research System [NARS] as a proxy), public investment (including investment on irrigation), and diversification (represented by area under fruits and vegetables) as the most important proximate determinants of growth. The Eleventh Plan had found out some research gaps in the agricultural sector.

The following critical research gaps were identified in the Eleventh Plan:-

- 1) Integrating methods of traditional and modern biology giving attention to both yield and quality aspects.
- 2) An orientation of public sector research in „hybrid development with commercial viability“ has to be reintroduced on a mission mode at least in crops like pigeon pea, soybean, and mustard.
- 3) Indigenous plant types that inherently possess genes responsible for higher nutritive value need to be identified and used for enriching nutrients in rainfed crops.
- 4) A major research thrust is warranted in areas of balanced and site-specific nutrient supply and efficient water management strategies.
- 5) Integrated Pest Management needs greater emphasis. In horticulture, the research agenda needs to emphasize survey of indigenous biodiversity for resistance to various biotic and abiotic stresses for improvement in production, productivity, and quality of produce.
- 6) In livestock, there is an urgent need to reorient research and assess the genetic potential of indigenous breeds. Intensive research work needs to be undertaken for genetic

identification of traits of excellence in Indian breeds.

- 7) With endemic shortage of animal feeds, research should explore technologies to augment feed resources, including genetic modification of microorganism to utilize high ligni forage grasses.
- 8) With large quantities of animal products now being produced, research on process technologies, value addition, packaging, storage, transportation, and marketing should receive high priority.

It was found to be essential to take a comprehensive view of the functioning of the agricultural research system and make systemic changes in the course of the Eleventh Plan.

CONCLUSIONS :-

Agricultural research in India has an interesting history regarding its growth and development. It started during the colonial era and today the agricultural research system in India includes some 27,500 scientists and more than 100000 supporting staff actively engaged in agricultural research, which makes it probably the largest research system in the world. They are distributed in the Indian council for Agricultural Research , Agricultural Universities, General Universities and other organizations. In the present research system, the Indian Council of Agricultural Research at the National level mainly aids, promotes and coordinates research and education activities throughout the country. The research and education responsibilities at the state level rest with the State Agricultural Universities. In addition to these main streams of research, some general universities and other agencies like scientific organizations related to agriculture, Government Departments, voluntary organizations, private institutions etc. participate in the nation's research efforts. Hence, the role of National Agricultural Research System in the development of agricultural research is of great importance within which all these organizations come. Five year plans play a major role regarding investment, technology transfer and other aspects related to agricultural development in India. Although agriculture has been playing the most vital role in Indian economy, during the course of the study, it has been found that not much emphasis has been given to the history of evolution of agricultural research in India.

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