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Acreage Superintendence in Punjab: Implementation and Inspection Approach

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ABSTRACT

Punjab is located in India's northwest. It is one of the smallest states in the country, containing 50,362 square kilometers, or 1.5% of India's physical area yet sustaining around 2.5% of the country's people. The Punjab State has a total land area of 5.03 million hectares, of which 4.23 million hectares are under cultivation. Agriculture is a lifestyle. Agriculture directly employs over 75% of its population. Punjab is admired by several Indian states for its outstanding achievements in agricultural development. During the Green Revolution, the country saw a significant growth in agricultural productivity, owing to a healthy combination of institutional and technical factors. Agrarian economy, landholding consolidation, reclamation of new agricultural areas, irrigation development, use of biochemical inputs including high yielding variety seeds, chemical fertilisers, pesticides, and mechanical inputs were all critical factors in Punjab agriculture's rapid progress.

Key words: Farm, Green Revolution, Fertilizer, Productivity

Agriculture profile of Punjab

The agricultural growth accomplished in Punjab country is unique in the history of global agriculture. The nation, which was in food deficit at the time of independence, has achieved remarkable progress in agricultural development and contribution to the primary pool, bringing India closer to self-sufficiency. Early success was brought about by dominating agricultural form, holding consolidation, irrigation infrastructure enhancement, and a tough running peasantry. With the adoption of the newest agricultural period in the mid-1960s, sponsored by good agricultural policies, the state became a model of India's successful green revolution approach. Wheat output in the country increased at a CAGR of 2.83 percent per year from 5.62 million tonnes in 1971-72 to 15.09 million tonnes in 2014-15. Wheat and rice productivity in the state grew dramatically, from 2405 kg/ha and 2044 kg/ha at one point in

1971-72 to 4305 kg/ha and 3838 kg/ha respectively at one point in 2014-15. The use of HYVs in Punjab has increased the demand of chemical fertilisers and plant protection chemicals.

Marketing

Besides the improvement in farm technology the agricultural development also depends on the advancement in market infrastructure to ensure better returns to the farmers. Agricultural Produce Markets Act, 1961 states that the market charges in Punjab have been governed and transactions are carried by open auction in the regulated markets. Punjab has developed from 88 in 1970-71 to 152 in the year 2014-15. Likewise, during the same period the number of sub-yards connected with these regulated markets has enhanced from 154 to 275. Over this period, the geographical area and average number of villages served per regulated market in

Punjab reduced from 573 to 331 sq. km and from 139 to 80. The Punjab Mandi Board offered all weather metalled roads to all the villages so that the farmers could easily sell their output throughout the year. It is very motivating that 100% villages of Punjab are connected with the all-weather metalled roads which helped in efficient marketing of farm output in the state.

Land use

The total geographical area, of the Punjab state is 50.36 lakh hectares. During 2013-14, about 82 % of the area in state was already under cultivation. The area under permanent barren and un-cultural land which has been found to be stable at 23-25 thousand hectares in state during 2007-08 to 2011-12 doubled in 2012-13 to 51 thousand hectares and it's the almost same during 2013-14. The sustainability in the increase of production per unit of land area has to come through enhancing the input use efficiency or upward shift in the use of technology.

Soil structure

Soils found in Punjab are alluvial and deep, varying from sandy to silt clay. The soils having developed on alluvium are at initial to moderate stage of profile development. They are very deep porous sandy loam in texture, and show weak to medium developed soil structures with good soil-air-water relationship. The soils have more potential for agricultural production in view of their high reserves of weather able minerals. In some parts of the state due to changing ground water table, use of bad quality irrigation water, improper soil and water management operations and lower topographic positions resulted into gathering of salts in the upper layer of soils and changing these into saline and sodic. The sodic soil can be taken under cultivation by addition of gypsum and following rice-wheat cropping system. Total land reclaimed through gypsum addition in state so far stand at 5.91 lakh hectare.

Cropping intensity

Cropping intensity is a measurement of the extent of multiple cropping. In Punjab state there has been progressive enhance in intensity of cropping over the years and now intensive cropping that is getting two crops from the same field is a general feature. The cropping intensity in state enhanced marginally from 188 % in 2007-08 to 189 % in 2013-14. This, al-

ready higher level of cropping intensity denotes that in Punjab state the vertical extension of area in future has become increasingly limited.

Water management

In Punjab about 99 % of the net sown area is irrigated. The state has good surface and groundwater irrigation infrastructure. Surface irrigation distribution network consists of 1, 45,000 kilometers of canals comprising branch canals and minor distributaries, and 1 lakh kilometers of field channels. The canal irrigation system irrigated 1160 thousand hectare in 2013-14 resulting for 27.99 % of the net irrigated area in state. While canal irrigation has been almost constant over the years with some variations, tube well irrigation, particularly in the central and northern region of Punjab has been on the expand and during 2013-14, there were about 14.05 lakh tube wells providing irrigation to about 2981 thousand hectares of land accounting for 71.92 % of the net irrigated area in Punjab. The water table in the central districts of Punjab has been decreasing whereas in south western parts it is increasing resulting into the problem of water logging.

Weather and climate

The affects of weather on agriculture are far reaching, effecting the crop plants right from germination till maturity. The climate of Punjab is generally affected by the Himalayas in the North and the 'thar' desert of Rajasthan in the south and south west. The mean annual rainfall differs from less than 300 mm to about 1400 mm. A major portion of the rainfall that is 70% is received during monsoon season during July to September.

Seeds

Good quality seed of high yielding varieties has played the very important role in broadening agricultural production in Punjab. Foundation seed of HYVs is supplied by the agricultural Universities for its additional multiplication. Various Seed Corporations, Punjab Agricultural University and State Department of Agriculture dispense the certified seeds to the farmers. Due to considerable efforts of concerned Departments of State and Punjab Agricultural University (PAU), the state farmers did not face the lacking of seed of principal crops in the state during the recent years. For wheat and paddy crops the total seed demand in the state during 2014-15 was figured at 350500 tones and 57880 tones.

Fertilizer and manures

Intensive agriculture, with high use of synthetic fertilizers was adopted in India in 1960s as a part of the Green Revolution. The quick initiation of synthetic fertilizers and fertilizer responsive varieties along with irrigation did help in a remarkable enhance in agricultural production of Punjab state⁰. Total utilization of Nitrogen (N), Phosphorus (P) and Potash (K) nutrients in state during 2007-08 was 16.98 lakh tons which reduced by about 1.24% that is to 16.77 lakh tons in 2014-15. During 2014-15, use of N, P and K was 13.21, 3.26 and 0.30 lakh tons, 2011-12, fertilizer prices remained unchanged for many years. Price of urea is still controlled by the Government and hence broadening marginally from Rs 530/qtl in 2010-11 to Rs 544/qtl in 2014-15. However after partial decontrol, prices of phosphate fertilizers particularly Di-ammonia phosphate (DAP) enhanced.

Farm machinery

Mechanization has provided remarkably in the increasing agricultural production of the state. It supports in performing the timeliness of numerous farm operations like seedbed preparation, sowing, spraying, harvesting and threshing and provides systematic use of resources. As per rate of Punjab State Farmers Commission, the state has dual the number of tractors than it requires. The average use of tractors per annum in the state is hardly 450 hours, which is much below the prescribed efficient usage of 1000 hours, in agriculture.

Irrigation

Punjab has an organized irrigation Distribution set up through canals, branch canals and minor distributaries and field channels. The cultivation of high water demanding crops particularly paddy is an important factor accountable for decline in underground water levels in Punjab. Annual availability of surface and ground water in state is 3.48 million hectare meters (mhm). However, the annual demand for state agriculture is 4.76 mhm. The annual deficit to the tune of 1.28 Mhm every year is met through the overexploitation of underground water by tube wells leading to serious problem of deteriorating underground water resources. Overtime, tube well irrigation has been increased and about 73 percent of the total irrigated area is irrigated by underground water pumped out by about 14.05 lakh tube

wells in the state. This is mainly due to availability of cheap credit and free supply of electricity in the state. As, for the last many years, the Punjab farmers are getting free electricity supply for the use of tube wells as well as canal water irrigation. Wheat and paddy being the major crops of the state, maximum area irrigated is under these two crops estimates that during 2013-14, wheat and paddy accounted for 44.95% and 36.73 % of the gross irrigated area in Punjab State.

Labour and agriculture wages

The employment elasticity with appreciate to combination output come down from 0.54 at some stage in 1970's to 0.36 throughout 1980's and presently even much less than 0.20 (Sindhu, 2002). In addition, the enjoy of the remaining decade brings out that, the growth in agricultural quarter has been producing more casualization of employment. There is an boom in casualization of labour as time beyond regulation the proportions of family labour and everlasting employed labour is declining (Deshpande *et al.*, 2007). The stage of mechanization is already higher in Punjab, where man days employed in manufacturing of crops are low as compared to different elements of the us of a and a negative boom in agricultural employment became skilled against a high quality growth fee of real agricultural output within the nineties (Haque and Sharma, 2004).

The consistent with hectare labour use in cultivation of wheat, paddy and cotton which together account for greater than 85 percentage of the gross cropped region in Punjab. During 2013-14, according to hectare labour use in cultivation of wheat, paddy and cotton became 136.48, 353.46 and 628.78 man hours.

Credit

Credit is a vital input which has performed a tremendous function in the development of Punjab agriculture. The formal credit score institutions together with Cooperative Credit Institutions, regional Rural Banks and Commercial Banks are presupposed to meet the rural credit score requirement within the Punjab. Out of general stores of Cooperative Credit set-up 3990 are Primary Agricultural Cooperative Societies, Primary Agricultural Cooperative banks and 676 rural/semi-urban branches of Central Cooperative Banks (Shergill, 2011). With aiming at increasing the performance of formal credit transport machine, the Central government

released the scheme of Kisan Credit Cards (KCC) in 1998-99.

Out of this industrial banks and cooperative banks had about 10.14 lakh and nine.48 lakh tremendous KCCs amounting to Rs 104459.93 and Rs 7217.86 crore respectively (Agenda papers of 136th Meeting Of SLBC-Punjab) .

Major crops: - Area, production and yield

The area, production and yield of rice over the study period (1992-93 to 2014-15) went up tremendously in Punjab by 39.67 percent, 58.08 percent and 13.18 percent, respectively. This tremendous increase in rice production happened despite it was not traditional rice growing state. Plan-wise the area expansion under rice was largest during 9th plan (9.03 %) and lowest during 10th plan (3.60 %) whereas, the production and yield increase was observed to be highest in 10th plan by 14.17 percent and 10.20 percent, respectively. The lowest increase in rice production (0.53 %) due to decline in yield by 6.92 percent was observed during the period of 11th plan. In Case of wheat area, production and yield during the study period went up by 6.76 percent, 21.69 percent and 13.95 percent, respectively. Plan-wise highest (3.64%) area increase under wheat was observed during 9th plan. While the maximum increase in wheat production (21.90%) and productivity (17.62%) was observed during 9th plan, the lowest increase in yield (0.24%) was recorded during the 10th plan. The rice productivity increased significantly at CAGR 2.40 percent during 10th plan, whereas it declined during 11th plan period by CAGR of 1.91 percent. The production of wheat during the study period increased at CAGR of 1.20 percent while its area and yield increased at the rate of 0.31 and 0.89 percent. Thus major contributor towards wheat production over this period was the increase in yield. Plan-wise major increase in wheat area, production and yield was observed during 9th plan. With the exception of potato CAGR of area of all other major crops in state viz. cotton, maize, total pulses, total oilseeds and sugarcane during this period were found to be negative.

Post-harvest management and value addition

Agro based industry refers to the subset of manufacturing that processes raw materials obtained from agriculture and its allied sectors such as animal husbandry, forestry and logging and intermediate products derived from other industries such as semi pro-

cessed hides and skins for manufacturing leather and leather products and edible oils for manufacturing hydrogenated oil. The value adding processes ranges from simple preservation like drying, grading and storage of output to production of high value products such as manufacturing of textiles, paper, rubber etc., through modern capital intensive methods (Chadha and Sahu, 2003).

Developing countries have long promoted post harvest management and value added processing of agricultural output as a path of industrialization. With increase in per capita income and urbanization leading to increase in demand for high quality processed and packaged foods the process of value adding to agricultural production and fostering of farm non-farm linkages starts gathering momentum which in turn generates higher income and employment for the farm families, besides making agriculture a more effective contributor to industrial growth (Sarkar, 1997).

Post harvest losses range between 15-35 percent for different types of agricultural produce. It is obvious that any reduction in post harvest losses will contribute to the net availability of food in the economy, which is of immeasurable worth and will help to increase the producer's returns and consumer's price (Grover and Kumar, 2011).

Conclusion

The econometric analysis in the previous section highlights the three factors that have been the drivers of agricultural growth in Punjab in the past: (i) expanded irrigation through tube wells (ii) assured remunerative prices for wheat and rice and (iii) expansion of all-weather roads. However, the growth that could be achieved by developing roads, irrigation and markets has already been realized and exhausted. The state has successfully brought 98.5% of the gross cropped area under irrigation, which is commendable. The road infrastructure in Punjab is among the most developed in India. Transport facilities enhance the interaction between different agents, starting at the farm level to the household consumption level. This is particularly critical to facilitate the movement of perishable agricultural commodities. Surfaced road as a percentage of total roads is 91% in Punjab, one of the highest in the country. The soils have more potential for agricultural production in view of their high reserves of weather able minerals. In some parts of the state due

to changing ground water table, use of bad quality irrigation water, improper soil and water management operations and lower topographic positions resulted into gathering of salts in the upper layer of soils and changing these into saline and sodic. The production of wheat during the study period increased at CAGR of 1.20 percent while its area and yield increased at the rate of 0.31 and 0.89 percent. Thus major contributor towards wheat production over this period was the increase in yield. Plan-wise major increase in wheat area, production and yield was observed during 9th plan. With the exception of potato CAGR of area of all other major crops in state viz. cotton, maize, total pulses, total oilseeds and sugarcane during this period were found to be negative. The share of wheat and rice procurement in total production is also the highest in the country. Wheat and paddy being the major crops of the state, maximum area irrigated is under these two crops estimates that during 2013-14, wheat and paddy accounted for 44.95% and 36.73 % of the gross irrigated area in Punjab State. There is no real scope for further improvement in these areas. Therefore, in order to bring agricultural growth in Punjab back on track and get it growing at more than 5% per annum for another decade or more, we must look to other sub-sectors that could lead to high agricultural growth in the future. With aiming at increasing the performance of formal credit transport machine, the Central government released the scheme of Kisan Credit Cards (KCC) in 1998-99. Out of this industrial banks and cooperative banks had about 10.14 lakh and nine. 48 lakh tremendous KCCs amounting to Rs 104459.93 and Rs 7217.86 crore respectively. The future of Punjab's agricultural prosperity lies in the high-value sectors of agriculture.

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