

Impact of Commercialisation of Agriculture and its Impact on Gross Cropped Area and Gross Irrigated Area

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ABSTRACT

Adoption of Borlaug's Mexican seed fertilizer strategy during mid sixteen put Punjab on growth trajectory .An uninterrupted growth process began on the edifice of multiple factors. The scene of traditional economy changed into modern and self sufficient economy. Farmer's psychology changed and large sized holdings dominated the agrarian base. Earlier the Punjab farms varied greatly. Enormous capital was poured into Punjab farms which resulted in the transition of animal oriented agriculture into machine oriented agriculture.

INTRODUCTION

Change in political configuration of Punjab was complemented with new agriculture strategy known as Green Revolution. The state's new agriculture strategy consisted of high yielding variety seeds, chemical fertilizers, insecticides, pesticides, herbicides and modern agriculture technology comprising of machinery etc. The cultivators of Punjab were the first to adopt Borlaug's Mexican seed fertilizer strategy during the mid 1960s (Ravita, 2011). After this, a chain of policies and plans were initiated and implemented for the development of agriculture. Agricultural price polices initiated in Punjab augmented the agricultural development process. This remarkable transformation from subsistence agriculture to commercial agriculture was due to the hard work of the farming community, determined efforts of successive governments, adequate physical infrastructure and well-developed irrigation network. The programs and policies initiated for agricultural development in the state were efficiently implemented compared to policies in other sectors of development. Major policies adopted for enhancement and improvement of agricultural gains were consolidation of landholdings, extension of cultivated and irrigated lands, use of fertilizers and high yielding variety seeds Finding wheat and paddy as most profitable, farmers of Punjab made the farming of these crops a usual practice. The increased food grains gave rise to surpluses, which in turn forced the farmers to bring it into the market for sale. Punjab state came to be known as the food basket of India (Jodhka, 2005). The journey of Punjab subsistence agriculture to modern commercial agriculture is very interesting and full of slacks and boom. The scene of Punjab agriculture was dominated by small and fragmented holdings but with the change in farmer's psychology the number of marginal and small holdings declined in comparison to 1970-71 and the large size holdings increased. New technologies entered into the society. Green revolution transformed Punjab from only wheat growing state to rice and wheat yielding state. Yield of Wheat and Rice

during 1970-71 was 2238 kg per hectare and 1765 kg per hectare which rose to 2730 kg per hectare and 2733 kg per hectare respectively during the year 1980-81. Crops like wheat and rice which assure the farmers of good returns are dominating the scene these days. Thus monoculture system has captured the scene in Punjab. In the modern capitalized system of agriculture social strata has also got changed. The transition from subsistence agriculture to commercial agriculture, that is, from animal power to mechanical power has made agriculture more capital intensive. The composition of Punjab farms varies greatly. All the farmers do not have easy access to modern and highly priced machineries Kaur and Sinha (2011) in their paper asserted that Green Revolution introduced the concept of commercialization of agriculture in Punjab which had irreversible and far reaching effects on Punjab economy. Under this system of agriculture more area is brought under cultivation, huge investments are made and land holdings are consolidated. Multi cropping system changes to mono-cropping system, consisting of wheat-paddy cycle. Mahaliyanaarachchi and Bandara (2006) defined commercialization of agricultural production as the phenomenon in which farmers' production is aimed at sales only. Elamin, et al. (2003) examined commercialization of agriculture as a stimulus to increase food production and reduce food insecurity. It is considered to be associated with cash crops. Khurana (2010) asserted that in commercial agriculture the entire farm is adopted to one chief market product. He asserted commercialization of agriculture as the penetration of capital into agriculture. Capitalism converts the cultivator into some sort of industrialist, land into marketable commodity and replaced labour service by hired labour. Harriss (1983) explained that, commercialization is understood as increasing exchanges of agriculture for cash. Sable (1994) defined commercialization of agriculture as a combination of many forces which are responsible to change the whole agrarian structure. The factors that have direct impact on the growth and progress of a country the important economic

factors are capital, labour, land, technology and management Afghah (199). Large and consolidated land holdings ensure use of modern farm equipments which results in higher production levels. Large scale production will automatically generate surpluses which will ultimately come to market for sale. Large sized land holdings also ensure specialization and monocultures which are important features of commercialization of agriculture (Shiva, 1991). **Vardarajan and Elangovan (1995)** highlighted that area under cash crop, credit rationing, favorable market, high investment cycles, alternate crop patterns, group /co-operative farming are the important factors effecting commercialization. **Gupta and Tewari (1985)** in their paper observed that there is inverse relationship between farm size and diversification. The greater the farm size the greater will be the scope of specialization and vice versa little scope for specialization and thus for commercialization also. Thakar, et al. (1985) and Singh, et al. (1985) also approved the same view. But their view differed from Haque (ed.1996) who elucidated in his paper that even small and marginal farmers can go in favour of high value crops and entrepreneurship if the constraints of technological, infrastructural, institutional and policy formulation are removed. **Martey, Ramatu, Hassan and Kuwornu (2012)** described marketing, agricultural finance, farm size, infrastructural facilities as the important factors influencing the level of commercialization. Their study stated that commercialization is related with increased competitiveness and farmers' integration into domestic and foreign markets **Jayne, Yamano and Weber (2003)** emphasized on land holdings for higher levels of commercialization **Rahut, Castellanos and Sahoo (2010)** also emphasized the significance of landholding in commercialization of agriculture. Their study stated that a household having lower land per capita generally has to devote a higher proportion of their land to food production in order to sustain the level of food self-sufficiency and so less land is available, if any for production of higher value crops for the market. **Lerman (2004)** in his paper has given great importance to land size in the commercialization of agriculture. His study stated that large sized holdings employ large number of workers by creating more employment and more income. Larger land areas have positive impacts on commercial orientation. **Olwande and Mathenge (2010)** in their paper gave profound significance to farm size. Their study stated that farm size had indirect positive impact on market participation by enticing farmer class to generate more production surpluses. Availability of surpluses helped farmers to overcome the problem of credit availability and thus improved the level of commercialization. As more and more area is brought under cultivation more grains are available to be brought for sale Vardarajan and Elangovan (1995). Large sized land holdings also ensure specialization and monocultures which are important features of commercialization of agriculture Shiva (1991). The main issue is to bring more and more area under

cultivation to reap more harvests so that they may be brought in the market for sale Kaur and Sinha (2011). The higher the area under cultivation the higher will be the level of commercialization. Rahut, et al. (2010), Abera (2009), Gebreselassie and Sharp (2008), and Assay (2008) also support this view.

OBJECTIVES

- 1 To show decade wise average of gross cropped area and gross irrigated area.
2. To find compound annual growth rate for gross cropped area and gross irrigated area.
3. To make future projections regarding marginal increase or decrease in gross cropped area and gross irrigated area.

DATA AND METHODOLOGY

This paper is a census study as analysis has been made by taking into account the data related whole Punjab. Coefficient of variation is used as a measure of relative variation. It is used when there is requirement of comparing the variability. The series for which the co-efficient of variation is greater is said to be more variable or conversely less consistent. On the other hand the series for which the co-efficient of variation is less is said to be less variable or more consistent. Co-efficient of variation is denoted by C.V. and is obtained by dividing the standard deviation with arithmetic mean and multiplying the result by hundred. When the relative dispersion is stated in terms of the arithmetic mean and the standard deviation, the resulting percentage is known as the co-efficient of variation or co-efficient of variability. The compound growth rates of different variables were worked out by applying the regression model in its exponential form as under:

$$Y = abt^u$$

Where,

Y = a performance indicator, a = a constant term

t = time variable (No. of years under study)

b = regression coefficient of time, u = a random error term

The compound growth rates were tested to determine their statistical significance with the help of t-test. It is particularly useful to compare growth rates from different data sets. T-test is calculated by dividing compound annual growth rate with standard error of compound annual growth rate. The calculations are done with the help of software HSC39 developed by Punjab Agricultural University. Test of significance is ascertained to know whether the growth rate is significant or not.

Considering the features of average, co-Considering the features of average, co-efficient of variation, compound annual growth rate and t-test, these have been applied skillfully to analyze the data in the present study.

RESULT AND ANALYSIS

It has been found that there is gradual increase in both gross cropped and gross irrigated area over the years. Increase in gross irrigated area is caused due to advancement in sources of irrigation along with profitability of farmers which motivated them to replough these gains back in farms. Increase in gross cropped area has shown the momentum gained by commercialization of agriculture.

AREA UNDER CULTIVATION

If the farmers are expecting positive returns from the market they will try to grow more in their farms. More marketable surplus can be derived from higher production levels. Large and consolidated land holdings ensure use of modern farm equipments which result in higher production levels. Large scale production will automatically generate surplus which will ultimately come to market for sale. More and more area need to be brought under cultivation to reap

more harvests so that they may be brought in the market for sale because large sized farms ensure specialization in monocropping. The higher the area under cultivation the higher will be the level of commercialization.

In the following table 1, gross cropped and gross irrigated area in Punjab has been shown in chronological order starting from the year 1971 onward. As shown in the table, the gross cropped and irrigated area in the year 1971 was equal to 5678 thousand hectare and 4242.5 thousand hectare and in 1981 it was 6763 thousand hectares and 5781.3 thousand hectares respectively. In the year 1991 it rose to 7502 and 7054.8 thousand hectares. It rose to 7882 thousand hectares and 7723.8 thousand hectares respectively in the year 2011. It is important to note that there is a gradual increase in both gross cropped area and gross irrigated area over the years but gross irrigated area increased sharply due to increased resources of irrigation over the years.

Table 1
Gross Cropped and irrigated Area in Punjab

(000' Hectares)

Year	Gross Cropped Area	Gross Irrigated Area	Year	Gross Cropped Area	Gross Irrigated Area
1971	5678	4242.5	1981	6763	5781.3
1972	5724	4377.0	1982	6929	5966.0
1973	5931	4571.0	1983	6915	6148.5
1974	6037	4619.0	1984	6977	6273.4
1975	5904	4770.2	1985	7013	6347.2
1976	6255	4930.8	1986	7158	6514.7
1977	6285	5080.2	1987	7217	6589.9
1978	6390	5194.5	1988	7326	6731.5
1979	6630	5506.2	1989	7398	6837.0
1980	6535	5699.5	1990	7398	6918.2
Avg	6136.90	4899.09	Avg.	7109.40	6410.77
C.V.	5.40	9.71	C.V.	3.13	5.86
C.G.R.	1.74	3.22	C.G.R.	1.02	1.96
t-value	10.45**	26.32**	t-value	15.47**	21.43**
Year	Gross Cropped Area	Gross Irrigated Area	Year	Gross Cropped Area	Gross Irrigated Area
1991	7502	7054.8	2001	7941	7663.8
1992	7518	7111.4	2002	7941	7666.6
1993	7552	7142.6	2003	7773	7542.5
1994	7623	7238.0	2004	7905	7686.7
1995	7693	7319.4	2005	7932	7692.2
1996	7712	7336.2	2006	7868	7679.5
1997	7808	7452.7	2007	7861	7666.0
1998	7833	7561.0	2008	7870	7689.3
1999	7739	7442.3	2009	7912	7723.6
2000	7847	7544.4	2010	7876	7714.2
			2011	7882	7723.8
Avg.	7682.70	7320.28	Avg.	7887.36	7677.11
C.V.	1.68	2.47	C.V.	0.61	0.65
C.G.R.	0.53	0.79	C.G.R.	-0.03	0.12
t-value	8.01**	10.15**	t-value	0.52	2.32*

Source: Director, Land records Punjab.

: Various issues of Statistical Abstract of Punjab.

The table1 also shows the decade-wise average of the gross cropped and gross irrigated area in Punjab. In 1970-71 decade, the average of gross cropped area and gross irrigated area in Punjab was 6136.90 and 4899.09 thousand hectares respectively. In 1981-90 decade average of gross cropped area and gross irrigated area in Punjab was 7109.4 thousand hectares and 6410.7 thousand hectares respectively. In 1991-2000 decade, average of gross cropped area and gross irrigated area in Punjab increased to 7682.7 thousand hectares and 7320.28 thousand hectares respectively. It further rose to 7887.36 thousand hectares and 7677.11 thousand hectares respectively during the period of 2001 to 2011. The decades averages shows that more and more cropped area has been brought under cultivation so as to boost the agriculture sector. The compound annual growth rate for the decade 1971-80 for gross cropped area has been positive at the rate of 1.74 which decreased to 1.02 in the year 1981-90 and further decreased to 0.53 in 1991-2000 and in the last decade of analysis it went negative at -0.03. But the compound annual growth rate for gross irrigated area for the decade 1971-80 has been 3.22 which decreased to 1.96 in 1981-91. The same has been

positive for 1991-2000 at 0.79 and further decreased to 0.12. No doubt the growth rate is decreasing but still positive changes have been noticed in all the decades. The coefficient of variation calculated and shown in the above table i.e. 5.40 and 9.71 for gross cropped area and gross irrigated area respectively for the decade of 1971-80 also supports the above argument. Moreover, much change has occurred during the decade of 1981-90 when the co-efficient of variation was 3.13 and 5.86. The change has been more rapid for the decade 1971-80 in comparison to other decades. The co-efficient of variation for 1991-2000 and 2001-2011 has been far lesser. The t-value calculated for the data shows that change in gross irrigated area is still significant. The t-value calculated for gross cropped area for all decades has been significant at 1% level except 2001-2011 where the change has been non-significant and the t-value for gross irrigated area for all decades has been significant at 1% level except 2001-2011 where the change has been significant at 5% level.

In the following table 2, Statistical analysis of data related to gross cropped and gross irrigated area from 1971-2011 in Punjab has been shown.

Table 2
Gross Cropped and Irrigated Area in Punjab

	Gross cropped Area	Gross Irrigated Area
Average (From the year 1971 -2011)	7220.76	6603.65
C.V.	9.91	17.08
C.G.R.	0.81	1.46
t-value	15.67**	15.66**
Future Projections for the year 2020	7851.78	7806.07
%age change over 2011-2020	-0.38	1.07

Source: Director, Land records Punjab.

: Various issues of Statistical Abstract of Punjab.

The average for the whole period from 1971-2011 for gross cropped and gross irrigated area is 7220.76 and 6603.65 thousand hectare respectively. The variations for gross irrigated area for the whole period are more than the variations in gross cropped area. The compound annual growth rate for gross cropped area has been positive from 1971-2012 at 0.81 level and for gross irrigated area it has been positive throughout at 1.46 level. The analysis of the data shows that over the years the changes in gross cropped area and gross

irrigated area are significant. The t-value for gross cropped area and gross irrigated area is 15.67 and 15.66 which is significant at 1% level. Moreover future projections show that there might be marginal decrease in gross cropped area in the next decade of 2011-2020 but positive change is expected in gross irrigated area over the next decade. It signifies that effort will be made to bring more area under irrigation of the area left of land cultivated.

REFERENCES

- [1] Jodhka, S.S., 2005. Beyond "Crises" Rethinking contemporary Punjab Agriculture. Governance and Policy spaces, Working Paper 4.
- [2] Ravita, 2011. Development of Agro-based Industries in Punjab: An Analysis. Patiala: Punjabi University Patiala.
- [3] Kaur, R. and Sinha, A.K., 2011. Globalization And Health. A case study of Punjab. Journal of Studies and Research in Human Geography, Volume 5.1, pp. 35-42.
- [4] Mahaliyanaarachchi, R.P. and Bandara, R., 2006. Commercialization of Agriculture and Role of Agriculture Extension. Subargamuwa University Journal, Volume 6, no.1, pp 13-22.
- [5] Elamin, E.M., Bauer, S. and Osman, A.A., 2003. Case study: Commercialization and Food Security,

- Can They go Together for The Sudanese Agarian Economy. Sudan, ERF December 16/18.
- [6] Khurana, M., 2010 Agriculture Development and Capital Relation: A Modern View. Cyber Tech Publication.
- [7] Harriss, B., 1983. Relations of Production and Exchange and Poverty in Rainfed Agricultural Regions. Economic and Political Weekly. Volume 18, no 39, pp. A82-A92.
- [8] Sable, R., 1994. Commercialization of Agriculture in Maharashtra. Thane: Vishwakarma Publications.
- [9] Vardarajan, S. and Elangovan, S. 1995. Scope of Commercialization of Small Farm Agriculture. Small Farm Diversification: Problems and Prospects. New Delhi: NCAEPR Publication.
- [10] Martey, E., Ramatu, M., Hassan, A. and Kuwornu, J.K.M., 2012. Commercialization of smallholder agriculture in Ghana: A Tobit Regression Analysis. African Journal of Agricultural Research, Volume 7(14), pp. 2131-2141.
- [11] Singh, B.P., 2005. Punjab Peasantry in Turmoil. Unpublished seminar paper, Punjab University Patiala.
- [12] Lerman, Z., 2004. Policies and institutions for commercialization of subsistence farms in transition countries. Journal of Asian Economics, 15, pp. 461–479.
- [13] Jayne, T.S., Yamano, T., Weber, M.T., Tschirley, D., Benfica, R., Chopto, A. and Zulu, B., 2003. Smallholder Income and Land Distribution in Africa: Implications for Poverty reduction strategies. Food Policy, 28(3), pp. 253-275.
- [14] Rahut, D.B., Castellanos, I.V. and Sahoo, P., 2010. Commercialization of Agriculture in the Himalayas. Institute of Developing Economies JETRO, Discussion paper No 265.
- [15] Thakur, D., Kapila, S. and Moorti, T.V., 1985. Vegetable production for diversification of farm economy. Indian journal of Agricultural Economics, 40(3).
- [16] Singh A.J., Jain, K.K. and Sain, I., 1985. Diversification of Punjab Agriculture: An econometric analysis. Indian journal of Agricultural Economics, 40(3).
- [17] Gupta, R.P. and Tewari, S.K., 1985. Factors affecting crop diversification: An empirical analysis. Indian journal of Agricultural Economics, 40(3).
- [18] Ravita, 2011. Development of Agro-based Industries in Punjab: An Analysis. Patiala: Punjabi University Patiala.