Green Revolution and Economic Development in Haryana

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ABSTRACT

The Green Revolution Implies: Well marked improvement in agricultural production in a short period and the sustenance of a higher level of agricultural production over a fairly period of time. The miracle seeds and dwarf and early-maturing varieties have brought about a sudden trasformation in Indian agriculture. The Green Revolution in Haryana has achieved much progress in agricultural productivity but at the cost of land and water degradation. Intensive agriculture during the Green Revolution period has brought continuous increase in the agricultural production due to the use of high doses of fertilisers and pesticides. The adaptation of various modern agricultural techniques has further strengthened the role of agricultural sector in the economic development and employment generation of Haryana. The cropping intensity in Haryana is one of the highest among the Indian States; and the production and productivity of major crops increased several times due to the advent of Green Revolution. But the adaptation of new cultivation strategy has restricted the state to have only two crops, i.e., wheat and paddy. Further it has resulted in diseased soil, pest infested crops, over-exploited groundwater and water logging deserts. The present papers describe the impact of Green Revolution on the economic development of Haryana.

Keywords: Green Revolution, Agriculture, Economic Development, Haryana.

The term 'economic development' was rarely used before 1940s. Before its formation in 1966, the Haryana territory was agriculturally a less developed part of the former Punjab. Its net area irrigated was 35.54 per cent against 58.48 per cent in Punjab. Its compound annual growth rate of agriculture in the ratio 1:2 with Punjab. One may recall the formation of the state coincide with the here that the formation of the state coincide with the beginning of the Green Revolution in parts of India including the Haryana territory. The advent of the Borlaug seed fertiliser based technology heralded a new era in agricultural transformation in mid-sixties. Green revolution was a technology innovation. This event provided a stimulus to the extension of irrigation which was its single most important prerequisite. But this advancement in agriculture caused scarcity of fresh water, deforestation and soil erosion on the Shiwalik hills and the Aravalli outliers; waterlogging in canal irrigated and low-lying areas in the east-central region and along the streams; a critical fall in water table in the tubewell irrigated area in the north-east (Singh, 1998:176-182).

The history of mankind has witnessed some significant agricultural revolutions. A notable agricultural change on political lines took place in the post-1917 revolution of Soviet Union. Agricultural land was nationalized and organized into collective or State farms. The same socialistic spirit guided the formation of communes in China. Around the middle of the present century, the world saw another major agricultural revolution associated with the cultivation of high-yielding varieties of wheat and paddy famously named as Green Revolution (Brar, 1999). The credit to develop this new technology went to Norman Borlaug who innovated the new varieties of dwarf wheat for which he was awarded the Nobel Peace Prize.

The new seeds were introduced in the third world countries during the period 1965-70. The per capita production in the developing countries was increased quite sharply due to the introduction of new seeds. The Green Revolution in Asia doubled the cereals production between 1970 and 1995 (World Development Report, 2008).

Despite its obvious success, however, the Green Revolution came under severe criticism during the 1970s for ecological and socio-economic reasons. The main criticism directed against the success of Green Revolution was the high yield which could not be obtained under certain optimum conditions: optimal

irrigation, intensive use of fertilizers, monoculture (for the rational use of machinery and agricultural equipments), and pest control with chemical pesticides (Glaeser, 1987).

The introduction of this new technology has completely replaced the old mode of production in Haryana's agriculture. Traditional agriculture was progressively given way to modern and commercial agriculture and sooner Haryana became the role model for the other States in the country. No doubt, the new technology has provided numerous economic gains to the State and the country in the form of increase in production and productivity, and irrigation coverage up to 95 per cent of the total cropped area in Haryana. So, it becomes all the more important to study the economic gains of the Green Revolution.

Objectives of the study

i. **To identify the pattern of regional variations in intensity of the Green Revolution in Haryana.**
ii. **To examine the growth of agricultural activities and the consequent economic development in Haryana.**
iii. **To provide overall linkages between the Green Revolution and economic development with empirical findings from Haryana**

Database and Methodology

This paper was based on the secondary data, collected from the different issuues of the statistical abstract of Haryana, published by the Economic and Statistical advisor, planning department, Government of Haryana, Haryana Agricultural University Hisar. The methodology of this chapter addresses itself to the objectives of the study enunciated in the introductory part of this paper. Since the purpose is to examine the economic benefits of the Green Revolution and to identify the elements of economy which would bear the impact of Green Revolution, to examine the present scenario in regional variations in the spread and intensity of the cropping of the Green Revolution. Intensity of cropping of the Green Revolution has been calculated by the formula:

$$\text{Intensity of Cropping} = \frac{\text{Total Cropped Area} * 100}{\text{Net Sown Area}}$$

Economic benefits of the Green Revolution

Economically, the agriculture in the state of Haryana has made spectacular progress after its independence in 1966. After being a new state, the Haryana experienced a new advancement in the field of agriculture. The state's economy recorded an annual growth rate of 5.60 during 1966-1985 against 5.18 for Punjab and 4.05 for the country as a whole (Singh,1998:36).The State of Haryana was known as the 'Bread Basket' of India due to its agricultural performance in since 1970s. The food surpluses from Haryana have been the backbone of the national food system. Although, Haryana encompasses only 1.34 per cent of the total geographical area of the country, it produces 3.4 million tonnes rice and 11.8 million tonnes wheat in India. In the total food grains production Haryana stands third, followed by Utter Pradesh and Punjab. The major economic gains of Green Revolution have been examined by focusing on the following points:

- **Increase in Agricultural Production**
- **Increase in Productivity**
- **Impact on Employment**
- **Dependence on Industrial Sector**
- **Impact on Agrarian Structure**
- **Impact on Landless Labor**

GSDP and Employment

The production structure of Haryana is heavily dominated by primary sector activities. Due to the advent of modern methods of cultivation, the agriculture sector of Haryana becomes the leader in economic development. In the case of Haryana, agriculture is the mainstay of economy. It absorbed 60.79 percent of the working force in 1981, as cultivators and agricultural laborers. No less than about 86 percent of its total

area is under plough. The all India figure is 46.31 per cent. About 60 per cent of the net area sown is irrigated in comparison to about 30 per cent in India. Agriculture contributed about 44.48 per cent of the state's domestic product in 1985-86 as compared with 27.30 per cent in India at current prices (Singh, 1998:36-37).

Haryana's agriculture sector constituted 46 per cent in GSDP in 1980-81 which slowly came down to 28.47 per cent in 2001-02 and 19.03 per cent in 2013-14. On the other hand agriculture consisted of 95.23 per cent of the primary activities income in 1980-81 and at present it consists of 93.19 per cent of total output of the primary activity. But if we compare the share of agriculture sector with the share of industrial or dynamic sector it is still an important part for the state's economy. It is pertinent to note that despite rapid mechanization of agricultural activities in Haryana since the early sixties the agriculture sector is still playing an important part in employment generation. In 1971, out of the total workforce 62.67 per cent was working in the agriculture sector and after one decades period it decreased to 60.79 per cent in 1981. The share of agriculture sector in employment is still high. After the period of four decades of the advent of Green Revolution and capital intensive techniques of production in rural economy of Haryana a substantial proportion of workforce still depend on the agriculture sector for their livelihood. So, it is the agriculture sector which has not only the growth driver of the GSDP of the State but also a major source of income for a large proportion of the total population.

Shift in Land Utilization

The quantity and quality of land resources in a particular region played an important role in the agricultural development. Haryana is essentially a plain area: 94 per cent below 300 metres. The plain spreads between the hilly tract in the northeast and the sand dune sprinkled desert topography in the south and southwest. The outliers of the Aravallis make their appearance in the southern part of the state. As such, Haryana assumes the shape of a saucer with its depression in the tract around Rohtak. Haryana has traditionally been the part of the old Punjab and is essentially in the nature of divide between the Ganga and the Indus river systems. It is transitional to the Rajasthan desert and the Ganga plain. In the last century, the State's geographical boundaries have been shifted twice – the violent partition of India in 1947 and the administrative division of Punjab in 1966 into present day Haryana and Himachal Pradesh. Now, Haryana encompasses total geographical area of 4421 thousand hectares, which constitutes about 1.34 per cent of total geographical area of the country. The land utilization pattern of the State showed that out of the total geographical area about 80 per cent is the net sown area (Table 1).

Table 1, Land Utilization Pattern in Haryana

(Area in thousand hectares)

Items	1966-67	1970-71	1980-81	1990-91	2000-01	2011-12
Uncultivated and barren land	232	181	65	97	102	106
Fallow land	259	150	177	169	232	149
Net sown area	3423	3565	3602	3575	3526	3513
Cropped area	4599	4957	5462	5919	6115	6489
Cropping intensity in(percentage)	134	139	151	165	173	185

Source: Statistical abstract of Haryana, Director of land records, Haryana

Due to the introduction of new technology and commercialization of production relations the uncultivated and barren land is continuously declining since 1966-67 to 1990-91but increase a little in 1990s

to onwards. It was 232 thousand hectares in 1966- 67 and declined to almost 130 thousand hectares in 2011-12. Similarly, the new mode of production in Haryana's agriculture also brought more and more area of fallow land under cultivation. The fallow land declined from 259 thousand hectares in 1966-67 to 177 thousand hectares in 1980-81; and it further declined to 149 thousand hectares in 2011-12.

The table1 also shows that due to new techniques of production the net sown area has also increased from 3423 thousand hectares in 1966-67 to 3602 thousand hectares in 1980-81; and it marginally declined to 3513 thousand hectares in 2011-12. The decline in net sown area has been due to the rapid growth of urban area in different parts of the State. Also, due to western vision of life-style the Haryanvi's are continuously moving towards better inhabitants. The cropped area has also progressed from 4599 thousand hectare to 6489 thousand hectares between 1966-66 and 2011-12. The cropping intensity has also progressed from 134 in 1966-67 to 185 in 2011-12. It is apparent that the introduction of modern methods of cultivation not only helped to increase the area under cultivation but it also played a positive role in the transformation of traditional methods of cultivation.

Production and Productivity Trends

After the introduction of new methods of cultivation the production and productivity increased very sharply in Haryana which gave boost to the overall growth of the economy. The productivity of all the crops in Haryana has increased after the introduction of new methods of cultivation, but the productivity of rice and wheat increased at a much faster rate in comparison to other crops. Table 2 shows that the yield of wheat increased from 1425 kg/hectare in 1966-67 to 5183 kg/hectare in 2011-12. Similarly, the yield of rice has also increased from 1161 kg/hectare to 3044 kg/hectare during the same period. It is significant to note that within as span of four decades the average productivity of wheat and rice has increased almost three to four times.

Table 2:Yield of Principal Crops in Haryana

(Kg/hectare)

Crops	1966-67	1970-71	1980-81	1990-91	2000-01	2011-12
Wheat	1425	2074	2360	3479	4106	5183
Rice	1161	1697	2606	2775	2557	3044
Jowar	181	277	354	497	208	500
Bajra	418	939	544	864	1079	2040
Maize	988	1142	1134	1414	2267	2727
Barley	1313	1150	1451	2092	2682	3617
Gram	500	742	629	722	640	924
Rapeseed and Mustard	404	678	634	1338	1369	1364
Cotton A	300	359	387	421	1081	2577
Cotton D	289	299	264	278	319	416
Sugarcane	3400	4504	4067	5273	5713	7319

Source: Statistical Abstract of Haryana, Various issues

All crops except maize, grams, rapeseed & mustard and groundnut have shown an increase in production. The production of wheat and rice has been much higher in comparison to other crops.
The production of wheat has increased from 1059 thousand tonnes in 1966-67 to 13119 thousand tonnes in 2011-12. Similarly, the production of rice also increased from 229 thousand tonnes to 3757 thousand tonnes during the same period. It is due to the reason that effective support price is available for the paddy and wheat crops. The production of other crops like bajra increased from 373 thousand tonnes in 1966-67 to 1175 thousand tonnes. The production of American cotton has increased from 134 thousand tonnes to 2577 thousand tonnes in the same study period. But on the other hand the production of Desi cotton has increased only 153 thousand tonnes in 1966-67 to 302 thousand hectares in 2000-01 but has decreased 44 thousand tonnes in 2011-12.

Intensity of Cropping

Intensification is a process that characterises all modern agriculture. The same is true in the case of Haryana. The net area sown didn't increase as much as the area sown more than once. In 1989-90 the intensity of Green Revolution was highest in the Karnal, Kaithal and Jind districts. In the Rohtak, Rewari and Gurgaon districts measure the low intensity of the Green Revolution. On the other side in 2011-12 the highest intensity of Green Revolution was in Bhiwani, Jind, Faridabad, Karnal and Panipat districts. The lowest intensity measured in the Gurgaon, Mewat, Rewari, Rohtak and Yamunanagar. The gap or difference of intensity of the Green Revolution is 16 in the given study period. The lowest intensity region is the industrial belt and sugarcane belt of Haryana where the Paddy-Wheat rotation plays a smaller role.

By contrast, Rewari district emerged as the one with only a small increase in area sown more than once. The same was true of Panchkula district. The intensity of the Green revolution has been low in both cases. The lack of irrigation, associated with undulating topography and deep water table, limited the scope of multiple cropping.

Conclusions

In the Haryana state much progress was made in agricultural productivity. The above analysis provides that from the economic point of view the State of Haryana made spectacular progress after the introduction of new technology of cultivation. With 1.34 per cent of the total geographical area of the country, Haryana is contributing about 11.8 million tonnes of wheat and 3.4 million tonnes rice to the national pool. Agriculture sector is playing an important role in the structural composition of the economy and contributing a large proportion in GSDP and employment. The farmers of Haryana are using each and every part of the soil for cultivation purposes. That's why the net sown area in Haryana is higher than the other parts of the country. Similarly, after the introduction of new methods of cultivation the cropping intensity in Haryana reached its saturation level. The production relations in Haryana's agriculture completely transferred from traditional to modern agriculture. The extension of irrigation facilities and announcement of minimum support price increased the productivity of wheat and rice about three to four times. The total production of principal crops (wheat and rice) also increased very sharply. All this progress establishes Haryana as one of the richest State in economic terms.

Suggestions

An attempt should be made not only to increase the production but also to sustain the increased production without further degradation of the natural resources. Possible reclamation measures are required to be taken up for restoration of physical health of soils and its productivity. By analysing the shift in cropped area and cropping pattern, it is quite evident that monocultures are the dominant systems as the shift has taken place from jowar, bajra, to rice during Kharif (summer cropping) season and wheat has replaced crops such as barley and gram during Rabi (winter cropping) season due to an expansion of irrigation facilities in these states. People prefer high yielding and more remunerative crops like wheat and rice, although barley and gram are still grown in rainfed areas. Although some diversification, and the productivity and profitability of crop husbandry continues to be an integral part of the existing cropping pattern, wheat and rice with highest growth yields per hectare, and high economic returns, will continue to

be dominant. Diversification of agriculture to increase the percentage area under agroforestry, oilseeds and pulses is being encouraged.

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