



## PERFORMANCE AND BULK LINE CONCEPT OF WHEAT CROP IN SOUTH GUJARAT

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### **Abstract**

*An attempt is made in this paper to study the Performance and bulk line concept of wheat crop in south Gujarat. Gujarat is one of the fastest developing states of India in Agriculture state. In case of wheat crop in Gujarat the growth performance of area, production and productivity during period 2 (2002-03 to 2011-12) are increasing which was about 4.46 %, 5.93 % and 1.41 % respectively. Overall growth performance from 1992-93 to 2011-12 of wheat crop in Gujarat is 1.98 %, 2.74%, and 0.74% respectively. Study also revealed the south Gujarat's area, production and productivity of wheat crop growth performance is -4.29 %, -1.85 %, and 0.43 % respectively during the period 1, in period-2, it is 2.52 %, 4.72% and 1.46% respectively. While overall growth rate (1992-93 to 2011-12), it is 0.71 %, 2.40 %, and 0.94 % respectively. Also the easy availability of agriculture input, agriculture produce market yard, irrigation facility, electricity supply and mechanization. While in case of bulk line cost concept total 82 per cent farmer, 85% area and ` 1422` cost of production covered at 85 per cent of total 240 respondent of south Gujarat from district Bharuch, Surat, Narmada and Tapi.*

*Key words:* Agriculture. Consumption, natural resource,

### **Introduction:**

Wheat (*Triticumaestivum* L.) is the world most widely cultivated as a cash crop because it produces a good yield per unit area, grows well in a temperate climate even with a moderately short growing season. The center of origin for wheat was in the Mid-east, near the cross point of national boundaries for USSR, Turkey, Iraq, and Iran. Wheat is a staple food and also one of the most important staple food grains of human race. India produces about 70 million tonnes of wheat per year or about 12 per cent of world production. It is now the second largest producer of wheat in the world.

Being the second largest in population, it is also the second largest in wheat consumption after China, with a huge and growing wheat demand. The poor growth in agriculture has been a matter of grave concern for the policy makers in India (Planning Commission, 2008; Bhalla and Singh, 2009). The blame has been on poor natural resource conservation policies; poor design of subsidies; inadequate investments in irrigation; inefficient pricing of water, electricity and other inputs for crop production; poor agricultural pricing policies, and regulations such as ban on inter-state trading of crops, particularly



the cereals. But, least has been written about how poor management of water economy is causing long term effects on Indian agriculture, particularly in regions which are historically agriculturally prosperous. In this backdrop, Gujarat's agriculture sector has been in the focus for the 'high growth' it has recorded in the early years of the new millennium (see Gulati et al., 2009; Shah et al., 2009). The state has clocked an impressive growth rate of 9.6% in the sector. The key state interventions, which have potential implications for agriculture in the state, are as follows: improved quality of power supply in agriculture; large-scale water transfers from land scarce and water-abundant south Gujarat to land rich & water-scarce north Gujarat; decision to meter new agro wells; setting up of the Gujarat Green Revolution Company for promote micro irrigation adoption; and decentralized water harvesting. This paper attempts a reality check on the 'miracle growth' in Gujarat's agricultural production by looking at the gross value of the outputs from agriculture over a reasonably long period of time with the growth rate of south Gujarat. Subsequently, the key sub sectors which have contributed to this growth are identified; and the trends in cropped area, yield and total production are systematically examined.

### Methodology

Estimation of Compound growth rate:

The compound growth rates of area, production and productivity of wheat crop, data will be collected for the last 20 years will be worked out by

exponential function of the farm (Kuthe, 2012).

$$Y = a.b^x$$

by taking logarithm of both sides, the equation taken the linear form

$$\log Y = \log A + x \log B$$

on writing  $\log A = a$  and  $\log B = b$  and  $\log Y = y$ , the equation becomes

$$Y = a + bx$$

Where,

$Y =$  Area/production/productivity of wheat

$a =$  Intercept

$b =$  Regression coefficient

$x =$  Time variable

The compound growth rate  $(r) = (B - 1) * 100$

The standard error of the CGR will be calculated using the formula.

$$S.E(r) = \frac{\log B \sqrt{[\sum \log Y^2] - (\log Y)^2 / N} - [\sum x^2 (\sum x^2) / N] (\log B)^2}{\log 10^e (N - 2) [\sum x^2 (\sum x^2) / N]}$$

Where,

$$\log 10^e = 0.4343$$

$N =$  Number of observation

Student t test will be used for testing the significance of the compound growth rate  $t = \frac{r}{S.E(r)}$



Where,

$r$  = compound growth rate

S.E ( $r$ ) = standard error of compound growth rate

### Result and Discussion:

The era of 1990s can be marked as a decade of complete departure from the restriction and controlled economic system when the government of India introduced a number of new economic policies in the form of structural adjustment and macro stabilization programme to integrate the national economy. Though, the Indian economy had got its way of rapid economic growth right from the beginning of the eighties, however, acceleration in the growth rate in wheat crop have been realized only after 1991. This continuous and accelerated high growth of wheat crops as well as agricultural economy provides a large base for being the 4th largest economy of the world in terms of PPP (G.S. Bhulla, 2005). But the main problem is the growth performance of the Indian agriculture has decelerated significantly after the opening up of the economy. —Since agriculture continues to be the largest sector of the economy in terms of employment, the deceleration of growth of this sector has serious implications for the living standard of agricultural workers both farmers and agricultural laborers.

The growth rate of agriculture production is generally judged by the performance of food grains and non-food grains production. From these both items of agriculture production of food grain is

more significant due to two reasons. Firstly, it provides the base for subsistence by supplying basic food items and secondly, it is the only group of agricultural produce where Green Revolution was introduced firstly and more successfully. After the introduction of Green Revolution, the scene has completely changed about the Indian agriculture has transformed from food shortage to self reliance. This has become possible because of technological changes as well as the Government initiatives in form of various programme. The new method of agricultural practice brought a drastic change in the productivity and production. More and more agricultural land are brought under cultivation with the help of improved irrigation facilities (with the help of assured means of irrigation) cheaply available chemical fertilizers and supply of high yield varieties of seeds in the market. Farm mechanization has also shortened the period of ploughing, sowing and harvesting process of agriculture.

The implementation of land reform has further added a new dimension in Gujarat agriculture. Therefore the successful implementation of Green Revolution and Land Reform not only increases the productivity but also increases the area under cultivation that paved the way for a higher growth of the agricultural sector. Consequently the items of food grains failed in attracting the appropriate prices in the market and therefore India was in a great need of new market for the food grains.



On the other hand the new economic policies has increased the cost of agricultural inputs due to rise in the prices of high yielding of varieties of seeds (HYVS) fertilizers, insecticides, pesticides and water and electricity while on the other hand, WTO regime has opened the world agricultural market for Indian food grains. Where Indian farmers may get a respectable price for their produce. The post independent era of Gujarat agriculture especially production of food grains may be divided into two phases. In the first phase (that starts from 1947 and last to 1990) the farmers were protected and supported by the Government of India. Government had supplied nearly all agricultural inputs at highly subsidized rate that resulted in form of a revolution in the Indian agriculture. The cheaper availability of factors of production supposed to increase the consumption of fertilizers and land under irrigation facilities so as to increase the total food grains production by increasing the yield and area under cultivation. In the next phase (that starts from 1992-93 and is continue) it has been assumed by the government that now the Indian agriculture is maintained enough to survive on her own feet. The opening up of the market no doubt increase the cost of agricultural inputs but the improved prices in the world market may cover the gap and the Indian agriculture will sustain herself.

Further climate change has emerged as an important determinant, particularly in the recent past. In Gujarat, before period 1 (1992-93) reforms government was providing a lot

of subsidies over the inputs that made the purchase of inputs affordable for the farmer which helps in fighting against the climate change. But after the economic reforms high rise in the prices of inputs of agricultural production has made it difficult for the farmers to purchase the inputs in right amount and vulnerability of agriculture to climate change has increased and it is expected that agriculture sector in Gujarat will be negatively affected. (Narain, Ghosh, Sexena, Parikh, Soni, 2009).

Growth rates of production area and productivity of wheat crop in the Gujarat and South Gujarat has been presented in table 4.1.4. The estimates of growth rates revealed that wheat production increased significantly in the state at a compound rate of 2.39 per cent per annum. Among the periods, production of wheat crop increased significantly by 4.47 per cent per annum but in the first period it was declined by 1.85 per cent per annum. Similar trend was observed in South Gujarat region. Production of wheat in South Gujarat was increase by 2.73 per cent per annum during the year 1992-93 to 2011-12. The production growth was increased significantly in period second (5.92 per cent per annum ) compared to period first.

Acreage under wheat crop in the state increased at a compound rate of 0.71 per cent per annum during the study period. It increased significantly in period second by 2.51 per cent per annum. In period first it was negative and non significant. Growth rates in area have



been positive and significant in south Gujarat region (1.97 per cent per annum ). The increased was more pronounced in period second (4.45 per cent per annum) while period first it was declined.

Productivity of wheat crop increased by 0.93 per cent per annum in the state as a whole. In period first it was increased by only 0.43 per cent per annum in the state while it was increased significantly by 1.46 per cent per annum in second period. In South Gujarat region, Productivity of wheat crop increased by 0.74 per cent per annum. Among periods it was significantly increased by 1.40 per cent per annum compared by first period

It is inferred from the analysis presented in this section that there has been increase in production of wheat in the state as well as in the South Gujarat region. This increase in production was contributed by the increase in productivity and area under the crop. Productivity of the crop has shown positive growth in the state as whole. This clearly brings that even the existing technology has been able to sustain the existing level of production of the crop.

It was happened because of development of technicality in agriculture knowledge of farmers through strengthening the different department of SAUs, KVKs and DOAs. Also the easy availability of agriculture input, agriculture produce market yard, irrigation facility, electricity supply and mechanization. (Mehta, 2009)

Table 4.1.5 also revealed the instability in production transmitted wide variation in arrival of the crop produce in the markets caused wide fluctuations in prices of the crop product. Apart from increasing the overall total production, stability in production of the crop over the years is equally important in planning for agricultural development of any area. A pre-requisite for stabilizing of wheat production is the necessity of examining and measurement of the extent of instability and also identification of the factors or sources causing the instability. As such an attempt has been made to examine the extent of the instability in wheat crop.

The coefficient of variation method was used to estimate the extent of instability in production, area and productivity of wheat crop. The coefficient of variation for production of wheat in the state of Gujarat was 56.11 per cent for the period 1992-9 to 2011-12. The instability in production was higher in period second compared to period 1. For the south Gujarat part same trend was observed. The coefficient of variation for wheat acreage was 41.21 per cent. The instability was high in period second compared to period first. The coefficient of variation for the acreage under wheat crop in south Gujarat was 27.02 per cent during the study period (1992-92 to 2011-12). The area instability for wheat crop was found to be higher for the period first compared to the second period.

The coefficient of variation for wheat productivity of the state revealed that this has been 14.20 per cent during



the study period. The extent of variability in productivity has been higher for the south Gujarat part compared to the stated during the study period. The foregoing discussion led to conclude that the magnitude of variability has been higher in the production compared to area and productivity. The area instability was also n higher side in south Gujarat region and state as a whole.

**Bulkline cost concept:**

The bulk line cost concept is giving the information regarding the exact cost of production of particular crop. In this concept total respondent's cost of production per hectare is arranging in ascending or descending order and formulate the categories of cost of production per hectare in which the

respondent fall and same way the number of farmer and total area under wheat crop of this particular farmer of categories are added and converted it to percentage of total and cumulative percentage is found out. This cumulative percentage is further draw on graph paper with percentage. At the point of 85 per cent the horizontal and vertical line touch the production line or cost of production per hectare is called the bulk line cost.

In case of wheat crop of south Gujarat the bulk line cost concept total 82 per cent farmer, 85% area and ` 1422 cost of production covered at 85 per cent of total 240 respondent of south Gujarat from district Bharuch, Surat, Narmada and Tapi.

**Table 1 : Compound growth rate and stability of wheat crop during year 1992-93 to 2011-12.**

Particular	Area	Production	Productivity
<b>(A) CGR (% per annum)</b>			
<b>South Gujarat</b>			
Period 1	-2.04	-1.85	0.19
Period 2	4.46*	5.93*	1.41
Overall	1.98	2.74**	0.75
<b>Gujarat</b>			
Period 1	-4.29	-1.85	0.43
Period 2	2.52*	4.72**	1.46
Overall	0.71	2.40**	0.94
<b>(B) Stability(%)</b>			
<b>South Gujarat</b>			
Period 1	30.77	18.59	13.47
Period 2	19.22	34.02	13.61
Overall	27.02	45.65	17.22
<b>Gujarat</b>			
Period 1	21.66	27.33	7.88
Period 2	33.31	43.92	13.24
Overall	41.21	56.11	14.20



Note : Period 1-(1992-93 to 2001-02),  
Period 2 -(2002-03 to 2011-12),  
Over all -(1992-93 to 2011-12)

Source: Directorate of Agriculture, Gandhinagar, Gujarat.

\* Significant at 5 % level of significance.

\*\* Significant at 1 % level of significance

**Table 2: Bulk line cost concept of wheat growers in south Gujarat.**

**(N = 240)**

No	Quintal range	No. of farmer	Area covered	Production covered in quintal	Percent of farmer covered	Per cent of area covered	Percent of Production covered	Cumulative percentage		
								Farmer	Area	Production
1	800-1000	15	22.11	1220	6.25	4.00	5.88	6.25	4.00	5.88
2	1001-1201	89	190.71	7975.43	37.08	34.53	38.41	43.33	38.54	44.29
3	1202-1402	82	224.46	8164.5	34.17	40.65	39.32	77.50	79.18	83.61
4	1403-1603	30	72.32	2180.34	12.50	13.10	10.50	90.00	92.28	94.12
5	1604-1804	24	42.63	1221.8	10.00	7.72	5.88	100.00	100.00	100.00
6	Total	<b>240</b>	<b>552.23</b>	<b>20762.07</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>			

(Source : Field survey)

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