INSTABILITY IN INDIAN AGRICULTURAL SECTOR

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ABSTRACT

Apart from the growth, instability is one of the important decision parameters in development dynamics because it affects the poorest section of the society as they solely depend on this sector. An analysis of fluctuations in crop output is important for understanding the nature of food security and income stability. Wide fluctuations in crop output not only affect prices and bring about sharp fluctuations in them but also results in wide variations in disposable income of farmers. In this context, the present paper tries to evaluate the instability of Indian agriculture sector. Though the magnitude of instability depends on the nature of the crop production, technology, and its sensitivity to weather, economic environment, availability of material input and many other factors but here we examined extent of production, area and yield instability for major crops through the Cuddy-Delia Valle Index. Here the study indicates that production and yield instability for wheat and rice declined in post-reform period.

INTRODUCTION

The performance of agriculture sector is vital not only for farm income, food security and price stability but also for inclusive growth and checking rural urban divide in the Country. At the time of independence, agriculture and allied activities contributed 55.6 percent to national income and 72 percent of total working population was engaged in this sector. But after 65 years of independence, the share of agriculture in total national income declined 14 percent in 2011-12. But even today more than 50 percent of workforce is engaged in agriculture. In spite of this, it is also an important feature of it is to be noted that growth of the other sectors and overall economy depends on the performance of agriculture to a considerable extent. lt is almost impossible to sustain 8 per cent growth in economy if agriculture sector remains stagnant. Apart from the growth, instability is one of the important decision parameters in development dynamics because it affects the poorest section of the society as they solely depend on this sector. Most of the studies on Indian agriculture have looked at the instability in agricultural production at aggregate level and have focused only on production (Dev, 1987;; Tripathi & Rao 2008). An analysis of fluctuations in crop output is important for understanding the nature of food security and income stability. Wide fluctuations in crop output not only affect prices and bring about sharp fluctuations in them but also results in wide variations in disposable income of farmers. In this context, the present paper tries to evaluate the instability of Indian agriculture sector. Though the magnitude of instability depends on the nature of the crop production, technology, and its sensitivity to weather, economic environment, availability of material input and many other factors but here we examined extent of production, area, and yield instability for some principal crops.

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DATA AND METHODOLOGY

The paper has used time series data on area, production and yield at the national levels for rice, wheat, corse cereals, pulse and the data were culled from Indian agricultural statistics at glance 2012. The analysis has covered the period 1950-51 to 2011-12, which was divided into three sub-periods, viz. pre-green revolution period (1950-51 to 1965-66), post-green revolution period (1966-67 to 1991-92) and post-reform period (1992-93 to 2011-12). The main consideration behind dividing the total period of past 62 years into three sub-periods was to see whether instability in farm production show any change?

The instability in area, production and yield of some principal crops is measured in relative terms by the Cuddy-Delia Valle index which is used in recent years by a number of researchers as a measure of variability" in time series data. The simple coefficient of variation overestimates the level of instability in time-series data characterized by long term trends whereas the Cuddy-Delia Valle index corrects the coefficient of variation.

The instability Cuddy-Delia Valle index is given by the expression:

$$CDVI = CV \times \sqrt{1 - R^2}$$

Where,

CDVI = Cuddy-Della Valle index

CV = Coefficient of variation (in percent)

R^2 = Coefficient of determination from a time trend regression adjusted by the number of degrees of freedom

The CV is calculated by using this formula : $\frac{\sigma}{X}$ where, σ standard deviation and $\overline{X}$ mean.

RESULTS AND DISCUSSIONS

Variability in agricultural production consists of variability in area and yield and their interactions. Variation in area under a crop occurs mainly in response to distribution, timeliness and variations in rainfall and other climatic factors, expected prices and availability of crop-specific inputs. All these factors also affect the variations in yield. Further, yield is also affected by outbreak of diseases, pests, and other natural or man-made hazards like floods, droughts and fire and many other factors. Different events may affect area and yield in the same, opposite or different way. Instability in area, production and yield of wheat, rice, corse cereals and pulses has been presented in Table 1. Instability index for area has shown an increase in all the three periods for rice and decline in the case of wheat. It increased from 1.69 to 2.88 in rice and declined from 6.85 to 3.09 in wheat .But area instability index for coarse cereals was highest in post green revolution period that is9.26 and for pulse instability index was the highest in post reform period that is 5.44. During the whole periods, instability in area was decreased in wheat, which is generally grown under irrigated conditions.

Instability in production of pulses and coarse cereals was increased in the whole period of study .It increased 11.74 to 16.51 for pulses and 9.11 to 10.81 for coarse cereals but instability in production of wheat and rice were continuously declined for the same period in wheat it decreased from 9.72 to 6.22 and in rice it decreased from 9.10 to 6.26. Volatility in production of pulses was the highest as 16.51 in terms of post reforms period.

The instability index of yield increased much over time in the case of course cereals, whereas it increased from 6.45 to 9.43, between 1950-51 and 1992-93 to 2011-12. Despite lot of concern about wheat and rice in green revolution years, their productivity has shown fewer fluctuations after 1966-67 to 1991-92 and 1992-93 to 2011-12

Table 1 : Instability in area, production, yield from important crops in India: 1950-51 to 2011-12

Crop	Period	CDVI Area	CDVI Production	CDVI Yield
Wheat	1950-51 to 1965-66	6.85	9.72	7.73
	1966-67 to 1991-92	6.52	7.01	5.99
	1992-93 to 2011-12	3.09	6.22	3.94
Rice	1950-51 to 1965-66	1.69	9.10	8.41
	1966-67 to 1991-92	2.31	9.15	7.24
	1992-93 to 2011-12	2.88	6.26	4.44
Coarse cereals	1950-51 to 1965-66	3.91	9.11	6.45
	1966-67 to 1991-92	9.26	9.54	8.31
	1992-93 to 2011-12	3.48	10.81	9.43
Pulses	1950-51 to 1965-66	5.39	11.74	8.14
	1966-67 to 1991-92	3.93	10.66	9.00
	1992-93 to 2011-12	5.44	16.51	5.97

Overall analysis indicatesSlthat area, production and yield instability for wheat and rice declined in whole period. But in pulse and coarse cereals indicates^that production instability increased in the same period. Therefore, it can be conclude^ that reduction in production instability for wheat is mainly due to reduction in instability of yield and area and for rice it is due to reduction in instability in yield only and on other side present instability in production of coarse cereals is mainly because of increasing instability in yield and instability in production of pulses is mainly because of increasing instability in area.

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