Economic Affairs, Vol. 66, No. 1, pp. 61-69, March 2021
DOI: 10.46852/0424-2513.1.2021.8

AESSRA

Research Paper

Growth and Instability Analysis of Groundnut Production in India and Karnataka

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Received: 19-12-2020 **Revised:** 27-02-2021 **Accepted:** 12-03-2021

ABSTRACT

Groundnut is grown throughout the tropics and extended to the subtropical countries. India is the second largest producer of groundnut in the world after China. The fact is that groundnut crops in India, particularly in Karnataka are mainly covered under rain fed situation, which in turn has to depend on the arrival of monsoon, climatic changes and drought. Hence, the productivity level of groundnut crop was erratic. It was in this backdrop, an attempt was made through the present study to examine the growth and instability of groundnut in India and Karnataka by way of analyzing the time series data of 48 years. The results revealed that the level of instability was marginally higher in groundnut area (8.7 %) during period II compared to period I (2.9%) and period III (7.3%). The variation in production and yield of groundnut was higher during the period III compared to period I and II. Change in the mean area is contributing more to change in average production of groundnut in India and in Karnataka followed by interaction between changes in mean area and mean yield. Change in area variance is the predominant component contributing to the change in variance of production of groundnut in India as well as in Karnataka. From the outcome of the result, it is concluded that the researchers and policy makers have to pay more attention to develop location specific cultural practice to increase and sustain groundnut production and yield in the nation.

Highlights

- The groundnut crops in India, particularly in Karnataka are mainly covered under rain fed situation, which in turn has to depend on the arrival of monsoon, climatic changes and drought. Hence, the productivity level of groundnut crop was erratic.
- Instability is one of the important decision parameters in development dynamics and more so in the context of agriculture production.
- Change in area variance is the predominant component contributing to the change in variance of production of groundnut in India as well as in Karnataka.

Keywords: Growth, Instability, Production, Area

India is fortunate in having a variety of oilseeds crops grown in its distinctive rich agro climatic zones. India ranks fifth in the world vegetable oil economy, next to USA, China, Brazil and Argentina. The two main interventions, which have very significantly contributed to the enhancement of the oilseed sector in India, are Technology Mission on Oilseeds (TMO) called Oilseeds Production Programme (OPP), initiated by the Govt of India in May 1986, during 8th Five-Year Plan, in order to enhance the oilseed production in the nation and liberalisation of trade in oilseeds in the post-WTO period. The TMO launched special initiatives on

How to cite this article: Nayak, A., Lokesha, H. and Gracy, C.P. (2021). Growth and Instability Analysis of Groundnut Production in India and Karnataka. *Economic Affairs*, **66**(1): 61-69.

Source of Support: None; **Conflict of Interest:** None

several critical fronts such as improvement of oilseed production and processing technology, additional support to oilseed farmers and processors and enhanced customs duty on the import of edible oils and also programme was designed to supplement the efforts of the state governments' for enhancing the production and productivity of various oilseed crops such as groundnut, soybean, safflower, sunflower, sesamum, rapeseed/mustard, castor, linseed and niger seeds.

A wide range of oilseed crops are grown in diverse agro-climatic regions but the growth performance of these oilseed crops is facing various kinds of risks over period and across the different agro-climate regions. Many biotic, abiotic, technological, institutional and socio-economic constraints inhibit exploitation of the yield potential of many oilseed crops especially in the case of groundnut. The fact that groundnut crops in Karnataka are mainly covered under rain fed situation, which in turn has to depend on the arrival of monsoon, climatic changes and drought. Hence, the productivity level of groundnut crop was erratic. Rising input prices, lack of availability of good quality inputs and insufficient extension services have negative impact on the production of oilseeds in Karnataka.

Among the oilseed crops, groundnut also called as peanut enjoys a predominant status in the oilseeds profile of the country. Groundnut belongs to the Papillionaceae family, and is called as "king of oilseeds" as well as 'poor man's cashew nut' and 'wondernut'. Groundnut contains around 40 – 50 percent of oil. Groundnut oil is used as edible oil in many countries and after oil extraction; oil cake is used as feed for cattle. Groundnut has ability to survive in less favourable agro-climatic conditions. Groundnut ranks fifth which account for 7.3 per cent of the total world oilseed production after soybean, rapeseed, cotton and sunflower (www.soystats.com). India is the second largest producer of groundnut in the world after China (GOI, 2017). In India, the production of groundnut was 6727.18 tonnes in an area of 4730.76 thousand hectares during 2018-19. Groundnut is mainly grown in the states of Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra and Rajasthan. In India, Gujarat is the leading producer of groundnut with an area of 1594.21 thousand hectares and harvesting about 2202.82 thousand tonnes, which occupy 33.69 per cent of area and 32.74 per cent of the total production in India, followed by Rajasthan with 14.23 per cent area and 22.55 per cent of production, Andhra Pradesh with 15.81 per cent of area and 6.87 per cent of production and Tamil Nadu with 7.09 per cent area and 13.55 per cent of production were contributing to most of the groundnut production in India during 2018-19. The present study is an attempt to examine the sources of growth and instability in production of groundnut at national as well as state level.

Groundnut is grown throughout the tropics and extended to the subtropical countries. The crop can be grown successfully in areas with a minimum of 500 mm of rainfall and a maximum of 1250 mm of rainfall. During the flowering and pegging of the crop, the rainfall should be evenly distributed. Groundnut can be grown in a wide range of soil types. The crop, on the other hand, thrives in sandy loam and loamy soil, as well as black soils with good drainage. Groundnut cultivation is not appropriate in heavy and stiff clays because pod production is hampered in these soils.

Groundnut is primarily grown as a rain-fed *Kharif* crop, with planting taking place between May and June, depending on monsoon rains. It is sown in late August or early September in some areas where the monsoon is delayed. Between January and March, and May and July, it is grown to a small extent as an irrigated crop. In the case of the *Kharif* crop, with the onset of rains in May and June, the field is given two ploughings and soil is pulverized well to obtain a good tilth.

An effort has been made to identify the sources of production growth of groundnut. It implies to what extent a change in production is contributed by area and yield. In order to evaluate the share of each factor in the change in production, a decomposition analysis has been employed. The decomposition of the total output has been analysed for the four phases by employing Hazells' decomposition technique (Hazell, 1982).

MATERIALS AND METHODS

The study pertains to Karnataka state and the country as a whole. The time series data pertaining to area, production, productivity of groundnut crop in India and Karnataka were collected from India stat. In view of the limitation of the data, the present study is restricted for a period of 48 years from 1971-72 to 2018-19 for analytical purpose. However, for better understanding of growth performance of groundnut crops and for instability analysis the growth in area, production and productivity were compared before and after introduction of Technology Mission on Oilseeds for the period from 1971-72 to 2018-19 which was further bifurcated into three sub periods *viz*., Period-I (1971-72 to 1986-87), Period-II (1987-88 to 2002-03) and Period-III (2003-04 to 2018-19).

Instability Analysis

Instability analysis represents the uncertainty, with the help of indicators like Coefficient of variation, Standard deviation and instability index, etc. The instability in area, production and productivity of groundnut was analyzed using the following method suggested by Ray (1983).

Instability index = Standard deviation of natural logarithm (Y_{t+1}/Y_t)

Where,

Y_t is the area/production /yield in the current year and Y_{t+1} is for the next year.

This index is unit free and it measures deviations from the underlying trend.

The instability of groundnut in India as well as Karnataka was estimated using the Cuddy- Della Valle index and is commonly used to measure the extent of instability in exports and imports (Cuddy and Della Valle, 1978). It is a better measure than coefficient of co-variation because it is adjusted for trend, which is common in time series results.

The formula is as follows:

$$I_x = \frac{SD}{\overline{Y}}\sqrt{1-R^2} \times 100$$

Where,

I_x = Instability index,

SD = Standard Deviation

$\overline{Y}$ = Average value of the time series data

R^2 = Coefficient of multiple determination obtained from the time series.

Hazell's decomposition method

The model of decomposition was developed by Peter, B.R. Hazell in 1982. This model was primarily developed to analyze the instability in Indian cereal production. This method is one among the most common methods of decomposition used till now. In this model, average production and variance of production are decomposed into several components. This model is mainly used for the time series data.

Model

Let Q be the production, A be the area and Y be the yield. Then for each crop, $Q = A*Y$. The average production can be expressed as,

$$E(Q) = \overline{A}\,\overline{Y} + Cov(A,Y) \quad \ldots(1)$$

Where, $\overline{A}$ and $\overline{Y}$ indicates the mean area and mean yield.

Thus, it can be noted that, the covariance between area and yield, as well as changes in the mean area and mean yield, have an effect on average output. The decomposition analysis' aim is to partition the changes in average output between the first and second periods.

The average production in first period and second period is given by,

$$E(Q_I) = \overline{A}_I \overline{Y}_I + Cov(A_I, Y_I) \quad \ldots(2)$$

And in the second period it is,

$$E(Q_{II}) = \overline{A}_{II} \overline{Y}_{II} + Cov(A_{II}, Y_{II}) \quad \ldots(3)$$

Each variable in the second period is expressed as its counterpart in the first plus the change in the variable between the two. For example,

$$\overline{A}_{II} = \overline{A}_I + \Delta\overline{A} \quad \ldots(4)$$

Where, $\Delta\overline{A} = \overline{A}_{II} - \overline{A}_I$

Thus equation 3 can be rewritten as,

$$E(Q_{II}) = (\bar{A}_I + \Delta\bar{A})(\bar{Y}_I + \Delta\bar{Y}) + Cov(A_I, Y_I) + \Delta Cov(A, Y) \quad \ldots(5)$$

The change in average production, Δ (*QQ*), is obtained by subtracting equation (2) from equation (5). Thus,

$$\Delta E(Q) = E(Q_{II}) - E(Q_I)$$

$$\Delta E(Q) = \bar{A}_I \Delta\bar{Y} + \bar{Y}_I \Delta\bar{A} + \Delta\bar{A}\Delta\bar{Y} + \Delta Cov(A, Y) \quad \ldots(6)$$

First period variables can be expressed as second period values less the change between two periods. For example,

$$\bar{A}_I = \bar{A}_{II} - \Delta\bar{A} \quad \ldots(7)$$

This change in average production has four different components (sources of change). These sources include the changes in mean area ($\Delta\bar{A}$), changes in mean yield ($\Delta\bar{Y}$), the interaction between changes in mean area and mean yield ($\Delta\bar{A}\Delta\bar{Y}$) and the changes in the variability of area and yield (ΔCov (A,Y) (Hazell, 1982). These components of change in average production are arranged in the Table 1.

The analysis of the components of change in mean production can be depicted biometrically, on the simple assumption that COV (A, Y) = 0. This method of analysis uses the first period as the base, but an alternative procedure can be developed, based on the second period (Hazell, 1982). Both methods are mathematically correct, but method II combines pure and interaction effects and was not considered for this analysis.

The variance of production, V (Q), can be expressed as,

$$V(Q) = \bar{A}^2 V(Y) + \bar{Y}^2 V(A) + 2\bar{A}\bar{Y} Cov(A, Y) - Cov(A, Y)^2 + R \quad \ldots(8)$$

Where R is a residual term, which is expected to be very small. From equation (8) it is noticed that V (Q) is not only a function of the variances of yield and area sown, but also of mean area and yield and of the covariance between area and yield. Change in any one of these lead to change in V (Q). The underlying objective of decomposition analysis is to partition the changes in the variability in Q to its constituent parts taking the values of the variables in the initial period as base.

The change in the variance of production can also be decomposed in the analogous way. Taking the variance of production and applying the variance formula given above leads to the decomposition as shown in Table 2. Here also the results are obtained by taking first period as the base.

Ten sources of change in variance in output can be identified. The components 1, 2, 5 and 6 represents the sources of change in mean output as shown in earlier case of decomposing the average production. But change can also occur through changes in variance of area, yield and the interaction between them.

Among the ten constituents of change in variance of production, the first four represents the pure effect and are of immense importance from variability point of view. The fifth component contributes towards the interaction effect, which is the outcome of simultaneous occurrence in change in mean area and yield. Sixth component represents the change in variability in area, yield and from changes in correlation between area and yield. The seventh and the eighth components refer to second and third degree interaction between changes in mean area, yield and also the variability in them. The last two sources of change are not significant in the present context.

RESULTS AND DISCUSSION

Instability is one of the important decision parameters in development dynamics and more so in the context of agriculture production. Instability in area, production and yield of groundnut has been discussed for India and Karnataka. The instability in area, production and yield of ground in India and Karnataka are presented in Table 3. The level of instability was marginally higher in groundnut area (8.7 %) during period II compared to period I (2.9%) and period III (7.3%). The variation in production and yield of groundnut was higher during the period III compared to period I and II. It indicates that the level of production and productivity instability was increased after 2003. The results are in line with Kalpana (2017) who also observed that

Table 1: Components of change in average production

Sl. No.	Sources of Change	Symbol	Component of change
1	Change in mean yield	$\Delta\bar{Y}$	$\bar{A}_I\Delta\bar{Y}$
2	Change in mean area	$\Delta\bar{A}$	$\bar{Y}_I\Delta\bar{A}$
3	Interaction between change in mean area and mean yield	$\Delta\bar{Y}$, $\Delta\bar{A}$	$\Delta\bar{Y}$, $\Delta\bar{A}$
4	Change in area – yield Covariance	ΔCov (A,Y)	ΔCov (A,Y)

Source: *Hazell, 1982.*

Table 2: Components of change in variance of production

Sl. No.	Source of changes	Symbol	Components of Change (Percentage)
1	Change in mean yield	$\Delta\bar{Y}$	$2(\bar{A}_I\Delta\bar{Y}\text{CoV}\ (A_I, Y_I) + [2\bar{Y}_I\Delta\bar{Y} - (\Delta\bar{Y})^2]$ V(A_I))
2	Change in mean area	$\Delta\bar{A}$	$2\bar{Y}_{II}\Delta A\text{Cov}(A_I, Y_I) + [2A_I\Delta A^- - (\Delta A)^2]$ $V(Y_I)$
3	Change in yield variance	ΔV(Y)	$(\bar{A}_I)^2\Delta V(Y)$
4	Change in area variance	ΔV(A)	$(\bar{Y}_I)^2\Delta V(A)$
5	Interaction between changes in mean yield and mean area	$\Delta\bar{Y}$, $\Delta\bar{A}$	$2\Delta\bar{Y}\Delta\ \bar{A}\ \text{CoV}\ (Y_I, A_I)$
6	Change in area-yield covariance	ΔCov (A,Y)	$[2\bar{A}_I\bar{Y}_I - 2\text{CoV}\ (Y_I, A_I)]\ \Delta\text{CoV} - [\Delta\text{CoV}$ (A, Y)]^2
7	Interaction between changes in mean area and yield variance	$\Delta\bar{A}$, ΔV(Y)	$[2\bar{A}_I\Delta\bar{A} + (\Delta\bar{A})^2]\Delta V(Y)$
8	Interaction between changes in mean yield and area variance	$\Delta\bar{Y}$,ΔV(A)	$[2\bar{Y}_I\Delta\bar{Y} + (\Delta\bar{Y})^2]\ \Delta V(A)$
9	Interaction between changes in mean area and yield and change in area-yield covariance	$\Delta\bar{A}$, $\Delta\bar{Y}$, ΔCov (A,Y)	$[2\bar{Y}_I\Delta\bar{A} + 2\bar{A}_I\Delta + 2\Delta\bar{A}\Delta\bar{Y}]\ \Delta C\text{oV}(A,Y)$
10	Change in residual	ΔR	$\Delta V(A, Y)$ − sum of other components

Source: *Hazell, 1982.*

more instability in period-II (2000-2014) compared to period–I (1985-1999) with respect to area, production, yield and seed of groundnut crop in India. The results are also in line with Jainuddin *et al.* (2019) who also reported the level of productivity instability was increased during after 1995s.

The study concludes that the fluctuation in area, production and yield was noticed in groundnut during the period II (1995-96 to 2015-16) compared to period–I (1975-76 to 1995-96) with respect to instability of groundnut production in Karnataka. The fact that the oil seed crops in Karnataka are mainly covered under rain fed conditions, which in turn has to depend on the arrival of monsoon, climatic changes and drought; the productivity level of groundnut crop was erratic. Availability of quality seeds of improved varieties is one of the major constraints limiting groundnut productivity.

Table 4 shows the sources of change in average groundnut production in India. Among the components of change 00.04, per cent of the increase was from increase in yield in period I but negative in period II, III and in whole period. 89.28, 89.68, 89.29 and 63.81 per cent from increase in the mean area and 03.11, 07.37, 11.93 and 27.12 per cent from area and yield interaction in period I, II, III and in whole period respectively. 07.63, 02.97, and 09.12 per cent from increase in the yield and area co-variance in period I, II and in overall period respectively and negative in period III. Overall the study observed that the area is contributing more to change in average production followed by interaction between change in mean area and mean yield. Hence, there is a need to increase the area under groundnut to increase the production by providing suitable facility to groundnut growing farmers. These results are little vary with Jainuddin *et al.* (2019) who reported during the whole period (1975-76 to 2015-16), change in mean yield was mainly contributing for the production of groundnut in all districts and divisions in Karnataka except Tumakur

Table 3: Instability in area, production and productivity of groundnut in India and Karnataka

	Periods	Instability index (%)		
		Area	Production	Productivity
India	I Period (1971-72 to 1986-87)	2.9	14.0	12.2
	II Period (1987-88 to 2002-03)	8.7	15.8	12.5
	III Period (2003-04 to 2018-19)	7.3	22.1	29.2
	Overall Period (1971-72 to 2018-19)	10.9	19.4	24.0
Karnataka	I Period (1971-72 to 1986-87)	11.7	20.3	28.8
	II Period (1987-88 to 2002-03)	32.7	35.7	12.3
	III Period (2003-04 to 2018-19)	38.4	39.6	42.7
	Overall Period (1971-72 to 2018-19)	38.1	45.5	30.7

Table 4: Components of change in the Average Production of Groundnut in India

Sl. No.	Source of changes		Components of Change (Percentage)			
	Description	Symbol	I Period	II Period	III Period	Overall Period
1	Change in mean yield	$\Delta\bar{Y}$	00.04	-00.01	-00.01	-00.02
2	Change in mean area	$\Delta\bar{A}$	89.28	89.68	89.29	63.81
3	Interaction between change in mean area and mean yield	$\Delta\bar{A}, \Delta\bar{Y}$	03.11	07.37	11.93	27.12
4	Change in area-yield co-variance	ΔCov(A,Y)	07.63	02.97	-1.20	09.12
	Total		**100**	**100**	**100**	**100**

in Chitradurga, Bellary districts and Bangalore division followed by the change in mean area. Kalyan (2016) observed area change is the major component of change in groundnut production in Eastern Indian states during the period 1990-91 to 1999-2000.

The components of variance in the groundnut production in India are given in Table 5. All the entries in the table are expressed as per cent of change in the variance of groundnut production. The table shows the positive as well as negative signs. The positive sign of this statistics indicates instability, while a negative sign implies the stability for the crop production. During first period, the variance in production of groundnut for the nation as a whole was predominantly due to change in area variance (78.59%). During whole period, change in area variance, interaction between changes in area variance and mean yield, and Interaction between changes in mean area and yield and change in area-yield covariance are the predominant components for the change in variance of production of groundnut in India. Other components have stabilizing effect on groundnut production. The results vary with Jainuddin *et al.* (2019) who reported that during the study period (1975-76 to 2015-16), the variance in production of groundnut for the state as a whole was predominantly due to interaction between change in mean yield and mean area (39.84 %) followed by change in yield variance (9.36 %), change in area variance (3.97 %), whereas the change in mean yield, change in mean area, interaction effect and residual components had a stabilizing effect on groundnut production. Policies and programmes should concentrate on increasing the area under cultivation and include non-traditional areas to increase the groundnut production.

It is revealed from Table 6 that the area under groundnut production in Karnataka plays a major role in growth of groundnut production in over all the period followed by change in area-yield co-variance and interaction between change in mean area and mean yield in period I and II. During period III change in area-yield co-variance is acted as major sources of growth in groundnut production followed by change in mean area. Whereas in overall period change in mean area has acted as major sources of growth followed by interaction between change in mean area and mean yield. The

Table 5: Components of change in variance of production of Groundnut in India

Sl. No.	Source of changes		Components of Change (Percentage)			
	Description	Symbol	I Period	II Period	III Period	Overall Period
1	Change in mean yields	$\Delta\bar{Y}$	0.00	-3.4E-05	-0.00	0.00
2	Change in mean areas	$\Delta\bar{A}$	0.33	3.8E-01	4.37	-0.74
3	Change in yield variance	$\Delta V(Y)$	0.00	-2.0E-06	0.00	0.00
4	Change in area variance	$\Delta V(A)$	78.59	9.7E+01	19.32	301.54
5	Interaction between changes in mean area and mean yield	$\Delta\bar{Y}, \Delta\bar{A}$	0.01	3.1E-02	0.58	-0.31
6	Change in yield - area covariance	$\Delta Cov (A,Y)$	0.03	1.3E-02	-0.06	-0.12
7	Interaction between changes in yield variance and mean area	$\Delta\bar{A}, \Delta V(Y)$	-0.00	1.8E-03	-1.33	-0.13
8	Interaction between changes in area variance and mean yield	$\Delta\bar{Y}, \Delta V(A)$	2.74	8.0E+00	2.58	128.09
9	Interaction between changes in mean yield and area and change in area-yield covariance	$\Delta\bar{A}, \Delta\bar{Y}, \Delta Cov (A,Y)$	0.08	-9.6E-01	7.78	61.136
10	Change in residual	ΔR	18.22	-4.3E+00	66.76	-389.46
	Total		**100**	**100**	**100**	**100**

Table 6: Components of change in the Average Production of Groundnut in Karnataka

Sl. No.	Source of changes		Components of Change (Percentage)			
	Description	Symbol	I Period	II Period	III Period	Overall Period
1	Change in mean yield	$\Delta\bar{Y}$	-00.22	-00.22	00.08	-00.01
2	Change in mean area	$\Delta\bar{A}$	54.92	54.92	26.60	106.38
3	Interaction between change in mean area and mean yield	$\Delta\bar{A}, \Delta\bar{Y}$	08.31	08.31	-01.22	03.28
4	Change in area-yield co-variance	$\Delta Cov (A,Y)$	36.988	36.988	74.55	-09.65
	Total		**100**	**100**	**100**	**100**

results are in tune with Nagarjun (2006) the area effect was positive in groundnut. The decline in interaction effect was observed more in crops such as groundnut and soybean in Karanataka. Jainuddin *et al*. (2019) also observed that the variation in groundnut production was predominantly due to interaction effect of yield and area during period I, whereas change in mean area largely contributed during period II in the state. By developing a suitable yield increasing technology in the state like HYV, expansion of irrigation area under groundnut will help to enhance the per unit production of groundnut as well as stabilize the area and yield of groundnut in the state.

The results of components of change in variance of production of Groundnut in Karnataka are presented in Table 7. The table indicates that change in area variance is the dominant factor which influences the variance of production of groundnut during over all period. The result confirm the findings of Rao and Raju (2005) who have studied the pattern of growth and magnitude of instability in area, production and yield of groundnut in Andhra Pradesh and concluded that the contribution of area had a higher effect on production of groundnut. The results obtained are closely an agreement with the findings of Pusadekar (2018) who observed that the area effect was most responsible for change in groundnut production followed by interaction effect at country level, whereas yield effect was negative. The results

Table 7: Components of change in variance of production of Groundnut in Karnataka

Sl. No.	Source of changes		Components of Change (Percentage)			
	Description	Symbol	I Period	II Period	III Period	Overall Period
1	Change in mean yields	$\Delta\bar{Y}$	0.01	0.00	0.00	0.00
2	Change in mean areas	$\Delta\bar{A}$	-1.20	-0.12	0.01	-0.20
3	Change in yield variance	$\Delta V(Y)$	0.00	0.00	0.00	0.00
4	Change in area variance	$\Delta V(A)$	232.85	108.72	107.45	102.85
5	Interaction between changes in mean area and mean yield	$\Delta\bar{Y}, \Delta\bar{A}$	-0.18	0.01	0.00	-0.01
6	Change in yield - area covariance	$\Delta Cov (A,Y)$	-0.81	0.01	0.03	0.02
7	Interaction between changes in yield variance and mean area	$\Delta\bar{A},\Delta V(Y)$	-0.09	-0.00	-0.00	-0.01
8	Interaction between changes in area variance and mean yield	$\Delta\bar{Y}, \Delta V(A)$	35.22	-4.48	-4.93	3.18
9	Interaction between changes in mean yield and area and change in area-yield covariance	$\Delta\bar{A}, \Delta\bar{Y}, \Delta Cov (A,Y)$	4.69	0.09	0.02	-0.13
10	Change in residual	ΔR	-170.48	-4.21	-2.58	-5.69
	Total		**100**	**100**	**100**	**100**

are also in line with the results of Paul *et al.* (2013); they concluded that during the overall period the change in the total production of groundnut was completely due to change in area under the crop as yield and interaction effects are very negligible. The findings of Ramesh chand and Raju, (2009) aptly support the findings of the study.

CONCLUSION

Instability is one of the important decision parameters in development dynamics and more so in the context of agriculture production. Instability of area, production and yield of groundnut has been discussed in both India and Karnataka. The level of instability was marginally higher in groundnut area (8.7 %) during period II compared to period I (2.9%) and period III (7.3%). The variation in production and yield of groundnut was higher during the period III compared to period I and II. The change in mean area is contributing more to change in average production of groundnut in India and Karnataka followed by interaction between change in mean area and mean yield. Change in area variance is the predominant component contributing to the change in variance of production of groundnut in India as well as in Karnataka. The area under cultivation of groundnut cannot be increased overnight as it is grown in rainfed condition; there is unpredictability in the onset of monsoons, annual rainfall and its distribution over the growing season leading to very low yield. Since groundnut is cultivable throughout the year, the area can be increased with improved cultural practices and improved cultivars contribute radically towards stability and increase of yield in all the cultivating states. From the outcome of the result, it is concluded that the researches and policy makers have to take more attention to develop location specific cultural practice to increase and sustain groundnut production and yield in the nation. Policies and programmes should concentrate on increasing the area under cultivation to include non-traditional areas to increase groundnut production.

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