Growth of Crop-output in Kerala–Is it Real or monetary?[+]

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Abstract

The main feature ofthe development of agriculture in Kerala in the last five decades is the change in cropping pattern and shift in cultivation, that is, shift in the cultivated area under food grain crops to non-food grain crops and shift in the cultivated area under one non-food grain crop to another non-food grain crop. The growth of agricultural crop output and productivity has been affected by many factors. The sources of output growth like area effect, yield effect and cropping pattern effect have relevance in deciding the programmes of agricultural development and priorities of investment in it. The growth of agricultural output in the state like that of other parts of India is influenced by the gross cropped area, productivity and level of prices. The increase in the agricultural crop output is decomposed into real and monetary components. The real component includes area effect, yield effect, cropping pattern effect and interaction effect. The monetary elements consist of the pure price effect, price yield effect, price cropping pattern effect and total interaction effect. From the analysis of the

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decomposition of output growth into real and monetary components of Kerala agriculture in the last five decades, the general conclusions arrived at are: price factor is the major element in determining the relative contribution of different elements to the growth of crop output and the overall growth in the Kerala agriculture is monetary growth in nature rather than real growth.

Keywords: Kerala; crop output; real growth; monetary growth.

Introduction

The agricultural development experience of Kerala since the seventies has shown a sharp decline in the area under food crops and the continuous expansion of non-food crops. Area under food crops decreased from67 percent of the total cropped area to 13 percent; whereas the area under non-food crops went up from 33 percent to 87 percent.

The agriculture-scenario at present indicates a heavy concentration of non-food crops. The predominance of crops dependent on world market conditions and the dominance of perennial crops against annual or seasonal crops are two main peculiarities of the cropping pattern of agriculture in Kerala. The emergence of cash crops as a dominant sector over the last four decades is also notable.

The shift in cultivation from food grain crops to non-food grain crops and from one non-food grain crop to another non-food grain crop emerged. In the state there are many factors affecting the growth of crop output and productivity. The sources of output growth like area effect, yield effect and cropping pattern effect have relevance in deciding the programmes of agricultural development and priorities of investment in it (Ranade CG, 1980). The growth rates as such offer no explanation for the desperate performance of agriculture. It is also important to find why growth rates differ from one another so that the bottlenecks could be removed to achieve speedy development in agriculture (Sikka BK and Vaidya CS, 1985). Though there are many elements of inclusive growth in agriculture, for rapid development of this sector, an attempt to analyse the growth of agricultural production in the state in terms of its determinants, viz, area, productivity and prices is very essential. Changes in the gross cropped area, productivity and level

of prices are important components influencing the growth of aggregate agricultural output (Karunakaran N, 2013). Therefore, an investigation into the growth of crop-output in Kerala in real and monetary terms for the last five decades is attempted in this paper.

Literature Review, Materials and Methodology

Decomposition of the growth of crop-output is an old concept in agricultural growth analysis. Still it has its usual importance to researchers and policy makers for identifying the root causes of high and low growth of agricultural output.

The first systematic study about this was by Minhas and Vaidyananthan (1965). The growth of crop-output was decomposed into a set of physical factors, such as, area, yield and rate of cropping pattern as well as interaction between the latter two. Later, Minhas developed a seven-component version of his additive scheme which was subsequently used by Mishra VN (1971) for his study.

RajenderSondhi, et.al (1975), VidhyaSagar (1977), DharmNarain (1977), Dashora SK, et.al (2000) and Kurosaki Takashi (2002) used the same as well as a modified version of the Minhas-Vaidyananthan model.

Besides these methodology used for decomposition, Ashok Parikh (1966), Dayal (1966) and Bhalla, et.al (1979) adopted multiplicative schemes, instead of the additive schemes, in their decomposition exercise.

Table.1 The Decomposition Model

Crop	Price weight in year		Proportion of area in year		Per hectare yield in year	
	0	t	0	t	0	t
c_1	w_{10}	w_{1t}	c_{10}	c_{1t}	y_{10}	y_{1t}
c_2	w_{20}	w_{2t}	c_{20}	c_{2t}	y_{20}	y_{2t}
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
c_n	w_{n0}	w_{nt}	c_{n0}	c_{nt}	y_{n0}	y_{nt}

Kurien CT and Joseph James (1979) and Kaushik KK (1993) used a procedure which was a modification of the Minhas-Vaidyananthan method to study the contribution of different elements to the growth of crop-output in Tamilnadu and Himachal Pradesh. This procedure is used to study the overall growth of crop-output in Kerala in real and monetary terms and is shown in Table.1.

Observing the value of output in period zero (V_0) and in period t (V_t), the difference between the two is decomposed into eight component elements, viz, (i) change in area, (ii) change in yield per hectare, (iii) change in cropping pattern, (iv) the interaction between yield and cropping pattern, (v) the price change effect, (vi) the interaction between price and yield, (vii) interaction between price and cropping pattern effect and (viii) interaction between price, cropping pattern and yield.

The 'c' and 'y' are the crops and their yields and 'w' are the prices in period zero (0) and period t. If V_0 and V_t will represent the value of output in the two periods and A_0 and A_t will denote gross cropped area in years 0 and t respectively, then by definition,

$V_0 = A_0 \Sigma_i wi_0 ci_0 yi_0$

$V_t = A_t \Sigma_i wi_t ci_t yi_t$

Terminal period output valued at base year prices can be said to represent the 'real output' of the terminal year to be denoted by P_t. That is,

$P_t = A_t \Sigma_i wi_0 ci_t yi_t$

The difference in the value of aggregate output ($V_t - V_0$) can be disaggregated into its 'real' and 'monetary' components with the help of the concept:

$V_t - V_0 = (V_t - P_t) + (P_t - V_0)$

The first term on the right hand side

$V_t - P_t = A_t \Sigma_i wi_t ci_t yi_t - \Sigma_i wi_0 ci_t yi_t$

is the difference between the terminal year aggregate output valued in terms of terminal year prices (wi_t) and base year prices (wi_0), and

hence can be thought of as a measure of the monetary component in increase in output.

The second term

$$P_t - V_0 = A_t \, \Sigma_i wi_0 ci_t yi_t - A_0 \, \Sigma_i wi_0 ci_0 yi_0$$

is the difference between 'real output' in the terminal year and 'real output' in the base year, and hence can be said to be a measure of the real component in increase in output.

$(P_t - V_0)$ can be decomposed as shown below. That is,
$$(P_t - V_0) = (A_t - A_0) \, \Sigma_i wi_0 \, ci_0 \, yi_0$$
$$+ A_t \, \Sigma_i wi_0 \, ci_0 \, (yi_t - yi_0)$$
$$+ A_t \, \Sigma_i wi_0 \, yi_0 \, (ci_t - ci_0)$$
$$+ A_t \, \Sigma_i wi_0 \, (yi_t - yi_0) \, (ci_t - ci_0) \tag{1}$$

In the decomposition scheme (1), the first term on the right hand side is the area effect, the second the yield effect, the third the cropping pattern effect and the fourth interaction effect, representing the interaction between yield and changes in cropping pattern. The term 'area effect' reflects the impact of growth of average area on the increase in the level of production, keeping all other influences inoperative during the period. 'Yield effect' reflects the impact of the growth of average yield and the 'cropping pattern effect' reflects the impact of cropping pattern changes during the current period as compared to the base period. The 'interaction effect' between yield and cropping pattern signifies the influence of these factors over others in bringing about the changes in production. The scheme (1) shows the disaggregation of the real component.

A decomposition of the monetary component is shown in scheme (2).
$$V_t - P_t = A_t \, \Sigma_i ci_0 yi_0 \, (wi_t - wi_0)$$
$$+ A_t \, \Sigma_i ci_0 \, (wi_t - wi_0) \, (yi_t - yi_0)$$
$$+ A_t \, \Sigma_i yi_0 \, (wi_t - wi_0) \, (ci_t - ci_0)$$
$$+ A_t \Sigma_i \, (wi_t - wi_0) \, (ci_t - ci_0) \, (yi_t - yi_0) \tag{2}$$

The first component in the scheme (2) is the 'pure price effect', that is, in the absence of any change in the total output ($c_{i0}y_{i0}$ is total output of the ith crop) an increase of this magnitude in the value of output is solely due to rise in prices. The second and third terms are respectively the first order interactions between price and yield rate and price and cropping pattern effect, under constant cropping pattern and constant yields. These effects signify the influence of any of the two factors over the others in bringing about changes in production. The last term is the second order interaction term between the three variables considered, viz, changes in prices, cropping pattern and yields and may be called the 'total interaction effect'.

The variables and notations used in the model are: A_0 = Gross cropped area in base year zero (0), A_t = Gross cropped area in terminal year (t), V_0 = Value of output in period zero (0), V_t= Value of output in period t, P_t = Real output of the terminal year (t), c_{i0} = Proportion of the area of the i^{th}crop in Gross cropped area in the base year, y_{i0} = Yield of the i^{th}crop in the base year, w_{i0} = Farm harvest price of the i^{th}crop in the base year, c_{it}= Proportion of the area of the i^{th}crop in the terminal year (t), y_{it}= Yield of the i^{th}crop in the terminal year (t), w_{it} = Farm harvest price of the i^{th}crop in the terminal year (t). The subscript '0'and't' refer respectively to the base year and terminal year. Subscript 'i' is used for the i^{th}crop.

Results and Discussion

Time series analysis of acreage, production and productivity data of twelve major crops in Kerala during the last five decades (Table.2) revealed the performance of these crops in terms of growth of area, production and productivity.

Table.2. Compound Growth Rates of Area, Production and Productivity of major crops during the last five decades in Kerala.

Sl. No.	Crops	Area	Production	Productivity
1	Rice	-2.683	-1.418	-1.245
2	Coconut	1.072	1.386	0.366
3	Arecanut	0.691	5.575	4.835
4	Rubber	3.292	7.065	3.903
5	Pepper	1.889	2.589	0.786
6	Cashewnut	-0.151	-1.238	-1.098
7	Tapioca	-2.634	**-0.729	2.067
8	Coffee	3.403	4.649	1.127
9	Tea	-0.215	0.999	1.189
10	Cardamom	****0.415	4.528	4.213
11	Ginger	*-0.429	2.945	3.348
12	Banana and other plantains	2.101	2.351	*0.236

* - Significant at probability level 0.01

** - Significant at probability level 0.03

**** - Significant at probability level 0.10

Source: - Karunakaran. N (2013), "Growth Trends of Area, Production and Productivity of Crops in Kerala: A Fifty Years Experience", Southern Economist, Vol. 51, No. 17, pp: 35-38.

The production of major food crops, rice and tapioca reached negative growth rates due to the declining trend of their cultivation area; but the production rate of banana and other plantains increased due to the increase in cultivation area. Both area and productivity growth rates influenced the production rates of non-food crops. Pepper production growth and growth rate of coconut production was determined more by increase in area. Increase in yield growth rate was responsible for increase in production growth rate of arecanut. Productivity growth rate was responsible for good production growth rate for ginger. Decline in area and yield growth rate was responsible for the negative growth rate in production of cashewnut. For cardamom and tea only yield growth rate is helpful for production growth. In the case of coffee both area and yield growth rates helped the increase in production growth rate. The outstanding performance of rubber in the production

growth rate is as a result of the combined growth of area and productivity.

Table.3Contribution of different elements in real and monetary terms to the growth of crop-output during the last five decades in Kerala (in %).

Sl. No.	Elements	Period					
		1960's	1970's	1980's	1990's	2000's	Five decades
1	Overall growth$\frac{vt-vo}{vo}$	187.58	114.67	192.00	179.77	129.93	10656.34
2	Area effect	19.05	-1.14	6.04	-0.06	-8.16	0.14
3	Yield effect	12.74	14.37	21.31	21.87	8.67	1.38
4	Cropping pattern effect	1.97	2.23	2.34	1.43	0.59	-0.15
5	Interaction effect	-0.13	0.57	-1.60	-0.20	-0.09	0.88
6	Real Growth (2+3+4+5)	33.63	16.03	28.09	23.04	1.01	2.25
7	Pure price effect	56.38	79.06	89.50	71.81	71.42	31.04
8	Price Yield effect	13.92	3.24	11.75	11.25	14.68	54.71
9	Price cropping pattern effect	-1.66	1.92	-17.35	-4.97	10.65	-3.43
10	Total Interaction effect	-2.27	-0.25	-11.99	-1.13	2.24	15.43
11	Monetary Growth (7+8+9+10)	66.37	83.97	71.91	76.96	98.99	97.75
12	Total (6+11)	100.00	100.00	100.00	100.00	100.00	100.00

Source: - Karunakaran N (2013), Relative contribution of different elements to the Growth of principal crop output in Kerala. Indian Development Review, 11(2), 48-58.

The growth of crop-output in Kerala in real and monetary terms was done for 12 major crops during the last five decades considering five sub-periods. Since the period can be divided in different ways, and the result will vary accordingly, decade wise classification of the entire period into five sub-periods was undertaken. In choosing the crops for analysis, the primary consideration has been to ensure maximum coverage of cropped area.

The results of the analysis are summarised in Table.3 and is decomposed into real growth and monetary growth. With 34 percent of the overall growth being real and 66 percent being monetary in 1960's; and 1 percent being real and 99 percent being monetary in 2000's.

The results in Table.3 shows that the real growth has tended to decline from 34 percent during1960's to 1 percent in 2000's and monetary growth has correspondingly risen from 66 percent to 99 percent. Comparison of the real and monetary growth during different periods revealed the dominance of monetary growth over real growth in all the periods under study. More specifically, the overall growth in Kerala in the agriculture sector is actually monetary growth rather than real growth.

Conclusion

The growth of agricultural crop output in Kerala like that of other parts of India is influenced by the gross cropped area, productivity and level of prices. The increase in agricultural crop-output is decomposed into real and monetary components. The real component includes area effect, yield effect, cropping pattern effect and interaction effect. The monetary elements consist of the pure price effect, price yield effect, price cropping pattern effect and total interaction effect.

From the analysis of the output growth of major crops into real and monetary components of Kerala agriculture in the last five decades, the general conclusions derived are: there are fluctuations in the overall growth of crop-output in Kerala over different periods; there is a perceptible increase in the monetary growth and decline in the real growth of crop-output; price factor is the major element in determining the contribution of different elements to the growth of crop-output; overall growth in the Kerala agriculture is monetary growth in nature rather than real growth; among twelve crops studied during different periods, rubber is the only crop, exhibited positive values in all the components in the analysis and for all crops during the overall period, the share of monetary components is more than 90 percent for the overall growth of output of these crops compared to real components.

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Annexure

Table 4 Decomposition of the growth of crop-outputduring the last five decades in Kerala

Sl. No.	Crops	1960's					
		c_0	y_0	w_0	c_t	y_t	w_t
1	Rice	33.16	1371	40.51	29.97	1403	100.31
2	Coconut	21.32	920	21.51	24.27	720	49.84
3	Arecanut	2.31	1020	2.73	2.87	1080	4.02
4	Rubber	5.23	187	347.96	6.01	439	518.94
5	Pepper	4.25	271	404.59	4.05	207	559.54
6	Cashewnut	2.31	1558	77.32	3.39	1122	146.42
7	Tapioca	10.31	6949	7.74	10.14	13785	18.48
8	Coffee	0.72	442	575	0.99	432	898
9	Tea	1.60	1073	562.50	1.31	1050	702
10	Cardamom	1.22	45	2230	1.61	23	5653
11	Ginger	0.51	938	117.50	0.40	1041	866.13
12	Banana and other plantains	1.89	7381	6.73	1.83	7570	17.18
A_0 = 2349 (' 000 hectare)					A_t = 2916 ('000 hectare)		

Sl. No	Crops	1970's					
		c_0	y_0	w_0	c_t	y_t	w_t
1	Rice	29.83	1484	90.25	27.79	1638	133.24
2	Coconut	24.52	790	56.68	23.22	655	114.28
3	Areca nut	2.93	1060	3.74	2.13	1270	6.15
4	Rubber	6.11	439	457.89	7.55	634	997.74
5	Pepper	4.03	212	616.90	3.71	273	1358.57
6	Cashew nut	3.50	1122	139.80	4.90	591	582.73
7	Tapioca	10.01	15729	20.59	8.54	16774	41.22
8	Coffee	1.08	398	1068	2.03	521	1698
9	Tea	1.28	1105	718.75	1.27	1451	1397.75
10	Cardamom	1.62	26	5302.50	1.89	61	14338
11	Ginger	0.41	1617	553.97	0.50	2536	405.88
12	Banana / plantains	1.66	7567	16.69	1.74	6253	38.08
A_0 = 2933 ('000 hectare)				A_t = 2854 ('000 hectare)			

Sl. No.	Crops	1980's					
		c_0	y_0	w_0	c_t	y_t	w_t
1	Rice	27.79	1587	152.06	19.32	1956	290.47
2	Coconut	22.56	660	138.09	27.57	748	203.81
3	Areca nut	2.12	1245	7.60	2.09	1352	14.27
4	Rubber	8.24	590	1114.24	13.13	695	2043.37
5	Pepper	3.75	264	1208.23	5.53	324	3473.06
6	Cashew nut	4.90	580	731.91	4.10	859	1177.51
7	Tapioca	8.49	16926	37.67	5.30	19075	138.67
8	Coffee	2.01	406	1705	2.49	285	4852
9	Tea	1.25	1402	1314	1.15	1878	2754
10	Cardamom	1.87	60	10915.33	2.14	44	26810.38
11	Ginger	0.44	2523	563.74	0.48	3283	2192.89
12	Banana / plantains	1.71	6438	38.65	2.01	7404	70.05
A_0 = 2885 ('000 hectare)				A_t = 3019 ('000 hectare)			

Sl. No.	Crops	1990's					
		c_0	y_0	w_0	c_t	y_t	w_t
1	Rice	18.53	1942	289.61	11.59	2203	684.43
2	Coconut	26.72	750	301.23	30.66	877	476.12
3	Areca nut	2.15	1442	26.40	2.72	7265	75.25
4	Rubber	13.63	747	1943.68	15.67	1211	3099
5	Pepper	5.58	278	3234.25	6.58	240	20506.16
6	Cashew nut	3.83	702	1379.90	2.96	733	3638.50
7	Tapioca	4.85	19133	150.69	3.71	22621	368.09
8	Coffee	2.49	278	5551	2.79	719	12671
9	Tea	1.15	1752	3814	1.15	1780	5134
10	Cardamom	2.21	52	22233.70	1.38	159	42636
11	Ginger	0.47	3240	2528.02	0.37	3670	6393.68
12	Banana / plantains	2.17	7499	75.41	3.06	8762	160.39
A_0 = 3020 (' 000 hectare)				A_t = 3017 (' 000 hectare)			

Sl. No.	Crops	2000's					
		c_0	y_0	w_0	c_t	y_t	w_t
1	Rice	11.50	2162	646.36	8.67	2520	915.87
2	Coconut	30.63	855	281.43	28.88	1055	544.25
3	Arecanut	2.89	6911	41.88	3.58	9200	48.90
4	Rubber	15.70	1222	3036	19.15	1514	11091
5	Pepper	6.69	301	12401.24	6.51	231	11475.64
6	Cashew nut	3.05	718	2368.81	1.96	800	3665.09
7	Tapioca	3.79	22572	397.24	3.23	31061	555.86
8	Coffee	2.80	832	3995	3.13	675	5306
9	Tea	1.22	1876	5133	1.35	1415	11030
10	Cardamom	1.37	184	56999	1.54	206	50644
11	Ginger	0.38	3677	6393.68	0.21	4191	7732
12	Banana / plantains	3.29	8173	104.35	3.81	7971	156.53
A_0 = 3022 (' 000 hectare)				A_t = 2669 (' 000 hectare)			

Sl. No.	Crops	Five Decades					
		c_0	y_0	w_0	c_t	y_t	w_t
1	Rice	33.16	1371	40.51	8.67	2520	915.87
2	Coconut	21.32	920	21.51	28.88	1055	544.25
3	Arecanut	2.31	1020	2.73	3.58	9200	48.90
4	Rubber	5.23	187	347.96	19.15	1514	11091
5	Pepper	4.25	271	404.59	6.51	231	11475.64
6	Cashew nut	2.31	1558	77.32	1.96	800	3665.09
7	Tapioca	10.31	6949	7.74	3.23	31061	555.86
8	Coffee	0.72	442	575	3.13	675	5306
9	Tea	1.60	1073	562.50	1.35	1415	11030
10	Cardamom	1.22	45	2230	1.54	206	50644
11	Ginger	0.51	938	117.50	0.21	4191	7732
12	Banana / plantains	1.89	7381	6.73	3.81	7971	156.53
A_0 = 2349 (' 000 hectare) A_t = 2669 (' 000 hectare)							

c_0, c_t– Share of area (%) of the total cropped area, y_0, y_t– Output in Kg per hectare, w_0, w_t– Price per quintal (In Rupees).

Table 5 Decomposition of the growth of crop-output in Kerala during thelast five decades formajor crops (In%)

Sl. No.	Elements	1- Rice					
		Period					
		1960's	1970's	1980's	1990's	2000's	5 decades
1	Increase in value of output	157.01	37.64	109.11	1.33	-16.05	226.78
2	Area effect	69.29	-24.80	-105.60	56.26	203.00	-30.83
3	Yield effect	14.85	25.00	65.62	12.61	-69.57	11.11
4	Cropping pattern effect	-6.10	-16.47	-86.02	-35.14	103.39	-9.79
5	Interaction effect	-1.43	-1.71	-20.00	-4.72	17.12	-8.21
6	Real Growth (2+3+4+5)	76.61	-17.98	-146.00	29.01	253.94	-37.72
7	Pure price effect	93.96	114.73	256.89	120.50	-175.18	286.57

8	Price Yield effect	21.93	11.91	64.11	1.69	-29.01	240.16
9	Price cropping pattern effect	-90.41	-7.85	-73.21	-45.13	43.11	-211.64
10	Total Interaction effect	-2.11	-0.81	-1.79	-6.07	7.14	-177.37
11	Monetary Growth (7+8+9+10)	23.39	117.98	246.00	70.99	-153.94	137.72
12	Total (6 +11)	100.00	100.00	100.00	100.00	100.00	100.00

2- Coconut							
Sl. No.	Elements	Period					
		1960's	1970's	1980's	1990's	2000's	5 decades
1	Increase in value of output	191.79	45.87	161.16	143.09	89.68	6025.98
2	Area effect	21.56	-16.15	17.22	9.48	-17.50	0.93
3	Yield effect	-16.04	-32.38	10.57	19.87	21.99	0.38
4	Cropping pattern effect	10.21	-4.35	17.60	10.95	-5.37	0.92
5	Interaction effect	-2.22	1.72	2.35	1.85	-1.26	0.13
6	Real Growth (2+3+4+5)	13.51	-51.16	47.74	42.15	-2.14	2.36
7	Pure price effect	97.08	192.52	37.73	43.11	87.78	62.86
8	Price Yield effect	-21.11	-32.90	5.03	7.30	20.44	9.22
9	Price cropping pattern effect	13.44	-10.21	8.38	6.36	-5.02	22.29
10	Total Interaction effect	-2.92	1.75	1.12	1.08	-1.06	3.27
11	Monetary Growth (7+8+9+10)	86.49	151.16	52.26	57.85	102.14	97.64
12	Total (6 +11)	100.00	100.00	100.00	100.00	100.00	100.00

3- Arecanut						
Sl. No.	Elements	Period				
		1960's	1970's	1980's	1990's	2000's	5 decades
1	Increase in value of output	198.75	1.55	107.46	2197.33	113.22	44543.71
2	Area effect	27.34	-30.17	2.98	1.20	9.48	0.18
3	Yield effect	4.35	95.71	8.23	23.24	32.39	3.06
4	Cropping pattern effect	18.86	-15.73	-1.36	1.53	23.35	0.22
5	Interaction effect	1.11	-3.98	-0.12	6.16	7.74	1.77
6	Real Growth (2+3+4+5)	51.66	45.83	9.73	32.13	72.96	5.23
7	Pure price effect	36.75	47.38	84.33	10.65	16.40	6.78
8	Price Yield effect	2.16	9.39	7.23	43.00	5.43	54.37
9	Price cropping pattern effect	8.91	-0.04	-1.19	2.82	3.91	3.73
10	Total Interaction effect	0.52	-2.56	-0.10	11.40	1.30	29.89
11	Monetary Growth (7+8+9+10)	48.34	54.17	90.27	67.87	27.04	94.77
12	Total (6 +11)	100.00	100.00	100.00	100.00	100.00	100.00

4 – Rubber						
Sl. No.	Elements	Period				
		1960's	1970's	1980's	1990's	2000's	5 decades
1	Increase in value of output	473.65	367.40	474.04	241.42	502.24	397853.67
2	Area effect	8.99	4.86	22.65	6.17	1.81	0.08
3	Yield effect	40.57	12.84	1.03	29.56	5.19	0.75
4	Cropping pattern effect	4.49	18.48	33.58	7.13	4.77	0.03
5	Interaction effect	6.05	3.03	5.98	4.42	1.14	2.01
6	Real Growth (2+3+4+5)	60.10	39.21	63.24	47.28	12.91	2.87
7	Pure price effect	14.79	34.06	4.72	28.29	57.63	3.28
8	Price Yield effect	19.93	15.13	6.23	17.57	13.77	23.25
9	Price cropping pattern effect	2.21	8.03	20.83	4.23	12.66	8.72

10	Total Interaction effect	2.97	3.57	4.98	2.63	3.03	61.88
11	Monetary Growth (7+8+9+10)	39.90	60.79	36.76	52.72	87.09	97.13
12	Total (6 +11)	100.00	100.00	100.00	100.00	100.00	100.00

Sl. No.	Elements	Period					
		1960's	1970's	1980's	1990's	2000's	5 decades
	5 – Pepper						
1	Increase in value of output	63.12	133.98	704.17	659.99	-39.90	8837.25
2	Area effect	-84.61	-7.75	12.96	3.15	32.65	1.19
3	Yield effect	128.99	19.25	8.34	-2.86	50.70	-0.41
4	Cropping pattern effect	25.70	-5.31	17.42	3.76	5.87	1.46
5	Interaction effect	-6.07	-1.53	3.96	-0.51	-1.36	-0.22
6	Real Growth (2+3+4+5)	64.01	4.66	42.68	3.54	87.86	2.02
7	Pure price effect	-20.92	80.42	6.88	111.75	16.26	75.04
8	Price Yield effect	49.39	23.15	16.80	-15.28	-3.78	-11.07
9	Price cropping pattern effect	9.84	-6.39	26.22	2.73	-0.44	39.90
10	Total Interaction effect	-2.32	-1.84	7.42	-2.74	0.10	-5.89
11	Monetary Growth (7+8+9+10)	35.99	95.34	57.32	96.46	12.14	97.98
12	Total (6 +11)	100.00	100.00	100.00	100.00	100.00	100.00

Sl. No.	Elements	Period					
		1960's	1970's	1980's	1990's	2000's	5 decades
	6 – Cashewnut						
1	Increase in value of output	117.73	318.89	74.54	64.56	-36.42	1100.35
2	Area effect	31.07	11.38	-21.08	-35.10	124.08	-0.14
3	Yield effect	-19.32	-20.21	71.28	5.29	-19.09	-2.48
4	Cropping pattern effect	32.20	17.09	-24.19	-27.21	59.74	-0.77
5	Interaction effect	-9.01	-8.09	-11.64	-1.20	0.77	0.38
6	Real Growth (2+3+4+5)	34.94	0.17	14.37	-58.22	165.50	-3.01
7	Pure price effect	61.56	135.38	90.22	196.06	-91.46	236.46

8	Price Yield effect	-17.23	-64.07	30.99	8.66	-10.45	-115.04
9	Price cropping pattern effect	28.78	54.15	-28.49	-44.53	32.68	-35.83
10	Total Interaction effect	-8.05	-25.63	-7.09	-1.97	3.73	17.42
11	Monetary Growth (7+8+9+10)	65.06	99.83	85.63	158.22	-65.50	103.01
12	Total (6 +11)	100.00	100.00	100.00	100.00	100.00	100.00

7 – Tapioca							
Sl. No.	Elements	Period					
		1960's	1970's	1980's	1990's	2000's	5 decades
1	Increase in value of output	468.49	51.25	69.24	68.77	24.97	3523.70
2	Area effect	4.70	-33.10	43.64	-34.32	-95.47	-1.82
3	Yield effect	25.68	10.76	-10.46	20.26	114.70	3.56
4	Cropping pattern effect	-0.43	-23.80	30.92	-26.11	-45.05	-0.70
5	Interaction effect	-0.42	-1.58	3.93	-4.76	-16.94	-2.44
6	Real Growth (2+3+4+5)	29.53	-47.72	68.03	-44.93	-42.76	-1.40
7	Pure price effect	36.12	162.36	-22.57	160.25	121.74	72.40
8	Price Yield effect	35.54	10.78	-33.03	29.22	45.78	251.25
9	Price cropping pattern effect	-0.60	-23.84	77.04	-37.67	-17.99	-49.72
10	Total Interaction effect	-0.59	-1.58	10.53	-6.87	-6.77	-172.53
11	Monetary Growth (7+8+9+10)	70.47	147.72	31.97	144.93	142.76	101.40
12	Total (6 +11)	100.00	100.00	100.00	100.00	100.00	100.00

8 – Coffee							
Sl. No.	Elements	Period					
		1960's	1970's	1980's	1990's	2000's	5 decades
1	Increase in value of output	260.67	618.18	220.76	641.04	20.40	30782.73
2	Area effect	27.57	13.52	11.73	1.88	-0.23	1.31
3	Yield effect	-1.49	9.17	-15.29	27.72	-92.45	0.86
4	Cropping pattern effect	24.73	26.12	12.25	2.11	57.74	5.48
5	Interaction effect	-0.56	8.07	-3.65	3.34	-10.90	2.89
6	Real Growth (2+3+4+5)	50.25	56.88	5.04	35.05	-45.84	10.54

7	Pure price effect	37.01	17.52	94.70	22.41	160.80	13.47
8	Price Yield effect	-0.84	5.41	-15.17	35.56	-30.34	7.10
9	Price cropping pattern effect	13.89	15.41	22.17	2.70	18.96	45.11
10	Total Interaction effect	-0.31	4.78	-6.74	4.28	-3.58	23.78
11	Monetary Growth (7+8+9+10)	49.75	43.12	94.96	64.95	145.84	89.46
12	Total (6 +11)	100.00	100.00	100.00	100.00	100.00	100.00

9 – Tea							
Sl. No.	Elements	Period					
		1960's	1970's	1980's	1990's	2000's	5 decades
1	Increase in value of output	1.77	143.46	147.29	37.51	77.94	2019.22
2	Area effect	100.42	-2.73	-2.70	1.47	-1.01	-0.14
3	Yield effect	-123.05	20.98	20.64	4.28	-31.27	1.53
4	Cropping pattern effect	-1040.46	-0.52	-0.05	0.00	13.56	-0.75
5	Interaction effect	22.30	-0.16	-1.65	0.00	-3.33	-0.24
6	Real Growth (2+3+4+5)	-1040.79	17.57	16.24	5.75	-22.05	0.40
7	Pure price effect	1423.82	63.27	66.62	92.77	146.22	89.51
8	Price Yield effect	-30.52	19.81	23.15	1.48	-35.93	28.53
9	Price cropping pattern effect	-258.04	-0.49	-4.20	0.00	15.58	-13.98
10	Total Interaction effect	5.53	-0.16	-1.81	0.00	-3.82	-4.46
11	Monetary Growth (7+8+9+10)	1140.79	82.43	83.76	94.25	122.05	99.60
12	Total (6 +11)	100.00	100.00	100.00	100.00	100.00	100.00

10 – Cardamom							
Sl. No.	Elements	Period					
		1960's	1970's	1980's	1990's	2000's	5 decades
1	Increase in value of output	330.23	740.35	146.36	127.11	126.30	18972.40
2	Area effect	35.47	1.83	-8.72	5.76	5.75	0.26
3	Yield effect	-44.28	20.66	14.23	-19.35	95.33	3.00

4	Cropping pattern effect	28.95	2.56	-7.71	122.79	98.93	0.22
5	Interaction effect	-14.16	3.44	2.06	7.26	11.83	0.79
6	Real Growth (2+3+4+5)	5.98	28.49	-0.14	116.46	211.84	4.27
7	Pure price effect	139.26	26.08	-77.64	-8.64	-88.86	18.25
8	Price Yield effect	-67.96	35.20	179.65	-17.75	-10.63	65.17
9	Price cropping pattern effect	44.44	4.36	-4.87	3.25	-11.03	-4.78
10	Total Interaction effect	-21.72	5.87	3.00	6.68	-1.32	17.09
11	Monetary Growth (7+8+9+10)	94.02	71.50	97.44	-16.46	-111.84	95.73
12	Total (6 +11)	100.00	100.00	100.00	100.00	100.00	100.00

11 – Ginger							
Sl. No.	Elements	Period					
		1960′s	1970′s	1980′s	1990′s	2000′s	5 decades
1	Increase in value of output	515.96	62.59	526.09	80.10	-63.46	5519.39
2	Area effect	-0.78	96.82	2.63	-13.37	78.52	-0.53
3	Yield effect	2.05	4.52	6.71	7.04	-10.12	1.99
4	Cropping pattern effect	-4.02	1.75	2.03	11.28	32.39	-0.27
5	Interaction effect	-0.44	0.99	0.61	1.49	4.53	-1.17
6	Real Growth (2+3+4+5)	-3.19	104.08	11.98	6.44	105.32	0.02
7	Pure price effect	118.56	-2.13	64.43	63.26	-15.16	29.53
8	Price Yield effect	13.03	-1.21	18.08	10.76	2.11	128.90
9	Price cropping pattern effect	-25.59	-0.47	3.75	17.25	6.78	17.38
10	Total Interaction effect	-2.81	-0.27	1.76	2.29	0.95	-75.83
11	Monetary Growth (7+8+9+10)	103.19	-4.08	88.02	93.56	-5.32	99.98
12	Total (6 +11)	100.00	100.00	100.00	100.00	100.00	100.00

Sl. No.	Elements	Period					
		1960's	1970's	1980's	1990's	2000's	5 decades
1	Increase in value of output	201.81	100.83	202.16	393.02	75.56	11511.37
2	Area effect	9.60	1.67	10.22	4.46	4.64	1.13
3	Yield effect	1.57	-18.36	8.10	2.60	-3.28	0.16
4	Cropping pattern effect	-3.60	1.47	9.48	63.24	20.97	2.05
5	Interaction effect	-0.05	-0.88	1.42	1.06	-0.52	0.16
6	Real Growth (2+3+4+5)	7.52	-16.10	29.22	71.36	21.81	3.50
7	Pure price effect	93.13	134.03	43.90	17.38	66.33	44.33
8	Price Yield effect	2.39	-23.27	6.39	2.93	1.64	3.54
9	Price cropping pattern effect	-2.96	6.46	9.05	7.13	10.48	45.03
10	Total Interaction effect	-0.08	-1.12	11.44	1.20	-0.26	3.60
11	Monetary Growth (7+8+9+10)	92.48	116.10	70.78	28.64	78.19	96.50
12	Total (6 +11)	100.00	100.00	100.00	100.00	100.00	100.00

12 - Banana and other plantains

Source: - Computed from Table 4