



PRODUCTION PERFORMANCE OF GARLIC IN INDIA – A VIEW

Dr.M.Manoharan* Mrs.T.Ramalakshmi**

*Associates Professor and Research Advisor, PG and Research Dept. of Commerce, PA. College., Bodinayakanur India.

**Fulltime Ph.D Research scholar, PG and Research Department of Commerce, CPA. College, Bodinayakanur India.

Abstract

Garlic is now cultivated extensively in countries like China, India, Egypt, USA, Russia and Korea. China occupies the first position in garlic cultivation in terms of production, India occupying the second position in production. The average share of India in garlic cultivation in the world in production is 5.08 per cent. In India, Gujarat leads in production. In Tamil Nadu, production had both increasing and decreasing trend during the study period. Tamil Nadu's average share in garlic cultivation in India in production is 0.47 per cent. In Dindigul district, the study area, it's average production of garlic during the study period was 2080 tonnes per hectare. Dindigul district ranks first in production. Dindigul district, the study area has all possibility to increase production if new technologies in agriculture, labour saving and new techniques are used.

Keywords: *Garlic Production, Trend, Common Growth Rate, Magnitude of Variability, Regression Analysis.*

INTRODUCTION

Garlic is one of the most popular spices in the world and it is extensively used in all the countries. Since ancient times, garlic has been used as a good cure. Garlic is one of the important bulb crops grown and is used as a spice or condiment not only in India but also throughout the world. Several advanced agricultural techniques are followed in production of garlic all over the world. But due to natural havocs, drought, pests, diseases and unfavourable climatic conditions, the farmers do not get good value of money in production and therefore it is imperative to take innovative steps to increase production and productivity of garlic. China, India, Republic of Korea, Russia and Egypt are major garlic producing countries in the world. They contribute an average of 81.13 per cent in total production of garlic and 75.95 per cent of the total garlic producing area. Garlic is one of the most important spices grown in India and a small quantity of garlic is also exported from India. India has been exporting garlic for many years.

NEED OF THE STUDY

Garlic is one of the most important spices that have been cultivated throughout the world from the antique past. It has been used extensively both as an important food ingredient and as a component in pharmaceutical preparations. At the world level, China ranks first in area and production of garlic followed by India. However, India turns out poor performance in productivity lagging far behind countries like Egypt, China and USA. To add to this, the cost of production in garlic cultivation is on the constant increase which is a major constraint in competing in the international trade to earn a sizable profit both in cultivation and marketing. An attempt is made in to present a global perspective of the total area and production of garlic and their trend in growth and its magnitude of variability during the study period. A similar attempt is also made at the State level in India and District level in Tamil Nadu.

OBJECTIVES

To study and analyze the trend, growth and magnitude of variability in production of garlic cultivation in global, country, state level and district level in Tamil Nadu.

METHODOLOGY

The present study is based entirely on secondary sources. The secondary data regarding production of 2000 to 2010 were collected from the Horticulture Department of State. The study entails a temporal as well as spatial analysis of the growth of production of Garlic grown in Tamil Nadu. In the present study, an attempt has been made to compare the difference in growth of production Garlic. The time series data on area, production and productivity of Garlic were obtained from various publications of Government of Tamil Nadu. Data were collected from various journals, books, news papers, Spices Statistics published by the Spices Board Cochin, Statistical Year Book, the report of Directorate of Economics and Statistics, Ministry of Agriculture and Websites.

Tools of Analysis

Trend



Trend in area, production and productivity of garlic were estimated with simple regression equation of the following form: $y = a + bt$

where, y = Area is the production in the year; a = constant; b = regression coefficient;
t = time in years

Growth per Formation and Magnitude of Variability

Nilakandha Rath in his study recommended that in biological process like agricultural growth, compound growth rate was more appropriate for analyzing the growth rate for a period of time. Considering his view, the compared growth rate with regard to production has been estimated on the basis of semi-log exponential function. $\text{Log } y = a + bt$;

Where, y = area, production and productivity; t = time periods;

'a' and 'b' are to be estimated compound growth rate = $(\text{antilog } b - 1) \times 100$

To measure the magnitude of variability in area, production and productivity, coefficient of variation (CV) is used.

$$CV = \frac{\text{Standard Deviation}}{\text{Mean}} \times 100$$

RESULTS AND DISCUSSION

The production of Garlic in global scenario is studied as under.

GLOBAL PROFILE OF GARLIC CULTIVATION

India ranks second in terms of area and production in garlic cultivation with a production of about 777827 tonnes. The crop is grown mostly in hill slopes where the congenial atmosphere with suitable range of temperature, rainfall and humidity prevail. Some of the states in India where garlic is cultivated are Gujarat, Uttar Pradesh, Madhya Pradesh, Karnataka and Tamil Nadu. In Tamil Nadu the crop is extensively cultivated in Dindigul, Erode and Nilgiris districts. In the study area Dindigul district, garlic is cultivated in the hill tracts of Kodaikanal, Poondi, Poomparai, Palampoothur, Thandikudi and Pallam.

China and India are the major producers of garlic, naturally so in view of their large scale demand for the teeming population followed by Russia, Korea, USA and Egypt.

COUNTRY- WISE GARLIC PRODUCTION

Garlic is one of the most important condiments used in many culinary, pharmaceutical and other preparations required for the humanity. Many countries in the world produce garlic realizing its significance. Therefore, it is necessary to analyse the volume of production of garlic in different countries during the study period and the details are presented in Table 1.

Table- 1, Country-wise Garlic Production from 2000-01 to 2009-10(tonnes)

Year	Egypt	Russia	U.S.A	China	Korea	India	Others	World Total
2000-01	158600	259230	218600	9083005	388780	360990	3411747	13880952
2001-02	159400	260240	219660	9568013	396680	373350	3137359	14114702
2002-03	160200	259120	218520	10082008	388580	494900	2755934	14359262
2003-04	161100	258320	217460	10578012	381280	747780	2265678	14609630
2004-05	162077	257280	216410	11083011	374980	789879	1986131	14869768
2005-06	163000	255860	224480	11587000	331379	656154	1951026	15168899
2006-07	168000	254000	221810	12088000	325000	853157	1776343	15686310
2007-08	172000	252500	219210	12593015	319084	1088370	1560131	16204310
2008-09	177000	251100	217010	13087000	319064	1196788	1481656	16724618
2009-10	182000	249300	214810	13597023	310032	1216897	1584558	17354620
Average	166338	255695	218797	11334609	352986	777827	2191056	15297307



Per cent Share	1.09	1.67	1.43	74.10	2.31	5.08	14.32	100.00
Rank	6	4	5	1	3	2		

Source: www.nhrdf.org

It is observed from Table 1 that China stands first in terms of average annual garlic production with 11334609 tonnes followed by India with 777827 tonnes, Korea with 352986 tonnes, Russia with 255695 tonnes, USA with 218797 tonnes and Egypt with 166338 tonnes during the study period.

The analysis reveals that China with 56.42 per cent share in area of garlic cultivation produced about 74.10 per cent of the total garlic production in the world. Therefore, China remains an unquestionable leader both in area and production of garlic at the world level. Whereas, though the percentage share of India in the area of garlic cultivation is 14.08 per cent in the world, the quantum of garlic production share is only 5.08 per cent, which is proportionately less compared to China. The share of Korea is 2.31 per cent, Russia 1.67 per cent, USA 1.43 per cent and Egypt has the share of 1.09 per cent in garlic production.

GROWTH AND VARIABILITY OF GARLIC PRODUCTION

The production of garlic cannot be expected to be consistent because it may be impacted by various factors like erratic rain pattern, fluctuations in price, pests and diseases and shortage of labour in respective countries. Therefore, it is necessary to analyse the growth pattern and variability of garlic production at the global level. To analyze the growth rate, compound growth rate has been calculated using exponential function and also to examine the variability in production.

Table - 2, Trend, Growth Rate and Magnitude of Variability of Garlic Production in the World

Country	Semi-log		R ²	CGR (per cent/annum)	CV (Percent)
	Constant	Regression coefficient			
Egypt	5.185 (0.005)	0.006** (0.001)	0.882	1.39	4.89
Russia	5.419 (0.001)	-0.002** (0)	0.943	-0.46	1.48
USA	5.342 (0.004)	^{NS} 0 (0.001)	0.036	-	1.26
China	6.944 (0.002)	0.019* (0)	0.997	4.47	13.41
Korea	5.622 (0.010)	-0.014** (0.002)	0.901	-3.28	10.13
India	4.973 (0.026)	0.043** (0.004)	0.909	15.08	40.74
Others	6.551 (0.024)	-0.041** (0.004)	0.937	-9.90	31.36
Total	6.551 (0.02)	-0.041** (0.004)	0.937	-9.90	7.61

Source: Computed from Table 1

Figures in parentheses denote standard errors

* Significant at five per cent level

** Significant at one per cent level ,NS: Not Significant



Table 2 reveals that the trend co-efficient of garlic production in Egypt, China, and India is positive and is statistically significant. It implies that garlic production increased significantly in these countries during the study period. The trend co-efficient is negative and significant in Russia and Korea and it reveals that garlic production decreased significantly in these two countries.

It is also inferred from the analysis, of all the countries, India has the highest growth rate in production of garlic with 15.08 per cent per annum followed by China with 4.47 per cent and Egypt has 1.39 per cent rate of growth per annum. Whereas, Korea experienced a decrease in the rate of growth in production by 3.8 per cent per annum and Russia by 0.46 per cent per annum during the period under study.

The co-efficient of variation indicates that India experienced the greatest variation with 40.74 per cent followed by China with 13.41 per cent and Korea by 10.13 per cent variation. The analysis reveals that USA, Russia and Egypt are consistent in garlic production.

PROFILE OF GARLIC CULTIVATION IN INDIA

India has a place of pride in cultivation and production of garlic with an annual production of about 777827 tonnes. Bigger cloved garlic in India is being produced in northern hills and Nilgiri hills in view of increasing demand in export market. Yamuna safed and Agri- found Parvathi are the varieties which are in great demand as they have 50-60 mm bulb diameter with 10-15 cloves per bulb. Cultivation of these varieties is picking up in Madhya Pradesh, Orissa, Haryana and Punjab.

In India garlic is cultivated in Gujarat, Uttar Pradesh, Madhya Pradesh, Karnataka and Tamil Nadu.

Area under Garlic Cultivation in India

In India, along with other spices and condiment crops, garlic also has been cultivated for many centuries. It has been used in cooking, pharmaceutical preparations and many value added products. The area under garlic cultivation in India the percentage change while comparing to the previous years and the trend values are presented in Table 3.

Table- 3, Area under Garlic cultivation in India from 2000-01 to 2009-10

Year	Area (Hectares)	Increase/ Decrease	Percentage Increase /Decrease	Trend Value
2000-01	105370	-	-	95883
2001-02	108790	3420	3.25	111970
2002-03	114410	5620	5.17	128057
2003-04	163770	49360	43.14	144145
2004-05	162732	-1038	-0.63	160232
2005-06	161703	-1029	-0.63	176319
2006-07	168944	7251	4.48	192407
2007-08	218483	49529	29.32	208494
2008-09	238765	20282	9.28	224581
2009-10	239780	1015	0.43	240669

Source: "Spice Statistics" – Spices Board, Cochin.

It is inferred from Table 3 that area under garlic cultivation during the study period had a gradual and consistent increase from 105370 hectares in 2000-01 to 239780 hectares in 2009-10. A remarkable increase in area of garlic cultivation could be noticed in the year 2003-04 during which the area rose to 163770 hectares from 114410 hectares in 2002-03 making an increase of 43.14 per cent. However in the successive years, there were slight decreases in the area of



cultivation. The trend value for area under garlic cultivation had increased from 95883 hectares in 2000-01 to 240669 hectares in 2009-10. The positive trend in area of garlic cultivation might have been due to the presence of congenial factors of all kinds for garlic cultivation.

Garlic Production in India

Garlic production in India and the absolute as well as percentage increase or decrease of garlic production over the previous year and trend values are presented in Table4.

Table- 4 ,Garlic Production in India during 2000-01 to 2009-10

Year	Production (tonnes)	Increase/ Decrease	Percentage Increase/ Decrease	Trend Value
2000-01	360990	-	-	324636
2001-02	373350	12360	3.42	425345
2002-03	494900	121550	32.56	526054
2003-04	747780	252880	51.10	626763
2004-05	789879	42099	5.63	727472
2005-06	656154	-133725	-16.93	828181
2006-07	853157	197003	30.02	928890
2007-08	1088370	235213	27.57	1029599
2008-09	1196788	108418	9.96	1130308
2009-10	1216897	20109	1.68	1231017

Source: "Spice Statistics" – Spices Board, Cochin.

It could be inferred from Table 4 that the production of garlic in India had a gradual increase during the study period. The production in 2002-03 which was 494900 tonnes increased to 747780 tonnes in 2003- 04 making a remarkable increase of 51.10 percentages. The reasons that could be attributed to such an increase might have been favorable climatic conditions and increase in area of cultivation. However it could be noticed that there was a reduction of 133725 tonnes in production in 2005-06 accounting for 16.93 per cent decrease from the production level of the previous year 2004-05. Unfavorable climatic conditions, pests and diseases and erratic rain pattern might have been some of the reasons for such a trend. However, the trend value for the production of garlic in general was increasing from 324636 tonnes in 2000-01 to 1231017 tonnes 2009-10.

STATE -WISE GARLIC CULTIVATION IN INDIA

Garlic as an important condiment crop is cultivated in many states in India. Some of the major garlic producing states are Gujarat, Uttar Pradesh, Madhya Pradesh, Karnataka and Tamil Nadu. In about 168276 hectares of land, garlic is cultivated in different states and about 777827 tonnes of garlic is produced in India. Therefore it becomes imperative to analyze the state-wise area of garlic cultivation, production and productivity in garlic cultivation.

State -wise Production of Garlic

Production of Garlic depends on many factors like climate, rainfall, type of soil and altitude etc. The production level in garlic cultivation may differ from state to state. Therefore, it is necessary to find out the state wise production of garlic in India and the details are presented in the Table 5.



Table – 5, State -wise Garlic Production in India during 2000-01 to 2009-10 (tonnes)

Year	Gujarat	Uttar Pradesh	Madhya Pradesh	Karnataka	Tamil Nadu	Others	Total
2000-01	43210	9800	74800	34300	2880	196000	360990
2001-02	44300	10300	75350	35800	3000	204600	373350
2002-03	46390	113930	76590	39800	3380	214810	494900
2003-04	151370	139530	137880	43210	3410	272380	747780
2004-05	144360	140080	178520	46000	2630	278289	789879
2005-06	159180	150820	125220	34800	2560	183574	656154
2006-07	244070	140400	182500	43270	3140	239777	853157
2007-08	327650	170770	225865	4440	2994	356651	1088370
2008-09	346720	182760	232680	48790	3210	382628	1196788
2009-10	349610	186220	238170	51180	3390	388327	1216897
Average	185686	124461	154758	38159	3059	271704	777827
Per cent	23.87	16.00	19.90	4.91	0.39	34.93	100
Rank	1	3	2	4	5		

Sources :1. “Spice Statistics” – Spices Board, Cochin 2. www.nhrdf.org

Table 5 shows that of all the states producing garlic, Gujarat stands at the first place with an average annual production of 185686 tonnes per annum followed by Madhya Pradesh with 154758 tonnes, Karnataka with 38159 tonnes, and Tamil Nadu has production of 3059 tonnes per annum. The analysis of the percentage share of each state in garlic production in India shows that Gujarat has the highest share of 23.87 per cent followed by Madhya Pradesh with 19.90 per cent, Uttar Pradesh with 16.00 per cent, Karnataka with 4.91 per cent and Tamil Nadu has the share of less than One per cent in garlic production at the nation level.

Growth rate and Variability for State -wise the Production of Garlic

To analyze the growth rate, compound growth rate has been calculated using exponential function and also to examine the variability in production of garlic in the state, co-efficient of variation has been used and the findings are presented in Table 6.

Table – 6, Trend, Growth rate and Magnitude of variability of State –wise Garlic Production in India

States	Semi-log		R ²	CGR (per cent/annum)	CV (Per cent)
	Constant	Regression coefficient			
Gujarat	4.503 (0.084)	0.117** (0.013)	0.905	30.92	67.08
Uttar Pradesh	4.238 (0.229)	0.128* (0.037)	0.602	34.28	51.56
Madhya Pradesh	4.978 (0.055)	0.064* (0.009)	0.866	15.89	42.75



Karnataka	4.600 (0.224)	-0.014 ^{NS} (0.036)	0.019	3.28	34.58
Tamil Nadu	3.468 (0.032)	0.003 ^{NS} (0.005)	0.036	0.693	9.97
Overall Total (India)	5.518 (0.042)	0.061** (0.007)	0.909	15.08	4.74

Source: Computed figure

Figures in parentheses denote standard errors

* Significant at five per cent level

** Significant at one per cent level

NS: Not Significant

The trend co-efficient of production of garlic in Gujarat, Uttar Pradesh, and Madhya Pradesh is positive and statistically significant at five per cent level. It implies that there is a significant increase in production of garlic in these states. But there is no significant increase in production of garlic in Tamil Nadu.

Of all the states producing garlic, Uttar Pradesh has the Highest annual growth rate in production of garlic with 34.28 per cent followed by Gujarat with 30.92 per cent, Madhya Pradesh with 15.89 per cent, Karnataka with 3.28 per cent and Tamil Nadu has less than One per cent growth rate in garlic production.

With regard to variability in production of garlic, Gujarat experienced the highest degree of variation of 67.08 per cent followed by Uttar Pradesh with 51.56 per cent, Madhya Pradesh with 42.75 per cent, Karnataka with 34.58 per cent, and Tamil Nadu had a variation of about 9.97 per cent in garlic production. The analysis reveals that almost all the states except Tamil Nadu have much variation in production of garlic.

PROFILE OF GARLIC CULTIVATION IN TAMIL NADU

Garlic in Tamil Nadu is produced in about 560 hectares of land in 2009-10 spread across Dindigul, Erode and Nilgiri and some other districts. The state produces about 3390 tonnes of garlic with productivity of about 6054 kgs per hectare. Tamil Nadu's share of garlic production to India during 2000- 2001 to 2009-2010 was 0.39 per cent. Tamil Nadu is one of the garlic producing states in India and it is grown in some districts of the state where it is suitable to grow. The details about the area of garlic cultivation, production and productivity in Tamil Nadu, with details on the percentage of increase or decrease over the previous years are presented for analysis.

Production of Garlic in Tamil Nadu

Production of garlic in Tamil Nadu, the percentage increase or decrease over the previous years and the trend values are presented in Table 7.

Table – 7, Garlic Production in Tamil Nadu from 2000-01 to 2009-10

Year	Production (Tonnes)	Increase / Decrease	Percentage Increase / Decrease	Trend Value
2000-01	2880	-	-	2971
2001-02	3000	120	4.17	2990
2002-03	3380	380	12.67	3010
2003-04	3410	30	0.89	3030
2004-05	2630	-780	-22.87	3050
2005-06	2560	-70	-2.66	3069
2006-07	3140	580	22.66	3089
2007-08	2994	-146	-4.65	3109



2008-09	3210	216	7.21	3128
2009-10	3390	180	5.61	3148

Sources : 1. "Agricultural Statistics" – Department of Statistics , Tamil Nadu
2. "Seasonal and crop Report of Tamil Nadu from 2000-2001 to 2009-2010"

It is inferred from Table 7 that garlic production in the state had a fluctuating trend. Production of garlic in the state which stood at 3000 tonnes in 2001-02 increased to 3380 tonnes in 2002-03 making an annual growth of 12.67 per cent. Similarly, in 2005-06 the production which was 2560 tonnes increased to 3140 tonnes making a substantial increase of 22.66 per cent, over the previous year. The trend value of garlic production in Tamil Nadu increased from 2971 tonnes in 2000-01 to 3148 tonnes in 2009-10.

District- wise Production of Garlic in Tamil Nadu

The average production of garlic from 2000-01 to 2009-10 by the major garlic producing districts in Tamil Nadu and their percentage share of production are given in Table 8.

Table -8, District -wise Garlic Production in Tamil Nadu During 2000-01 to 2009-10

(tonnes)

Year	Dindigul	Erode	Nilgris	Others	Total
2000-01	2031	203	452	194	2880
2001-02	2332	185	483	0	3000
2002-03	2677	192	450	61	3380
2003-04	2085	121	775	429	3410
2004-05	1903	135	576	16	2630
2005-06	2043	73	433	11	2560
2006-07	2079	169	488	404	3140
2007-08	2086	220	688	0	2994
2008-09	2036	214	566	394	3210
2009-10	2067	217	595	511	3390
Average	2080	180	554	204	3018
Per cent Share	68.93	5.96	18.36	6.75	100.00
Rank	1	3	2		

Sources: 1. "Agricultural Statistics" – Department of Statistics, TamilNadu.
2. "Seasonal and Crop Report of Tamil Nadu from 2000-2001 to 2009-2010"

Table 8 presents the average volume of garlic production from various districts of Tamil Nadu from 2000-01 to 2009-10. Among the major districts, Dindigul district stands in first place with the average of 2080 tonnes per annum, followed by Nilgris district in second position with 554 tonnes and Erode district in the third place with 180 tonnes of garlic production per annum. The Dindigul district contributed 68.93 per cent of share in the total quality of garlic production in Tamil Nadu followed by the Nilgris district with 18.36 per cent and the Erode district with 5.96 per cent during the period



under study. It is also observed that there was a vast difference in production of Dindigul district and other major garlic producing districts in Tamil Nadu. Conducive climate, fertility of the soil, monsoon showers and irrigation facilities, improved methods of cultivation and the like are some of the factors for the concentration of garlic production in Dindigul district.

Trend, Growth Rate and Magnitude of Variability for District- wise Garlic Production in Tamil Nadu

The trend, growth rate and magnitude of variability of major garlic producing districts in Tamil Nadu are computed and the results are presented in Table 9.

Table -9,Trend, Growth Rate and Magnitude of Variability of District –wise Garlic production in Tamil Nadu

Districts	Semi-log		R ²	CGR (per cent/ annum)	CV (Per cent)
	Constant	Regression co-efficient			
Dindigul	3.356 (0.028)	-0.005 ^{NS} (0.004)	0.145	-1.16	10.22
Erode	2.178 (0.109)	0.007 ^{NS} (0.018)	0.020	1.63	28.20
Nilgris	2.675 (0.057)	0.011 ^{NS} (0.009)	0.144	2.56	20.46
State overall Total (Tamil Nadu)	3.468 (0.032)	0.003 ^{NS} (0.005)	0.036	0.69	9.9 7

Source: Computed from Table 4.33

Figures in parentheses denote standard errors

NS: Not Significant

Table 9 helps us understand that among the selected districts both Erode and Nilgris showed positive trend but without significance. From this, it is evident that there is insignificant increase in garlic production in these districts. The garlic production is increasing at the rate of 2.56 per cent per annum and 1.63 per cent per annum for Nilgris and Erode districts respectively.

In case of Dindigul District, trend co-efficient is negative but not significant. It implies that Production is not decreasing significantly. The production is decreasing at the rate of 1.16 per cent per annum during the period under study. The reasons attributed to such decrease may be due to irregular monsoon. The highest variation in terms of magnitude of variability of 28.20 per cent is found in Dindigul district and it is followed by Nilgris and Dindigul district at 20.46 per cent and 10.22 per cent respectively.

GARLIC CULTIVATION IN DINDIGUL DISTRICT

Garlic is grown in many places in Dindigul district, especially in hill tracts. The district has the conducive climate, soil structure and the like which are ideal for garlic cultivation. Therefore, it is necessary to examine the area under garlic cultivation in Dindigul district.

Garlic Production in Dindigul District

The garlic production in Dindigul district during the period from 2000-01 to 2009-10, their percentage of increase or decrease over the previous years are presented in Table 10.



Table – 10, Garlic Production in Dindigul District from 2000-01 to 2009-10

Year	Production (Tonnes)	Increase / Decrease	Percentage Increase / Decrease	Trend Value
2000-01	2031			2259
2001-02	2332	301	14.82	2231
2002-03	2677	345	14.79	2203
2003-04	2085	-592	-22.11	2176
2004-05	1903	-182	-8.73	2148
2005-06	2043	140	7.36	2120
2006-07	2079	36	1.76	2092
2007-08	2086	7	0.34	2064
2008-09	2036	-50	-2.40	2037
2009-10	2067	31	1.52	2009

Sources: 1. "Agricultural Statistics" – Department of Statistics , Tamil Nadu.
2. "Seasonal and Crop Report of Tamil Nadu from 2000-2001 to 2009-2010"

It is observed that the production of garlic in Dindigul district ranged from 1903 tonnes in 2004 -05 to 2086 tonnes in 2007-08. The garlic production which was 2043 tonnes in 2005-06 had 7.36 per cent increase over the previous year. These increases might be due to scientific method of cultivation, the use of right fertilizers, favourable climate conditions and the timely monsoon. The production increased substantially from 2079 tonnes in 2006 - 07 to 2086 tonnes in 2007-08, making 0.34 per cent increase over the previous year and from 2036 tonnes in 2008-09 to 2067 tonnes in 2009 - 10 making 1.52 per cent increase over the previous year. It is also observed that the production declined from 2677 tonnes in 2002-03 to 2085 tonnes in 2003-04 making a 22.11 per cent shortfall over 2002-05. This decrease in production was caused by the unfavorable climate condition and the incidence of pests and disease in 2003-04. In 2008-09 also production decreased sharply by 50 tonnes over the previous year 2007-08 making 2.40 per cent reduction in production.

Growth Rate and Magnitude of Variability of Garlic Cultivation in Dindigul district

To estimate trend in production of garlic cultivation in Dindigul district, compound growth rate has been calculated. To analyse the magnitude of variability, co-efficiency of variation has been used and the results are presented in Table 11.

Table-11,Trend, Growth Rate and Magnitude of Variability of Production in Garlic cultivation in Dindigul district

Particulars	Semi-log		R ²	CGR (per cent/ annum)	CV(Per cent)
	Constant	Regression co-efficient			
Production	3.356 (0.028)	^{NS} -0.005 (0.007)	0.145	-1.16	10.22

Source: Computed Value
Figures in parentheses denote standard errors
NS: Not Significant

Table 11 reveals that trend in production of garlic cultivation in Dindigul district is negative but not significant. It implies that there is a decrease in production of garlic cultivation during the period under study; however the decrease is not statistically significant. It is also inferred from the analysis that production of garlic is decreasing at the rate of 1.16 per cent



per annum. The analysis also reveals that there is 10.22 per cent variation in production. It implies that production of garlic is not consistent in the study area.

CONCLUSION

Garlic is an important spice now being used extensively in pharmaceutical preparations and cooking in both raw and value added form the world over. It is cultivated in many countries in the world wherever there exists suitable climate, fertile soil, improved methods of cultivation, irrigation and the like. Garlic is now cultivated extensively in countries like China, India, Egypt, USA, Russia and Korea. China occupies the first position in garlic cultivation in terms of area and production and third position in terms of productivity followed by India occupying the second position in terms of area and production and sixth position in terms of productivity. The average share of India in garlic cultivation in the world in production is 5.08 per cent. In India, Gujarat leads in production. In Tamil Nadu, production had both increasing and decreasing trend during the study period. Tamil Nadu's average share in garlic cultivation in India in production is 0.47 per cent. In Dindigul district, the study area, it's average production of garlic during the study period was 2080 tonnes per hectare. Dindigul district ranks first in production. Dindigul district, the study area has all possibility to increase production if new technologies in agriculture, labour saving and new techniques are used.

REFERENCES

1. Agricultural Situation in India, 2000-2010.
2. Agricultural Statistics of Tamil Nadu, 2000-2010.
3. Suryaprakash, S., Venkataraman, J.V. and Raman, R.R., "A Comparative Study of Price-Spread of selected Agricultural Commodities in Karnataka", Indian Journal of Agricultural Economics, 34, 1979.
4. Thambi, J.M.L., "Small Scale Industries problem of Marketing",
5. Indian Journal of Marketing, III (6), 1973
6. Vadivelu and Madusoodanan K.J., "Problems and perspectives of Garlic Productivity and Exports", Indian journal of Arecanut, Spices and Medicinal Plants, Volume.5 o.3 July-September, 2003.
7. Bal, H.S., "Factor Share in Farm Income and Inequality in Punjab", Agricultural Situation in India, 37(7), 1982.
8. Bhatti, J.P. et al, "Marketing Agencies and marketed surplus of Tarai Farms", Agricultural Marketing, 15(3), 1972.
9. www.spicesboard.com
10. www.garlicfarm.ca
11. www.garlic.mistral.co.uk