IOSR Journal Of Humanities And Social Science (IOSR-JHSS)
Volume 22, Issue 9, Ver. 12 (September. 2017) PP 47-56
e-ISSN: 2279-0837, p-ISSN: 2279-0845.
www.iosrjournals.org

Growth Trends in Area, Production and Productivity of Coconut in Major Growing Countries

J. Nehru Naik
Research Scholar, UGC Faculty Development Program, Department of Economics, Andhra University, Visakhapatnam – 530003

ABSTRACT: The present study seeks to examine the growth trends in area, production and productivity in major coconut growing countries. It focuses on the performance of different counties in coconut production and also observed magnitude of variations in production trend. The study is based on secondary data obtained from reports of Food and Agriculture Organization of the United Nations. The time period consider for this study is span of 15 years from 2005-06 to 2014-15 and out of the 97 coconut producing countries, 15 countries are selected as sample of the study. The study used average, coefficient of variation, Instability, Compound Annual growth and Semi-Log function for analyzing the data. The results reveals that the leading coconut producing countries in world, viz. Brazil, Malaysia, Vanuatu, Ghana, Papua New Genuine. Among the countries of the world, the coconuts productivity in the Ghana had increased highest followed Papau New Guninea, India, Vanuatu, Malaysia, Sri Lanka and Myanmar.

Date of Submission: 11-09-2017 Date of acceptance: 23-09-2017

I. INTRODUCTION

The coconut (***Cocos nucifera***) is an important horticulture crop which provides food, oil, beverage, medicine fiber and variety of raw materials for the production of an array of products of commercial importance (Karen, 1984). The coconut palm grows throughout the tropics and is widely called the "tree of life" for its important role in smallholders' livelihoods as a direct source of cash income, nutrition and materials (Warner, 2007). The coconut, having originated in South East Asia including Australasia appears to have dispersed eastwards along the Pacific and further in to America, towards the West. It moved to India and Madagascar over the calm tropical waters. Although, it was often considered as an ocean-dispersed nut due to its sustenance viability in sea water for over 100 days, sea travellers were also responsible for the worldwide introduction and propagation of coconut plantation. This is significant from the fact that Spaniards introduced it into West Indies and southern shores of the Caribbean Sea and the Portuguese introduced it to Bahia and other parts of Brazil. Polynesians sea-farmers further spread it to different Islands of the Pacific. The Arabs disseminated it on the African coasts and maritime Tamils together with the Mariners of the Bengal coast distributed it into the lands of the Indian Ocean (GoI, 2008).

However, the greatest economic benefit to coconut producers has come from drying the coconuts into copra for further processing into copra oil. Coconut harvesting and primary processing is dominated by smallholders, as large coconut estates turn to more profitable crops. Papua New Guinea, Fiji, Solomon Islands, Marshall Islands, Vanuatu and Kiribati have substantial exports of copra and copra oil for further refining. In contrast, India, Indonesia and the Philippines produce three quarters of the world's coconuts, much of this in plantations, and fully process it locally (PARDI, 2011).

More than 97 countries spread over the tropical belt in the regions of Asia, East Africa and America grows coconuts and those countries are also potential producers. Philippines and Indonesia were the leading producers which along contributed about 56 per cent of the world production, followed by India and Brazil. Moreover, the ten major coconut producing countries viz. Indonesia, Philippines, India, Brazil, Sri Lanka, Thailand, Vietnam, Malaysia, Papua New Guinea and Tanzania. India ranks third among the leading coconut growing of the world, accounting for more than 21.02 per cent of the total world production of nuts (Coir Board, 1989). In India, coconut is grown in 17 states and 3 union territories under varying soil and climatic conditions. Production of coconut in the country is concentrated mainly in the four southern states, namely Kerala, Tamil Nadu, Karnataka and Andhra Pradesh (Elias, 2015).

II. LITERATURE REVIEW

Gopala krishnan (1998) in his study highlights, the history and growth of coconut in India, the study also reveals that the coconut board will continue to serve the coconut industry and will help to stabilize the coconut based economy in the country.

Barman and Ahmed (1998) in their study examined the performance of production and productivity of coconut in Bangladesh and also state that there is considerable expansion in the coastal regions in Chittagong and Khulna divisions. These two divisions account for about 81 per cent of coconut area and 83 per cent of production.

Singh (1998) in his study analysed area, production and productivity of coconut is different in coconut growing countries. He has also reported the state wise area, production and productivity of coconut in India. Even though a wide range of coconut products are internationally traded, the traditional products such as copra, coconut oil, copra meal, desiccated coconut and coir dominate among them.

Mamoria (1999) In this study primarily focused on Indian in terms of area and productivity of coconut is the second largest producer of coconut in the world and majority of this area is concentrated in Kerala, Karnataka, Tamil Nadu, Goa-Derman and Din. In Tamil Nadu, majority of production is obtained from Thanjavur, Coimbatore, Kanyakumari, Madurai, Trichy, Selam, Ramanathapuram and Theni districts.

Rethinam & Idroes (2003) explored the scope for the increased production of copra. Coconut, a perennial vegetable oil yielding crop occupies 12.190 million hectares distributed over 93 countries and produces 13.68 million tons of copra equivalents per annum (2004). World area of coconut grew at 3.05 per cent per annum for the last four decades and the production in terms of copra equivalent accelerated annually at 2.9 per cent.

Lathika & Kumar (2005) their study analysed the growth trends in coconut area, production and productivity for five years (2000-2005) in the different coconut producing states of India and came to the conclusion that area effect assumes greater role in output growth in almost all coconut regions of the country, though some states like Kerala and Orissa recently showed signs of a productivity based output growth. States like Andhra Pradesh and Karnataka are already on the path of vast area expansion.

Rethinam (2005) in his study on "Steps for Yield Increase" said that nearly 50 products of coconut are being traded from the producing countries. Of them coconut oil is the largest coconut product. The price trend of copra, and coconut oil in India, Indonesia, the Philippines and Sri Lanka during 2001-2005 reveals that domestic prices are the highest in India and Sri Lanka and the lowest in Indonesia.

Lathika& Kumar (2009) identified the prospective coconut producing countries that put up formidable trade competition to India, and to examine the growth performance of coconut in major producing countries, especially the ones identified to be real challengers to Indian interests. Philippines, Indonesia and India formed the cluster of major stakeholders. India fared better than both the other countries in the major cluster, in respect of area, production and yield; and therefore, it should enjoy a comparative advantage.

Arancon (2010) explored production and global trade scenario of coconut. The global exports of some coconut products during the last 5 years showed an increasing trend, particularly for coco powder, desiccated coconut, coco chemicals, shell charcoal and coir, and coir products. There was a decrease in the export of copra, coconut oil, coconut cream and copra meal, and a significant increase in coco chemicals, coconut shell charcoal, coir as well as coir products.

Muyengiet al. (2015) assessed the production of coconuts and factors affecting the production of coconut and to advise suitable research and development areas in coconut sub-sector in Tanzania. Data were analysed using descriptive statistics and Multiple Regression Model. Results showed that palm population was 50 tree/ha which is below the recommended by 60.8%.

Kishore& Murthy (2016) were estimated the growth in area, production and productivity of coconut in Karnataka and its districts using compounded annual growth rate analysis. The necessary secondary data was collected for a period of fifteen years from 2000-2001 to 2014-15. Growth rates in area, production and productivity of coconut in Karnataka state was positive and significant.

Aim and hypothesis

This study mainly analyses trends in coconut cultivation in terms of area, production and productivity of major producing countries during the study period and also expected that there is considerable expansion in the in coconut cultivation in sample courtiers. The present study seeks to examine the growth trends in coconut area, production and productivity for the past 15 year's period. It focuses on the performance of different counties in coconut production and also observed magnitude of variation in production growth.

III. DATA AND METHODOLOGY

The study is mainly based on secondary data obtained from reports of Food and Agriculture Organization of the United Nations. The time period we consider for this study is span of 15 years from 2005-06 to 2014-15. Out of the 97 coconut producing countries, 15 countries are selected as sample of the study. In the present study we calculated average of area, production and productivity. Arithmetic average is also called as mean. It is the most common and widely used measure of central tendency or an average (Kothari, 2004). The coefficient of variation indicates the relative magnitude of the standard deviation as compared with the mean of the distribution as a percentage (Daniel et al, 2003). Instability is one of the important decision parameters in development dynamics, more so in the context of production (Krishan & Chanchal, 2014). Compound Annual growth is a way to measure change reliably at any time or for any time difference (Tague et all, 1981) and calculated trend with Semi-Log function for 15 years' time period. As Semi-Log regression model coefficients (ie slope parameters) are elasticity coefficients (Gujarathi, 1988).

IV. RESULTS AND DISCUSSION

Area under Coconut Cultivation:

From Table – 1 and Appendix -1 it is clear that the average country-wide area under coconut cultivation during 2005-06 to 214-15. Among the major countries of the world cultivating coconut, Philippines occupied the first rank, with an average of 34,74,463 hectares, followed by Indonesia ranking second with 27,98,777 hectares, India ranking third with 20,22,892 hectares, United Republic of Tanzania ranking fourth with 6,13,953 hectares and Sri Lanka in the fifth rank with 4,01,571 hectares. Philippines contributed 32.67 per cent share of the total area under coconut cultivation, followed by Indonesia with 26.31 per cent, India 19.02 per cent, and United Republic of Tanzania 5.77 per cent and the Sri Lanka 3.78 per cent during the period of study. During the year 2009-10, Philippines had the highest area of 3575944 hectares under coconut cultivation accounting for 36.36 per cent of the total area of 9834314 hectares under cultivation in the world, due to the invariable spread of rain in the countries. In 2014-15 Indonesia had the highest area of 36,10,000 hectares under coconut cultivation accounting for 32.46 per cent of the total world area under cultivation which was 1,11,20,000 hectares, due to the scarcity of rain in the countries. In 2012-13, the India had the highest area of 35,50,491 hectares under coconut cultivation accounting for 19.54 per cent of the total world area of 1,10, 43,791 hectares under cultivation due to the low spread of rain in the countries. In 2011-12, United Republic of Tanzania had the highest area of 6, 80,000 hectares under coconut cultivation accounting for 6.13 per cent of the total world area of 1,10,86,086 hectares under cultivation due to the low spread of rain in the countries. In 2011-12, Sri Lanka had the highest area of 4,17,000 hectares under coconut cultivation accounting for 3.76 per cent of the total world area of 1,10,86,086 hectares under cultivation due to the low spread of rain in the countries.

It can be noted from Table – 2 that the trend coefficient is positive and significant in such countries namely, India, Philippines, Sri Lanka and Vietnam while Indonesia also positive trend but not significant. In Brazil, Thailand, Ghana and Malaysia the trend coefficient is observed negative and significant whereas Papua New Guninea, Mexico, Myanmar, Soloman Island and Vanuatu are also noticed negative trend but not significant.

It is also inferred from the Table that among the countries of the world, the area under coconut cultivation in the Vietnam had increased at the rate of 6.64 per cent per annum followed by 3.14 per cent per annum in India, 1.11 per cent per annum in the Papua New Geneva and 1.09 per cent per annum in Sri Lanka. The area under coconut cultivation had decreased at the Compound Annual Growth rate of 14.63, 6.87, 2.90, 2.64, 2.23, 1.43, 0.42, 0.29 and 0.10 per cent per annum United Republic Tanzania, Ghana, Sri Lanka, Malaysia Thailand, Brazil, Vanuatu, Mexico and Myanmar respectively. Father, CV reveals that the area under coconut cultivation in Ghana had experienced a variation of 37.67 per cent followed by a variation of 27.96 per cent in the United Republic of Tanazia, 22.51 per cent in Vietnam, 17.72 per cent in Indonesia and 11.36 per cent in Malaysia. As the whole, the rate of variation is observed in magnitude of area under coconut cultivation in all countries (Table - 2).

Coconut Production:

From Table – 3 and Appendix – 2, it is observed the average country-wide coconut production since 2005-06. Among the major countries of the world coconut production, Indonesia occupied the first rank, with an average of 1,82,34,313 nuts , followed by Philippines ranking second with 1,52,16,062.3 nuts, India ranking third with 1,18,41,047.3 nuts, Brazil ranking fourth with 29,44,039.4 nuts and the Sri Lanka in the fifth rank with 22,51,166 nuts. Indonesia contributed 31.50 per cent share of the total world production coconut followed by Philippines with 26.29 per cent, India 20.46 per cent, and Brazil 5.09 per cent and the Sri Lanka 3.89 per cent during the study period. In 2006-07, Indonesia had the highest production of 1, 96,25,000 nuts accounting for 33.69 per cent of the total world production of coconuts which was 5,82,44,566 nuts, due to the invariable spread of rain in the countries. In 2011-12 the Philippines had the highest production of 1, 58,62,386 nuts

accounting for 27.18 per cent of the total world production of coconuts which was 5,83,44,247 nuts. In 2014-15 the Philippines had the highest production of 2,16,65,000 nuts accounting for 32.84 per cent of the total world production of coconuts which was 6,59,55,920 nuts due to the spread of rain in the countries. In 2014-15, Indonesia had the smallest production of 1, 63, 54,000 nuts accounting for 24.79 per cent of the total world production of coconuts which was 6, 59, 55,920 nuts. In 2014-15, Philippines had the smallest production of 1, 46, 96,000 nuts accounting for 22.28 per cent of the total world production of coconuts, which was 6, 59, 55,920 nuts, due to the uneven spread of rain in the countries. In 2007-08, India had the smallest production of 1, 01, 48,300 nuts accounting for 17.95 per cent of the total world production of coconuts, which was 5, 65, 07,283 nuts, due to the low rate of rain fall in the countries. In 2007-08, Brazil had the smallest production of 28, 31,004 nuts accounting for 4.86 per cent of the total world production of coconuts, which was 5, 82, 44,566 nuts, due to the insufficient rain throughout the countries.

It can be observed from Table – 4 that the trend coefficient is positive and significant in such countries namely, Malaysia, Ghana, Vietnam, India and Sri Lanka whereas in Mexico, Thailand and Solomon Island are registered negative growth and significant. Papua New Guninea, Tanzania and Myanmar are observed positive growth while Philippines, Brazil and Indonesia are noticed negative trend but not significant during the 2005-06 to 2014-15. Father, it is also reveals from the Table that among the countries of the world, the production of coconuts in the Papua New Geneva had increased at the rate of 8.58 per cent per annum followed by 7.38 per cent per annum in India, 5.24 per cent per annum in the Vanuatu and 3.10 per cent per annum in Sri Lanka. The production of coconut had decreased at the Compound Annual Growth rate (CAGR) of 12.59, 5.78, 0.46, 0.20, 0.18, and 0.12 per cent per annum Solomon Island, Thailand, Indonesia, Brazil, Philippines and Mexico respectively. As can be noted from Table 2.5 the area under production of coconut in India had experienced a variation of 29.48 per cent followed by a variation of 24.15 per cent in the Thailand, 25.96 per cent in Solomon Island, 20.53 per cent in Papu New Geneva and 11.42 per cent in Sri Lanka, 11.27 percent in Malaysia, 10.94 percent in Ghana, 10.16 percent in Vietnam, remaining all countries less than ten percent the rate of variation in production of coconut.

Coconut Productivity:

Table – 5 and Appendix – 3 shows the average country-wide productivity of coconut since 2005-06. Among the major countries of the world's coconut productivity, Brazil placed at the first rank, with an average of 1,09,324 nuts , followed by Myanmar ranking second with 99, 956 nuts, Ghana ranking third with 97,184 nuts, Vietnam ranking fourth with 90,031 nuts and the Solomon Island in the fifth rank with 70,991 nuts, Mexico in the sixth rank with 67,677 nuts per hectare, Indonesia in the seventh rank with 61,205 nuts, India is the eighth rank with 58,338 nuts, Malaysia in the ninth rank with 57,090 nuts and Sri Lanka in the tenth rank with 55,969 nuts, eleventh, twelve thirteenth fourteenth and fifteenth, Thailand (55,603 nuts), Papua New Genuine (52,498 nuts), Philippines (46,816 nuts), Vanuatu (35,389 nuts), and United Republic Arab (7,647 nuts) respectively. In the year 2013-14, Brazil had the highest productivity of 1,16,506 nuts per hectare, followed by Myanmar with 1,06,079 nuts per hectare, the Ghana with 1,43,000 nuts per hectare, the Vietnam countries with 78,340 nuts per hectare and Solomon Island, with the lowest productivity of 72,453 nuts per hectare.

The trend coefficient is positive and significant in such countries namely, Brazil, Malaysia, Vanuatu, Ghana, Papua New Genuine and Myanmar whereas Vietnam, Sri Lanka, Philippines and India are observed positive growth in terms of productivity but not statistically significant. In Thailand Indonesia, Mexico and Solomon Island the negative trend in productivity has witnessed at significant level excluding United Republic of Tanzania. Majority of selected countries observed a positive phase in coconut productivity during study period. Among the countries of the world, the coconuts productivity in the Ghana had increased at the rate of 9.42 per cent per annum followed by 7.39 per cent per annum in Papau New Genuine, 6.81 per cent per annum in India, 5.96 per cent per annum in Vanuatu, 5.23 per cent per annum in Malaysia, 1.99 per cent per annum in Sri Lanka and 1.25 per cent per annum in Myanmar. The productivity of coconut had decreased at the Compound Annual Growth rate (CAGR) of 9.98, 5.28, 3.63, 3.49, 0.66 and 0.65 per cent per annum Solomon Island, United Republic Tanzania, Thailand, Indonesia, Philippines and Vietnam respectively. Table - 6 also shows that the productivity of coconut in Ghana had experienced a variation of 23.91 per cent followed by a variation of 23.62 per cent in the India, 18.88 per cent in Philippines, 18.29 per cent in Solomon Island and 14.84 per cent in United Republic Tanzania and 14.61 percent in Papua New Genuine remaining all countries less than ten percent the rate of variation in productivity of coconuts in the world countries during the period(Table – 6).

Table – 1: Average Area under Coconut Cultivation of Selected Countries during 2005-06 to 2014-15

Sl. No	Country	Average	Percentage	Rank
1	Indonesia	2798777	26.31	2
2	Philippines	3474463	32.67	1
3	India	2022892	19.02	3
4	Brazil	270648	2.54	6
5	Sri Lanka	401571	3.78	5
6	Vietnam	98097	0.92	11
7	Papua New Guninea	221884	2.09	8
8	Mexico	168793	1.59	9
9	Thailand	227636	2.14	7
10	Malaysia	102348	0.96	10
11	United Republic of Tanzania	613953	5.77	4
12	Myanmar	47450	0.45	14
13	Solomon Islands	50600	0.48	13
14	Vanuatu	96071	0.9	12
15	Ghana	40526	0.38	15
Total		**10635709**	**100**	-

Source: Appendix -1

Table - 2: Trends in Area under Coconut Cultivation of Selected Countries

Countries	Semi-Log		R^2	CAGR (per cent/ Annum)	CV (Per cent)	Instability
	Constant	Regression Coefficient				
Indonesia	14.712 (0.130)	0.021NS (0.021)	0.115	3.14	17.72	16.67
Philippines	15.023 (0.013)	0.007** (0.002)	0.554	0.48	2.74	1.83
India	14.431 (0.023)	0.016* (0.004)	0.705	0.96	5.73	3.11
Brazil	12.607 (0.011)	-0.018* (0.002)	0.993	-1.43	5.67	0.47
Sri Lanka	12.865 (0.022)	0.007*** (0.004)	0.326	1.09	3.78	3.11
Vietnam	11.235 (0.095)	0.044** (0.015)	0.508	6.64	22.51	15.79
Papua New Guninea	12.320 (0.048)	-0.002NS (0.008)	0.011	1.111	6.85	6.82
Mexico	12.048 (0.018)	-0.002NS (0.003)	0.061	0.29	2.60	2.51
Thailand	12.493 (0.014)	-0.029* (0.002)	0.956	-2.23	9.13	1.92
Malaysia	11.723 (0.032)	-0.035* (0.005)	0.851	-2.64	11.36	4.39
United Republic of Tanzania	13.719 (0.329)	-0.086NS (0.053)	0.247	-14.63	27.96	24.26
Myanmar	10.795 (0.051)	-0.005NS (0.008)	0.052	-0.10	7.01	6.82
Solomon Islands	10.902 (0.067)	-0.014NS (0.011)	0.165	-2.90	8.99	8.22
Vanuatu	11.477 (0.012)	-0.001NS (0.002)	0.018	-0.42	1.70	1.68
Ghana	11.152 (0.150)	-0.111* (0.024)	0.726	-6.87	37.67	19.72

Source: Appendix -1
Note: Figures in parenthesis are standard error.
* Significant at 1% level, ** Significant at 5% level & *** Significant at 10% level. NS – Not significant.

Table – 3: Average Coconut Production of Selected Countries during 2005-06 to 2014-15

Sl. No	Country	Average Production	Parentage	Rank
1	Indonesia	18234313	31.5	1
2	Philippines	15216062	26.29	2
3	India	11841047	20.46	3
4	Brazil	2944039.4	5.09	4
5	Sri Lanka	2251166	3.89	5
6	Vietnam	1181978.6	2.04	6
7	Papua New Guninea	1170015	2.02	7
8	Mexico	1142680	1.97	8
9	Thailand	1282341.5	2.22	9
10	Malaysia	572556.4	0.99	10
11	United Republic of Tanzania	537074.1	0.93	11
12	Myanmar	473386.9	0.82	12
13	Solomon Islands	365200	0.63	13
14	Vanuatu	339872	0.59	14
15	Ghana	332904.3	0.58	15
Total		**57884637**	**100**	

Source: Appendix - 2

Table - 4: Trends in Coconut Production of Selected Countries

Countries	Semi–log		R^2	CAGR (per cent/ Annum)	CV (Per cent)	Instability
	Constant	Regression Co-efficient				
Indonesia	16.773 (0.042)	-0.003NS (0.007)	0.022	-0.46	5.81	5.74
Philippines	16.544 (0.019)	-0.001NS (0.003)	0.019	-0.18	2.66	2.64
India	16.006 (0.130)	0.046*** (0.021)	0.367	7.38	29.48	23.46
Brazil	14.921 (0.025)	-0.003NS (0.004)	0.067	-0.20	3.70	3.58
Sri Lanka	14.505 (0.061)	0.021*** (0.010)	0.364	3.10	11.42	9.11
Vietnam	13.804 (0.26)	0.032* (0.004)	0.877	2.21	10.16	3.56
Papua New Guninea	13.752 (0.154)	0.036NS (0.025)	0.207	8.58	20.53	18.28
Mexico	13.997 (0.026)	-0.009*** (0.004)	0.364	-0.12	4.51	3.60
Thailand	14.442 (0.049)	-0.073* (0.008)	0.916	-5.78	24.15	7.00
Malaysia	13.080 (0.047)	0.031* (0.008)	0.683	2.45	11.27	6.34
United Republic of Tanzania	13.144 (0.47)	0.009NS (0.008)	0.140	1.80	6.72	6.23
Myanmar	13.003 (0.055)	0.011NS (0.009)	0.164	1.13	8.16	7.46
Solomon Islands	13.193 (0.261)	-0.081*** (0.42)	0.316	-12.59	25.96	21.47
Vanuatu	12.331 (0.076)	0.069* (0.012)	0.789	5.24	22.33	10.26
Ghana	12.557 (0.052)	0.028** (0.008)	0.577	1.90	10.94	7.11

Source: Appendix - 2
Note: Figures in parenthesis are standard error.* Significant at 1% level, ** Significant at 5% level & *** Significant at 10% level. NS – Not significant.

Table – 5: Average Coconut Productivity of Selected Countries during 2005-06 to 2014-15

Sl. No	Counties	Average	Percentage	Rank
1	Indonesia	61205	6.34	7
2	Philippines	46814	4.85	13
3	India	58338	6.04	8
4	Brazil	109324	11.32	1
5	Sri Lanka	55969	5.8	10
6	Vietnam	90031	9.32	4
7	Papua New Guninea	52498	5.44	12
8	Mexico	67677	7.01	6
9	Thailand	55602	5.76	11
10	Malaysia	57090	5.91	9
11	United Republic of Tanzania	7647	0.79	15
12	Myanmar	99956	10.35	2
13	Solomon Islands	70991	7.35	5
14	Vanuatu	35389	3.66	14
15	Ghana	97184	10.06	3
16	**Total**	**965715**	**100**	

Source: Appendix – 3

Table - 6: Trends in Coconut Productivity of Selected Countries

Countries	Semi-Log		R^2	CAGR (per cent/ Annum)	CV (Per cent)	Instability
	Constant	Regression Coefficient				
Indonesia	11.150 (0.062)	-0.024** (0.010)	0.427	-3.49	10.12	7.66
Philippines	10.659 (0.110)	0.015NS (0.018)	0.018	-0.66	19.06	18.88
India	10.786 (0.136)	0.030NS (0.022)	0.191	6.81	26.26	23.62
Brazil	11.520 (0.022)	0.015* (0.004)	0.671	1.25	5.35	3.07
Sri Lanka	10.851 (0.051)	0.014NS (0.008)	0.277	1.99	8.53	7.26
Vietnam	11.377 (0.055)	0.005NS (0.009)	0.041	-0.65	7.57	7.42
Papua New Guninea	10.642 (0.119)	0.038*** (0.019)	0.331	7.39	17.86	14.61
Mexico	11.160 (0.013)	-0.007** (0.002)	0.578	-0.41	2.70	1.75
Thailand	11.162 (0.036)	-0.045* (0.006)	0.882	-3.63	14.92	5.13
Malaysia	10.567 (0.045)	0.066* (0.007)	0.911	5.23	21.56	6.43
United Republic of Tanzania	9.096 (0.134)	-0.031NS (0.022)	0.206	-5.28	16.66	14.84
Myanmar	11.419 (0.043)	0.017** (0.007)	0.414	1.23	7.42	5.68
Solomon Islands	11.501 (0.196)	-0.067*** (0.032)	0.362	-9.98	22.90	18.29
Vanuatu	10.064 (0.074)	0.070* (0.012)	0.811	5.96	22.48	9.77
Ghana	10.616 (0.186)	0.139* (0.030)	0.728	9.42	45.84	23.91

Source: Appendix – 3
Note: Figures in parenthesis are standard error.
* Significant at 1% level, ** Significant at 5% level & *** Significant at 10% level. NS – Not significant.

V. CONCLUSION

Area under cultivation continues to assume positive growth by almost all coconut regions of the world, though some counties like India, Philippines, Sri Lanka, Vietnam and Indonesia has positive trend. In Brazil, Thailand, Ghana and Malaysia the trend coefficient is observed significant negative trend while Papua New Guninea, Mexico, Myanmar, Soloman Island and Vanuatu are also noticed negative trend but not significant. The analysis of the growth of coconut production during the study period reveals that in Brazil, Malaysia, Vanuatu, Ghana, Papua New Guninea, Myanmar Vietnam, Sri Lanka, Philippines and India are observed positive growth. In Thailand Indonesia, Mexico and Solomon Island negative trend in productivity has witnessed at significant level. Majority of selected countries observed a positive phase in coconut production during study period and highest in Papua New Geneva then by India, Vanuatu and Sri Lanka. The country-wise productivity of coconut showed that the leading coconut producing countries in world, viz. Brazil, Malaysia, Vanuatu, Ghana, Papua New Guninea, Myanmar, Vietnam, Sri Lanka, Philippines and India. Among the countries of the world, the coconuts productivity in the Ghana had increased highest followed Papau New Guninea, India, Vanuatu, Malaysia, Sri Lanka and Myanmar.

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Appendix -1 : Distribution of Area under Coconut Cultivation of Selected Countries

year	Indonesia	Philippines	India	Brazil	Sri Lanka	Vietnam	Papua New Guninea	Mexico	Thailand	Malaysia	United Republic of Tanzania	Myanmar	Solomon Islands	Vanuatu	Ghana	Total
2005-06	2650000	3337378	1946800	289815	394840	83601	198000	164100	258187	115000	622273	48500	51000	96000	55000	10310494
2006-07	2900000	3359777	1940000	283205	394840	86748	260000	171000	255697	119701	679886	50200	53000	96000	55000	10705054
2007-08	2880000	3379740	1903200	287016	394840	90429	221000	178500	245725	111925	663933	50600	50000	96000	55000	10607908
2008-09	2900000	3401500	1895200	284058	394840	92881	221000	172600	237882	100362	681841	50829	51000	96000	55000	10634993
2009-10	1980000	3575944	1895900	275091	394840	82837	221000	167656	230950	105659	660000	41437	52000	96000	55000	9834314
2010-11	1980000	3561981	2070820	270541	394840	94599	221000	165116	215993	106312	670000	41729	52000	96000	25250	9966181
2011-12	3000000	3573806	2137000	257742	417000	96435	221000	166000	213197	100996	680000	47600	53000	97000	25310	11086086
2012-13	3000000	3550491	2159000	257462	394836	95725	220000	165000	208603	87974	680000	47600	53000	98000	26100	11043791
2013-14	3087770	3502011	2140000	250554	394836	98710	214840	168960	204126	87550	673600	48000	53000	97710	26600	11048267
2014-15	3610000	3502000	2141000	251000	440000	159000	221000	169000	206000	88000	128000	48000	38000	92000	27000	11120000

Source: Food and Agriculture Organization of the United Nations (FAO), Annual Reports various issues from 2005-06 to 2014-15

Appendix 2 : Distribution of Coconut Production of Selected Countries

year	Indonesia	Philippines	India	Brazil	Sri Lanka	Vietnam	Papua New Guninea	Mexico	Thailand	Malaysia	United Republic of Tanzania	Myanmar	Solomon Islands	Vanuatu	Ghana	total
2005-06	17125000	14957900	10190000	2978217	2115840	1000700	651000	1132300	1815392	512700	456625	455177	384000	249000	315000	54338851
2006-07	19625000	14852900	10894000	2831004	2180440	1034900	1424000	1167000	1721640	530040	506918	485724	420000	255000	316000	58244566
2007-08	17937000	15319500	10148300	3223983	2210840	1095100	1210000	1246700	1483927	555120	568499	505014	432000	255000	316300	56507283
2008-09	19000000	15667565	10824300	2960049	2168280	1128500	1210000	1191000	1380980	459640	577099	420393	384000	255000	273800	57900606
2009-10	18000000	15510283	10840000	2843453	1990440	1162200	1210000	1156800	1298147	550140	570000	428075	396000	400000	292000	56647538
2010-11	17500000	15244609	10280000	2943651	2057320	1201563	890000	1139300	1055318	562556	550000	420000	384000	373500	344000	54945817
2011-12	19400000	15862386	10560000	2931531	2224500	1273003	1209500	1091800	1056658	624152	520000	490717	384000	371000	345000	58344247
2012-13	18300000	15353200	11930000	2890286	2513000	1303826	1207500	1064400	1010033	624727	530000	510412	384000	410000	366183	58397567
2013-14	19102130	14696280	11078873	2919110	2181000	1374404	1205150	1118750	1000320	653489	545800	509177	384000	415110	380380	57563973
2014-15	16354000	14696000	21665000	2919110	2870000	1245590	1483000	1118750	1001000	653000	545800	509180	100000	415110	380380	65955920

Source: Food and Agriculture Organization of the United Nations (FAO), Annual Reports various issues from 2005-06 to 2014-15

Appendix 3 : Distribution of Coconut Productivity of Selected Countries

Yea	Indonesia	Philippines	India	Brazil	Sri Lanka	Vietnam	Papua New Guninea	Mexico	Thailand	Malaysia	United Republic of Tanzania	Myanmar	Solomon Islands	Vanuatu	Ghana	Total
2005-06	64623	44819	52342	102763	53587	83601	32879	69001	70313	44583	7338	93851	75294	25938	57273	878205
2006-07	67672	44208	56155	99963	55223	86748	54769	68246	67331	44280	7456	96758	79245	26563	57455	912072
2007-08	62281	45327	53322	112328	55993	90429	54751	69826	60390	49597	8563	99805	86400	26563	57509	933084
2008-09	65517	46061	57114	107206	54915	92881	54751	69003	58053	45798	8464	82707	75294	26563	49782	894109
2009-10	60403	43374	57176	103364	50411	82837	54751	68998	56209	52068	8636	103307	76154	41667	53091	912446
2010-11	58725	42798	49642	108806	52105	94599	40271	69000	48859	52916	8209	100649	73846	38906	136238	975569
2011-12	64667	44385	49415	113739	53345	96435	54729	65771	49562	61800	7647	103092	72453	38247	136310	1011597
2012-13	61000	43242	55257	112261	63647	95725	54886	64509	48419	71013	7794	107229	72453	41837	140300	1039572
2013-14	61864	71965	51770	116506	55238	98710	56095	66214	48295	74642	8103	106079	72453	42484	143000	1073418
2014-15	45300	41960	101190	116300	65230	78340	67100	66200	48590	74200	4264	106080	26320	45120	140880	1027074

Source: Food and Agriculture Organization of the United Nations (FAO), Annual Reports various issues from 2005-06 to 2014-15

IOSR Journal Of Humanities And Social Science (IOSR-JHSS) is UGC approved Journal with Sl. No. 5070, Journal no. 49323.

J. Nehru Naik . "Growth Trends in Area, Production and Productivity of Coconut in Major Growing Countries." IOSR Journal Of Humanities And Social Science (IOSR-JHSS) , vol. 22, no. 9, 2017, pp. 47–56.