Economic Affairs, Vol. 67, No. 01(Spl.), pp. 143-150, February 2022
DOI: 10.46852/0424-2513.1.2022.24

AESSRA

Review Paper

Trade Competitiveness and Trend Pattern of Plantation Crop Exports in India

Kumareswaran, T.*, V. Kamalvanshi and P.S. Badal

Department of Agricultural Economics, Banaras Hindu University, Varanasi, Uttar Pradesh, India

*Corresponding author: kumareswaran@bhu.ac.in (**ORCID ID:** 0000-0002-1067-5402)

Received: 7-11-2021 **Revised:** 09-01-2022 **Accepted:** 03-02-2022

ABSTRACT

The foremost focus of this study is to scan the export performance of plantation sector in India for the years 1987-2019 using the CGAR, Cuddy-Della Valle instability index and index number. The analysis mainly draws conclusion on the selected major plantation crop tea, coffee, and cocoa. The analysis of growth trends of plantation crop exports during the overall period registered positive growth rate for export quantity and export unit value. The high growth rates of cocoa products together with high instability indices in the export revealed the prospects for Indian plantation sector in the global market during the post liberalization period. Incase of tea and coffee showed annual growth rate at minimum and instability indicating low to medium range during the overall period. While the trend analysis with the help of index number showed fluctuations in export quantity and export value throughout the study period which may be due to changing policies and its execution at different periods of time. The result indicated that India must give much effort to increase the export share of plantation crop and other value-added plantation products like green tea, toasted coffee grain, cocoa paste etc. to augment the foreign earnings.

HIGHLIGHTS

- It mainly focuses the instability and trend pattern of various plantation crop across the India

Keywords: Plantation crop growth rate, Instability, CDVI, Index number

Plantation sector is a part of agriculture sector and those crops, which are grown in an extensive scale in large contiguous areas and the produce, can be utilized only after processing. Its plays an important role in export as well as to meet domestic requirement and in employment generation both directly and indirectly to Indian people and poverty alleviation, particularly in rural areas (Gyanendra Singh, 2020). It has more export oriented commodities, contributing to foreign exchange earnings. The major plantation crops are coconut, arecanut, oil palm, cashewnut, tea, coffee, and rubber while minor plantation crops are cocoa and betelvine.

India has been a leading exporter of almost all the plantation crop commodities to various parts of the world and tea is one of an imperative exported commodity of the country's plantation basket. Today tea is cultivated all over the world, primarily in Asia and Africa, however it's commercially produced by more than 60 countries (Noman *et al*. 2020). India is the second largest producer of tea and total of 1.28 billion kilograms of tea was produced in the country in financial year 2021. It contributes 19 percent to global areas under tea and 24 percent to global production. The cultivation of tea plantation crop are all over India, especially Assam and West Bengal in the north, Tamil Nadu and Kerala in the southern region of India.

How to cite this article: Kumareswaran, T.* Kamalvanshi, V. and Badal, P.S. (2022). Trade Competitiveness and Trend Pattern of Plantation Crop Exports in India. *Economic Affairs*, **67**(01 Spl.): 143-150.

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

Coffee is one of the world's most commonly traded agricultural products. India is Asia's third-largest coffee leading exporter, as well as the world's sixth-largest producer and fifth-largest exporter. In 2019-20, India produced 299,300 metric tonnes (MT) of coffee, with Karnataka accounting for 71 per cent, followed by Kerala and Tamil Nadu (Patil *et al*., 2020). The total coffee export accounted for US$ 622.09 million from April 2020 to February 2021 and for February 2021 it was US$ 72.37 million and over 70 percent of the coffee produced in the country is exported and remain 30 percent is consumed within the country.

MATERIALS AND METHODS

The growth rates were used to measure the past performance of the economic variables. The exponential growth model was used to study the growth and thereby the performance of plantation product exports in terms of export quantity and value of export. CGAR recommended the magnitude of the change in the variable under consideration per unit of time, whereas it also showed the tendency of the variable to increase, decrease, or stagnate over a period of time.

Compound Growth Rate

The compound growth rate was analyzed by using exponential growth function as given below

$$Y = ab^t \quad \ldots(1)$$

Where,

Y = Export quantity / Export value of the animal product

t = Time variable

b = Regression coefficient

a = Intercept

Equation (1) will be converted into the natural logarithmic form in order to facilitate the use of linear regression. Taking logarithms on both sides we obtain,

$$Log\ Y = Log\ a + t\ Log\ b$$

The compound growth rates '*r*' was computed by using the formula

$$CGR\ (r) = [Antilog\ (log\ b) - 1] * 100$$

Where, r = Compound growth rate

Instability Index

Instability in export is expected to hamper the process of economic development. The degree of instability in export quantity and export value of the animal products was measured by using the coefficient of variation. The standard deviation as a percentage of mean is called the coefficient of variation.

$$\text{Coefficient of variation (CV)} = \frac{\sigma}{\underline{X}} \times 100$$

Where,

σ = Standard deviation

$$\sigma = \sqrt{\frac{\Sigma (X - \underline{X})^2}{n}}$$

$\underline{X}$ = Arithmetic mean

To examine the extent of variation and risk involved in prices, the instability index is calculated using the Cuddy-Della Valle approach (Cuddy and Della Valle, 1978).

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

Where CDVI is the Cuddy-Della Valle instability index in percent, CV is the coefficient of variation in percent and is the coefficient of determination from a time-trend regression. The estimating index value is a close approximation of the average variation in annual prices which is adjusted for trend. An index number is a statistical measure designed to show changes in variables or group of related variables with respect to time. Index numbers were calculated by choosing the first three years average (1987 to 1989) as a base year. The following formula was used to estimate the index number.

$$\text{Index number} = \frac{\text{Current year's value}}{\text{Base year's value}} \times 100$$

By using the above mentioned formula, the index number for India's area, production, yield and

export quantity, export value and compared with world production and yield of tea and coffee.

RESULTS AND DISCUSSION

Tea, coffee and cocoa product are major plantation crops and play an important role in export to meet domestic requirements and in employment generation more than two million people are engaged in plantation sector directly and another six million peoples are indirectly engaged in plantation sector (Kumareswaran, T. *et al.* 2019).

Indian plantation processing industry is basically export oriented. The present study reveals that three major export processed products like tea, coffee, and cocoa product. India's exports of plantation products have increased over the years, whereas compound growth analysis of export quantity under tea registered a significant and positive growth trend during overall period (1987- 2019) at the rate of 1.16 per cent per annum. It's showed low growth rate compared to other plantation crop due to lack of infrastructure, lack of organised production system, high input costs and low price realization, unskilled labour, aged bushes and other legal problem (Biswas D, 2013). It **s**hows that the export quantity under tea was increased from 205246 tonnes to 244292.80 tonnes in the overall period, whereas export quantity under coffee was increased from initial year 88333 tonnes to 212832.60

Table 1: Year wise data of export quantity and export value in plantation crops

	Tea		Coffee		Cocoa Product	
Year	**Quantity**	**Value**	**Quantity**	**Value**	**Quantity**	**Value**
1987-88	205246	457530	88333	193422	202.42	282.40
1988-89	193012	415898	81460	191767	170.69	384.06
1989-90	208043	543408	122800	201199	397.42	1082.25
1990-91	198136	594191	82961	125683	624.15	1780.43
1991-92	215144	490292	88796	116615	844.25	1616.20
1992-93	166359	360933	107654	111305	156.73	366.18
1993-94	153159	331845	111043	137741	302.89	813.40
1994-95	150874	308399	120574	283955	813.69	2278.62
1995-96	158333	359054	143795	369386	952.78	2645.27
1996-97	138360	282579	146772	308935	1236.46	2760.16
1997-98	191472	497239	136183	344797	1041.51	2489.95
1998-99	201798	518258	179605	334292	891.47	2097.53
1999-00	177507	406106	175830	264748	1357.94	2702.62
2000-01	200868	431596	161508	174622	1297.80	2866.33
2001-02	177603	367207	150943	151905	1293.38	2737.78
2002-03	181617	326629	164689	142590	1234.07	2462.48
2003-04	174246	333408	167495	157295	1688.37	3587.16
2004-05	174728	377742	140613	157109	2313.31	6163.65
2005-06	159121	372628	157208	254586	2525.10	5490.37
2006-07	181326	407375	188058	314660	3412.21	8898.96
2007-08	193459	469274	152610	327897	4979.26	10444.50
2008-09	203207	590226	149624	372598	6831.89	18273.33
2009-10	203863	583803	126330	261526	5863.87	20462.98
2010-11	234560	694661	177926	379757	9077.53	27856.13
2011-12	322548	867143	231087	677680	16678.59	36703.21
2012-13	225082	685600	216703	610437	19083.35	54030.79
2013-14	254841	819630	227677	565374	15962.96	93571.14
2014-15	212606	656214	196013	534476	20877.69	138868.75
2015-16	235132	677933	209419	535452	32652.55	193313.59
2016-17	230456	661719	250415	546343	25649.50	162729.82
2017-18	261419	768194	262770	635350	29582.59	177471.01
2018-19	262421	766112	229986	511715	27603.73	193261.39
2019-20	244292.8	718100.9	212832.6	525811	27410.58	178886.51

Source: *www.apeda.gov.in.*

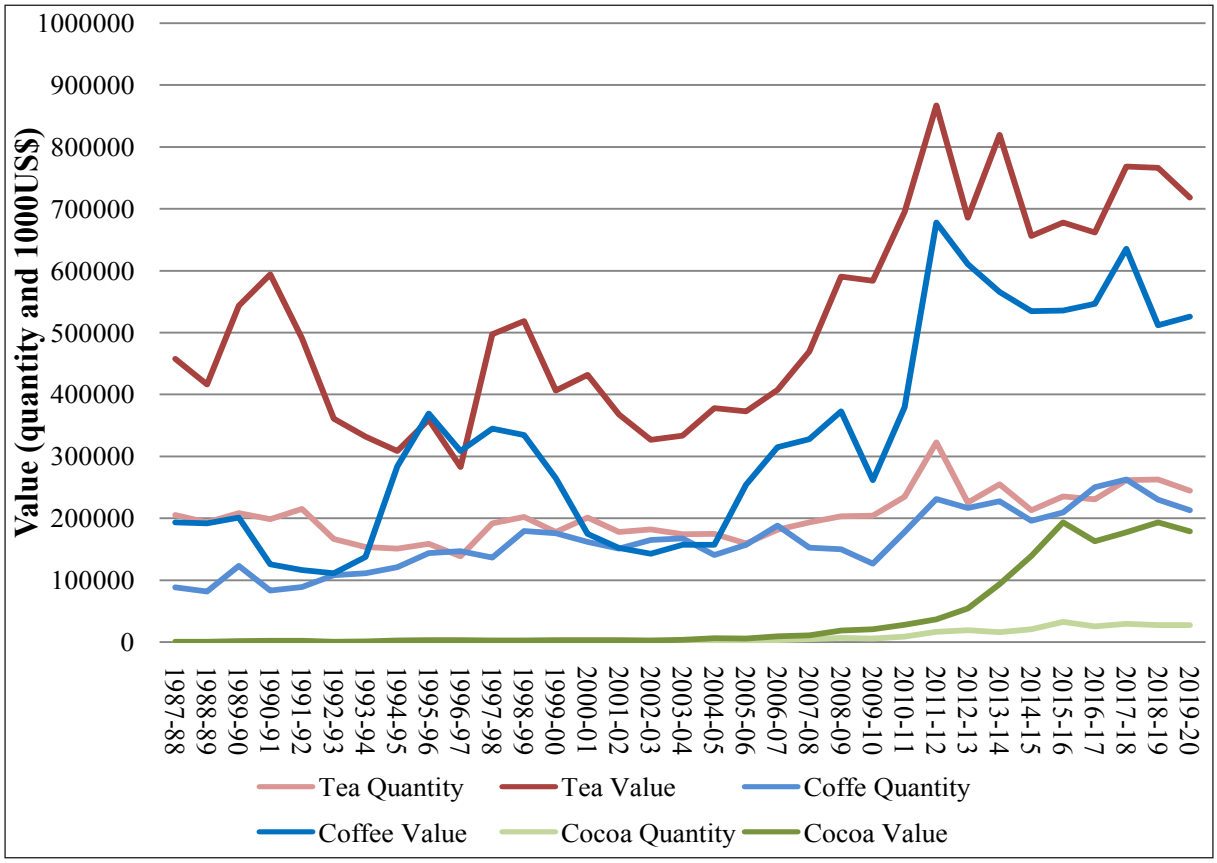

Fig. 1: Year wise data of export quantity and export value in plantation crops

Table 2: Compound growth rate in export quantity and export value under the Plantation crop in India 1987-2019

Particulars	Beginning 1987	End -2019	R^2	Growth rate
Export quantity (Metric Tonnes)				
Tea	205246	244292.80	0.368193	1.16***
Coffee	88333	212832.60	0.775289	2.97***
Cocoa product	202.42	27,410.58	0.940054	18.05***
Export value (1000 US $)				
Tea	457530	718100.90	0.428009	2.19***
Coffee	193422	525811	0.585763	4.49***
Cocoa product	282.40	178886.51	0.926376	22.08***

****, indicates significant at 1 per cent level, NS- Non Significant, respectively.*

tonnes in end of the year which shows that 2.97 per cent of growth rate per annum (Arulkumar and Gopalasamy, 2019). In case of export quantity under cocoa products increased from 202.42 tonnes during 1987-88 to 27, 410.58 tonnes in 2019-20 which shows that 18.05 per cent of growth rate during the overall period.

The Compound Growth rate of the major plantation crops export value can also be seen in the table 2. It is clearly seen that for export value, the beginning year of tea, coffee and cocoa product was 457530 (1000 US $), 193422 (1000 US $) and 282.40 (1000 US $), whereas the end of the year all products registered as 718100.90 (1000 US $), 525811 (1000 US $) and 178886.51(1000 US $). Whereas, the highest growth rate was found to be in the case of cocoa product 22.08 per cent and lowest growth rate was observed in the case of tea 2.19 per cent and coffee 4.49 per annum. Indian plantation crop exports have registered significant increase, both in

Table 3: Instability analysis of export quantity and export value of the plantation crop in India – 1987-2019

Particulars	Mean	SD	CV (%)	CDVI	Range
Export quantity (Metric Tonnes)					
Tea	202752.7	38734.21	19.10	15.18	Medium
Coffee	162415.53	49306.61	30.35	14.39	Low
Cocoa product	8030.62	10525.24	131.06	32.08	High
Export value (1000 US $)					
Tea	519422	166368.1	32.02	24.22	Medium
Coffee	327909.93	172377.47	52.56	33.83	High
Cocoa product	41193.30	66818.79	162.20	44.01	High

Note: *SD- Standard Deviation, CV- Coefficient of Variation and CDVI- Cuddy-Della Valle instability index.*

terms of quantity and earnings during the overall study period (Oktaviana *et al.* 2017) and as the table 2 presents there has been a significant rise and positive growth rate in the total exports all plantation crops **(**Sabu and Manoj Kumar, 2020).

Table 3 reveals that the variability in export quantity of plantation crop was found to be more in cocoa product recorded a higher coefficient of variation (131.06%) followed by coffee (30.35%) and tea (19.10%), which shows that instability of cocoa product was higher than the other plantation crop tea and coffee. The CDVI value of cocoa was observed to be 32.08 which gives clear signs of high range instability whereas in case of tea registered medium range of instability at the rate of 15.18 and whereas in case of coffee indicated low range of instability at the rate of 14.39. It's due to the condition of consumption and competitiveness effect of India, and also the world market distribution and commodity composition effect.

As regards the export value of plantation crops, cocoa recorded a higher coefficient of variation (162.20%) followed by coffee (52.56%) and tea (32.02%), which shows that instability of cocoa product was higher than the other plantation crop tea and coffee. However, the CDVI value for export value of tea was registered to be 24.22 which give clear signs of medium range instability, whereas in case of coffee and cocoa registered high range of instability at the rate of 33.83 and 44.01 respectively. Along with the high export growth rates, a progressive increasing in the instability indices of export indicated the high instability of cocoa export market. This results shows that cocoa and coffee product export value has a high range of instability compared to tea, which is very well showed in the attractive export growth rate during the overall study period (Thasnimol, 2020) Cuddy-Della instability index and Revealed Symmetric Comparative Advantage (RSCA.

The index numbers were estimated for world yield, India`s yield, world production, India's production, world export, India's export, world export value and India`s export value of tea and coffee. The basic objective for estimating index numbers was to study the trends in tea and coffee (Darvishi Lam Abbas and Indira, M. 2013). For this analysis, the data pertaining to the year from 1990 to 2019, total 30 years were used. The results have been presented in table 4 and table 5 respectively.

Table 4 the data compared to the world yield and India's yield of tea, both world yield (137.58) and India's yield (142.98) was highest in the year 2013 and 2019. In that, the lowest index number value of yield was found in 1992 (101.58) for world and India 1993 (101.50). Table the data compared to the world production and India's production, both productions was highest in 2019 at the rate of world (274.54) and India (217.66) respectively, in that the lowest index number value of production was found in 1990 for world (106.67) as well as India (107.74). Compared to the world export and India's export, the highest value of world export quantity (191.87) was found in 2019 and for India (162.23) in 2011. In that the lowest value was found in 1994 and 1996, at the rate of 95.34 and 69.90 respectively. Comparing to the world export value and India's export value, the highest value of world (384.32) was found in 2019 and for India (196.15) in 2011 in that the lowest value was found in 1994 and 1996, at the rate of 98.16 and 63.92 respectively. The main reasons causing the fluctuation in instability

Table 4: Index number for yield, production, export quantity, and export value of Indian tea

Year	World Yield	India's Yield	World production	India's Production	World Export quantity	India's Export quantity	World Export value	India's Export value
1990	104.93	107.12	106.67	107.74	110.27	100.10	131.78	134.41
1991	105.20	110.48	108.36	112.78	107.44	108.69	117.03	110.90
1992	101.58	109.71	105.58	118.09	101.12	84.05	107.86	81.64
1993	106.13	101.50	110.75	110.21	109.84	77.38	109.89	75.06
1994	107.90	114.17	111.90	117.90	95.34	76.22	98.16	69.76
1995	108.18	113.78	111.32	118.04	104.95	79.99	108.19	81.22
1996	110.32	114.36	114.35	118.37	109.02	69.90	117.00	63.92
1997	113.48	116.88	117.37	122.13	119.17	96.73	141.45	112.48
1998	122.97	120.56	127.26	126.83	128.06	101.95	159.57	117.23
1999	121.67	119.08	130.94	136.85	123.38	89.68	132.44	91.86
2000	118.51	108.87	127.36	129.33	131.54	101.48	138.85	97.63
2001	122.13	108.55	132.49	132.62	130.26	89.73	133.97	83.06
2002	122.88	108.16	136.17	133.72	141.97	91.76	136.05	73.88
2003	122.41	105.90	138.86	132.47	137.41	88.03	139.76	75.42
2004	125.67	109.19	146.89	137.63	146.83	88.27	156.15	85.44
2005	127.72	112.42	155.58	142.02	154.44	80.39	170.17	84.29
2006	127.06	110.36	157.54	148.59	146.36	91.61	178.12	92.15
2007	129.11	110.87	168.95	152.35	160.53	97.74	195.87	106.15
2008	132.09	110.23	178.74	154.54	171.47	102.66	262.68	133.51
2009	131.16	108.55	181.03	152.30	163.69	102.99	257.79	132.06
2010	136.18	110.55	194.51	155.20	181.71	118.50	304.02	157.14
2011	130.60	117.92	201.71	171.53	178.16	162.96	313.92	196.15
2012	133.58	121.21	212.72	177.73	162.23	113.72	299.99	155.09
2013	137.58	138.46	226.01	189.27	184.28	128.75	359.81	185.40
2014	136.18	136.52	234.98	187.45	174.89	114.06	324.57	178.88
2015	135.81	125.86	224.57	184.82	173.80	139.69	328.12	173.12
2016	129.93	139.91	245.18	195.81	167.19	116.44	315.46	149.69
2017	118.94	137.73	253.29	207.48	191.87	132.08	384.32	173.77
2018	121.24	138.85	267.33	209.61	180.98	132.59	363.95	173.30
2019	119.00	142.98	274.54	217.66	180.65	130.38	364.77	184.08

Base year = Tri-annum ending average of 1990-2019.

situation have been the proportional decline in cultivation area, production and export of tea, backed with the substantial increase in domestic consumption resulting in the increased tea imports (Sneha Chaudhry, 2019).

Table 5 the data compared to the world yield and India's yield of coffee, world yield (181.18) was highest in 2018 and for India (142.07) in 2001; the lowest index number value of yield was found in 1990 for world and India 1990, at the rate of 101.49 and 79.11 respectively. Compared to the world production and India's production, world production (180.89) was higher in 2018 and for India (238.79) in 2016, in that the lowest index number value was found in 1993 for world as well as 1990 for India, the values at the rate of 96.51 and 81.03 respectively. Comparing to the world export and India's export, the higher value (189.79) was found in 2019 and for India (318.79) in 2017, whereas lowest rate was found in the world (102.11) and India (100.64) respectively in the year of 1995 and 1990.Comparing to the world export value and India's export value, the highest value was found in 2011 for world (237.38) and India (323.34), in that the lowest value was found in 2002 and 1992, 44.48 and 53.10 respectively.

Table 5: Index number for yield, production, export quantity, and export value of Indian coffee

Year	World Yield	India's Yield	World production	India's Production	World Export quantity	India's Export quantity	World Export value	India's Export value
1990	101.49	79.11	105.33	81.03	116.67	100.64	61.25	59.96
1991	105.23	112.74	105.98	116.65	111.80	107.72	57.95	55.64
1992	109.90	119.25	105.74	123.51	113.76	130.60	46.86	53.10
1993	102.61	107.40	96.51	111.16	112.94	134.71	50.60	65.72
1994	109.15	136	99.51	142.72	109.98	146.28	94.29	135.48
1995	106.72	116.74	96.09	123.51	102.11	174.45	107.44	176.24
1996	118.50	136.59	107.93	153.01	116.35	178.06	91.02	147.40
1997	114.01	120.88	104.14	140.66	118.00	165.21	115.50	164.51
1998	122.42	118.22	115.23	156.45	118.20	217.89	104.58	159.50
1999	123.17	129.92	117.98	181.83	126.69	213.31	85.58	126.32
2000	132.33	140.29	132.24	200.36	132.43	195.94	73.98	83.31
2001	129.53	142.07	128.46	206.54	131.03	183.12	47.52	72.47
2002	142.99	139.11	138.83	206.54	132.29	199.80	44.48	68.03
2003	128.22	127.25	123.30	188.88	125.95	203.20	49.93	75.05
2004	135.70	123.25	137.60	185.61	135.25	170.59	62.63	74.96
2005	130.46	122.37	129.46	189.04	134.31	190.72	85.11	121.47
2006	141.49	118.96	141.64	188.01	142.62	228.15	100.03	150.13
2007	141.30	124.44	141.43	197.62	148.30	185.14	118.90	156.45
2008	149.71	112.74	147.69	179.78	152.68	181.52	145.05	177.77
2009	138.87	110.81	135.45	179.98	151.84	153.26	125.63	124.78
2010	150.84	120.74	147.40	198.71	158.52	215.85	156.78	181.19
2011	157.94	124.14	145.88	207.22	162.04	280.35	237.38	323.34
2012	158.87	126.22	153.29	215.46	171.48	262.90	210.32	291.26
2013	156.82	125.33	154.46	218.34	167.78	276.21	165.71	269.75
2014	156.63	118.37	152.71	208.94	167.10	273.15	204.47	294.78
2015	157.38	125.48	153.48	224.38	168.79	270.75	193.50	285.26
2016	159.64	118.67	163.40	238.79	180.62	303.80	171.92	260.68
2017	165.68	102.86	162.71	214.09	177.88	318.79	184.29	303.15
2018	181.18	113.35	180.89	216.83	180.38	279.02	164.23	244.16
2019	168.67	113.59	174.35	219.24	189.79	282.27	159.14	238.43

Base year = Tri-annum ending average of 1990-2019.

The index number shows the annual trend in the values of tea and coffee, which indicates that index number for yield of world as well as India, world production and India`s production, world export and India's export, world export value and India's export value, of tea and coffee were showing increasing trend in overall period on the initial tri-annum ending as a base year. A comparison between the world and India, it was more during the post-WTO period for production, export, value of export. The results secured in close agreement with the findings of Ananthakumar A. *et al*. (2019).

CONCLUSION

The contemporary study was undertaken to investigate the compound growth rates and instability of plantation crop during the study period from 1987 to 2019. The export quantity and value of all plantation crops showed positive value in overall period. But incase of instability the plantation sector shown medium to high range of fluctuation in all over period of India, which may be due to changing policies and increasing domestic consumption, rising demand for plantation produce in the global market and its execution at different periods of time. The Government should make suitable changes in export policies and domestic supportive measures would ensure higher price for their plantation crop produce and also adoptions of right value additions and market diversifications strategies would improve the Indian tea industry performance at global level.

REFERENCES

Ananthakumar, A., Sekhar, C. and Murugananthi, D. 2019. Global and National Scenario and Growth Trends in Area Production Productivity and Export of Fruits and Vegetables. *Int. J. Curr. Microb. and Appl. Sci.*, **8**(11): 1787–1801.

Arul Kumar, M. and Gopalsamy, S., 2019. Coffee Export from India. *Int. J. Scientific Dev. Res.*, **4**(5): 516-520.

Biswas, D. 2013. Export of Indian Tea: Recent Problems. *J. Business Mgt. and Admini.*, **1**(1): 1-6.

Chaudhry, S. 2019. Export Competitiveness of Indian Tea Industry. *Int. J. Res. in Engg. Appli. & Mgt.*, **5**(2): 318-323.

Cuddy, J.D. and Valle, P.D. 1978. Measuring the instability of time series data. *Oxford Bulletin Econ. Stat.*, **40**(1):79-85.

Darvishi, G.A. and Indira, M. 2013. An analysis of changing pattern in area, production and productivity of coffee and tea in India. *Int. J. Marketing Finan. Services and Mgt. Res.*, **2**(9): 46-60.

Kumareswaran, T., Singh, H.P., Kamalvanshi,V., Avdhesh and Kumar, D. 2019. Production and export performance of coffee from India. *J. Pharmacognosy and Phytochem.*, **8**(2):1619–1623.

Noman, A.U., Majumder, S., Imam, M.F., Hossain, M.J., Elahi, F. and Akter, K. 2020. Detection of Tea Export Potentiality from Bangladesh in the World Market: An Autoregressive Integrated Moving Average (ARIMA) Approach. *Asian J. Agric. Ext., Econ. Soc.*, **38**(4): 21-29.

Oktaviana, N., Masyhuri, M. and Hartono, S. 2017. Competitiveness of Tea Exports in Asean: A Constant Market Share Analysis. *Ilmu Pertanian (Agricultural Science)*, **1**(2): 088-093.

Patil, P., Jadhav, P. and Maiti, M. 2020. The impact of new agricultural export policy on Indian agriculture exports. *J. Public Affairs*, **20**(4): 1–6.

Sabu, K.M. and Kumar, T.K. 2020. Predictive analytics in Agriculture: Forecasting prices of Arecanuts in Kerala. *Procedia Computer Science*, **171**(2019): 699–708.

Singh, G. 2020. Trends in agricultural production as influenced by growth in irrigation resources in India. *World Water Policy*, **6**(2): 286–298.

Thasnimol, F., Prema, A. and Jayasekhar, S. 2020. Impact of Trade Liberalisation Policies on the Coconut Export from India. *Econ. Affairs*, **65**(4): 603-609.