



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2016; 2(12): 256-260
www.allresearchjournal.com
Received: 09-10-2016
Accepted: 10-11-2016

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Export data of frozen vegetables

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Abstract

This study paper aims at drawing statistical inferences based on using past official records taken from different reliable sources. We have selected vegetables as the base of study. Exploring half-yearly export data of last three years showing export quantity from three different main ports of western zone and a group of some ports from southern India to three different countries; we have focused on export of vegetables. The important point of the study lies in assessing the fact what we arrive at by implementing two way ANOVA in the given situation.

Keywords: Export, ports, countries, vegetables

Abbreviation: RTS (Ready to Serve), CTN (Carton), K.G. (Kilogram), S.S. (Sum of Squares), T.S.S. (Total sum of Squares), D.F. (Degree of Freedom)

Purpose of Study: The main purpose of the study is to assess the claim of equality of population means in two primary variables (1 Export from three selected major ports, 2 Export to three different countries) in the case we have concerned data entries (amount/ quantity) in the different tables referring to export of vegetables in different years. The data distribution becomes clearer by graphical presentation. We assume that their population variances are same.

Introduction

Main stream line and the vital source of any nation's economy and global sustainability is and can also be solely attributed to maximum utilization of all available resources for the production of different gadgets, goods, and grains, sources of utilization may be any production sector but production to the most extent need to be within the national territories. While on the other end credibility, soundness, consistency, and reliability for the nation on the international platform of trade and economy is a function of national production policy for the development of resources. Soundness in inner wheel sounds the outer wheel and both stand united as a one. All these need, ideally the surplus, and specially designed and manufactured goods to export to the international market. This calls for direct export to the buyers of different countries and in some cases it can be the role of government export policy which serves as directive to export business.

According to the topographical and vital statistics India has an extensive coastline of about 7517 k.ms. Spreading on the Western and Eastern borders of the mainland and including to some of the islands in government occupation. Ports are important form of infrastructure in Indian economy and play a vital role in initiating and supporting as a linkage between two or more countries executing international trade and commerce by providing an interface between the ocean transport and land-based transport. It has a well-established port infrastructure covering 12 major ports and nearly 200 minor (or intermediate ports or dry ports) which serve as linkage between major ports across 9 coastal States. These major ports come under the purview of the Central Government; the concerned authority is the Department of Shipping while non-major ports (minor/ intermediate ports) come under the jurisdiction of the respective State Governments. Freezing is one of the oldest and most widely used methods of preservation, which allows preservation of taste, texture, and nutritional value in vegetables better than any other method. The freezing process is a combination of the beneficial effects of low temperatures at which microorganisms cannot grow, chemical reactions are marginally reduced, and cellular metabolic reactions are delayed (Delgado and Sun, 2000).

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Market share of frozen vegetables: Seasonal and tropical vegetables if not globally marketed remain part of the country and in the long run becomes less lucrative in financial resources for the farmers and this is the main reason of extinction of certain herbs and vegetation. So as a conclusion the crop and its wide varieties should be available, possibly, all the time round the year and so its preservation and proper export channels are highly necessary. The frozen vegetable industry mostly grew after the development of scientific methods for blanching and processing in the 1940s. Only after the achievement of success in stopping enzymatic degradation, did frozen vegetables gain a strong retail and institutional appeal. Today, market studies indicate that considering overall consumption of frozen vegetables.

Commercialization history of frozen fruits is older than frozen vegetables. The commercial freezing of small fruits and berries began in the eastern part of the U.S. in about 1905 (Desrosier and Tressler, 1977). The main advantage of freezing preservation of fruits is the extended usage of frozen fruits during off-season. Additionally, frozen fruits can be transported to remote markets that could not be accessed with fresh fruit. Also, freezing preservation makes year-round further processing of fruit products possible, such as jams, juice, and syrups from frozen whole fruit, slices, or pulps. In summary, the preservation of fruits by freezing has clearly become one the most important preservation methods. The 12 major ports serve as the gateways to India's international trade by sea, handling over 90% of foreign trade. They are spread equally on the east coast and west coast of India. Kolkata port (including Dock complex at Haldia), Paradip port, Visakhapatnam port, Chennai port, Ennore port, and Tuticorin port are on the east coast. While, Cochin port, New Mangalore port, Mormugao port, Jawaharlal Nehru port, Mumbai port, and Kandla port are on the west coast. All the major ports are Administered by the 'Port Trusts' governed by the provisions of Major Port Trust Act, 1963 which are autonomous bodies, except the newly 'Ennore Port' which is run by 'Ennore Port Limited' (registered under the Companies Act, 1956). The total 200 non-major ports are in the following States:- Gujarat (42), Maharashtra (48), Tamil Nadu (15), Karnataka (10), Kerala (17), Andhra Pradesh (12), Odessa (13), Goa (5), West Bengal (1), Daman and Diu (2), Lakshadweep (10), Pondicherry (2), and Andaman & Nicobar (23).

There has been a phenomenal growth in the cargo handled at the ports, which has increased from 19.38 million tons (major ports) in 1950-51 to around 649.38 million tons (major and non-major ports) by 2006-07. At the beginning of the Tenth Plan, the capacity of major ports was about 344 MT. The aggregate capacity as on 31.3.2007 has been 504.75 million tons per annum (MTPA). Container traffic handled at major ports is also fast increasing. About 75 per cent of the cargo handled normally at these ports is for overseas trade. The major ports have handled a total traffic of 463.84 million tons during the year 2006-07 and 423.99 million tons in the year 2007-08 for the period up to 31.1.2008. Traffic in these ports is projected to go up to 700 MT by the year 2011-12. It is, therefore, planned to augment the capacities in the major ports to about 1000 MTPA by that period so as to ensure smooth flow of traffic. Besides, the average output per ship per day for all major ports taken together has improved from 9267 tons in 2005-06 to 9745 tons in 2006-07. Average turnaround time has marginally

increased from 3.50 days to 3.62 days over the same period primarily on account of increase in the number of ships handled at the ports.

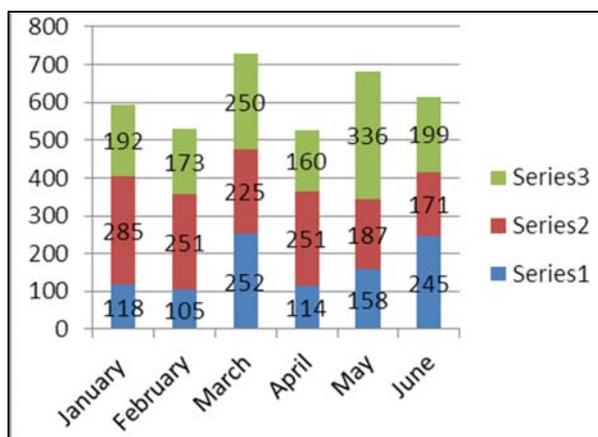
In order to improve efficiency, productivity and quality of services as well as to bring in competitiveness in port services, the port sector has been thrown open to private sector participation. Such private investments are mainly on the Build, Operate and Transfer (BOT) basis and include various areas of port functioning, such as leasing out existing assets of the port, construction/ creation of additional assets, construction of cargo handling berths, container terminals and warehousing facilities, installation of cargo handling equipments, construction of dry docks and ship-repair facilities, leasing of floating crafts, pilot age and captive facilities for port based industries, etc. Foreign direct investment (FDI) up to 100 per cent is permitted for construction and maintenance of ports and harbors.

Joint venture formations between a major port and a foreign port, between major port and minor port(s) without tender, as well as between major port and company (IES) following tender route are permitted by the Government. The measure is aimed at facilitating port trusts to attract new technology, introduce better managerial process, expedite implementation of schemes, foster strategic alliance with minor ports for creation of optimal port infrastructure and enhance confidence of private sector in funding ports. So far, 15 private sector projects involving an investment of Rs. 4242 corers have become operational. While, one project, that is, ICTT at Cochin is partly operational. Five projects are under implementation and 17 projects are in the pipeline.

Export data of frozen Vegetables from different ports to different countries.

Table 1 (a): Export Data Export of vegetables from Mundra to U.S

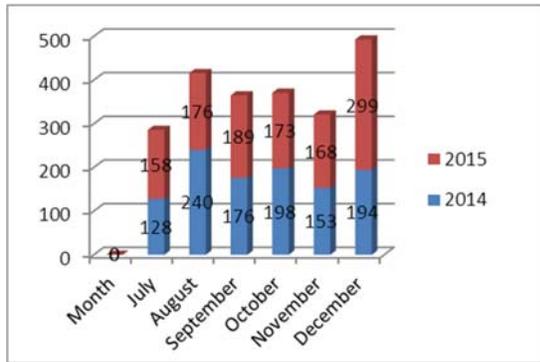
Month/Year	2014	2015	2016
	Total no. of items	Total no. of items	Total no. of items
January	118	285	192
February	105	251	173
March	252	225	250
April	114	251	160
May	158	187	336
June	245	171	199
Mean	165.33	228.33	218.33



Graphical representation of table no.1 (a) (Series 1=2014 Series 2=2015 Series 3=2016)

Table 1(b): Export Data Export vegetables From Mundra to U.S.

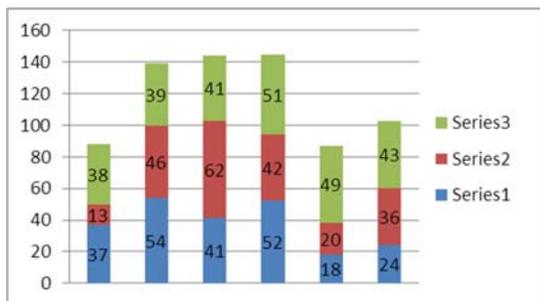
Month/Year	2014	2015	Grand mean
	Total no. of items	Total no. of items	
July	128	158	
August	240	176	
September	176	189	
October	198	173	
November	153	168	
December	194	299	
Mean	181.5	193.83	197.46



Graphical representation of table no.1 (b) (series 1=2014 series 2=2015)

Table 2(a): Export Data Export vegetables From Mundra to Canada

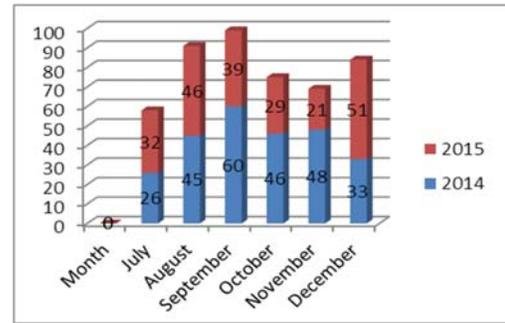
Month/Year	2014	2015	2016
	Total no. of items	Total no. of items	Total no. of items
January	37	13	38
February	54	46	39
March	41	62	41
April	52	42	51
May	18	20	49
June	24	36	43
Mean	37.66	36.5	43.5



Graphical representation of table no. 2(a) (Series 1=2014, Series 2=2015, Series 3=2016)

Table 2 (b): Export Data Export vegetables From Mundra to Canada

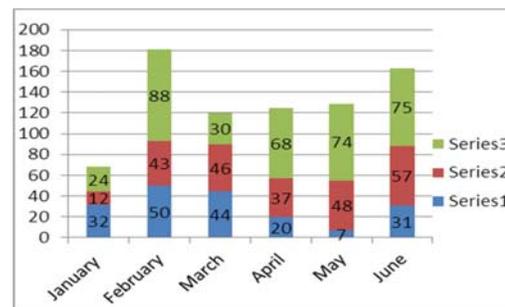
Month/Year	2014	2015	Grand mean
	Total no. of items	Total no. of items	
July	26	32	
August	45	46	
September	60	39	
October	46	29	
November	48	21	
December	33	51	
Mean	43	36.33	39.4



Graphical representation of table no. 2(b) (series 1=2014 series 2=2015)

Table 3(a): Export Data Export vegetables From Mundra to U.K.

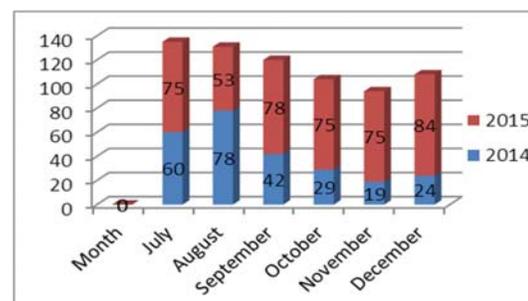
Month/Year	2014	2015	2016
	Total no. of items	Total no. of items	Total no. of items
January	32	12	24
February	50	43	88
March	44	46	30
April	20	37	68
May	7	48	74
June	31	57	75
Mean	30.66	40.5	59.83



Graphical representation of table no. 3(a) (Series 1=2014, Series 2=2015, Series 3=2016)

Table 3(b): Export Data Export vegetables From Mundra to U.K.

Month/Year	2014	2015	Grand Mean
	Total no. of items	Total no. of items	
July	60	75	
August	78	53	
September	42	78	
October	29	75	
November	19	75	
December	24	84	
Mean	42	73.33	41.055



Graphical representation of table no 2(b) (series 1=2014 series 2=2015)

As shown in above tables we have also collected the export data of frozen vegetables for the years 2014, 2015, and 2016 exported from the port Nahva Sheva and a group of some other ports of south India. Their grand means along with the grand mean of the Mundra port are given below.

Table 4: In order to substantiate the logic we consider the following illustration which in connection of the above data.

Ports			
Countries	Mundra	Nahva sheva	Southindia Zone
U.S	197.46	91.86	2.7
Canada	39.4	28.16	0.23
U.K	41.055	20.53	1.43

5.3 Illustration: To study the consequences of export of the frozen Vegetables from three different ports to three different countries by using the above data. Analyze the data and draw the inference at 5% level of significance. The following values are the Grand means as shown in the above table.

Pedagogy: Three years primary data regarding the two particular items on hand were extracted from official records regarding export from different ports and to different countries. Some salient features are described below.

- 1 Calculation on Quarterly Basis for each year (Port wise and Country wise)
- 2 Calculation of Mean and Standard deviation
- 3 A Graphical Presentation
- 3 B Preparing tools for applying Analysis of Variance (ANOVA)

Hypothesis

- (1) H_0 : There is no difference in means of export amount to three countries
- (2) H_0 : There is no difference in means of export amount from three ports
- (3) H_1 : Population means in the corresponding cases are different.

Level of significance = $\alpha = 0.05$

Export (Quantity)/Means					
Port ↓ /Country →	U.S	Canada	U.K	Total	
Mundra	197.47	39.4	41.055	277.925	R1
Nahva sheva	91.87	28.77	20.53	141.17	R2
South Indian Ports	2.7	0.2333	1.433	4.3663	R3
Total	292.04	68.4033	63.018	423.4613	
	C1	C2	C3	G=Grand Total	
Squares of the data					
Port ↓ /Country →	U.S	Canada	U.K	Total	
Mundra	38994.4	1552.36	1685.513	42232.27393	R1
Nahva sheva	8440.097	827.7129	421.4809	9689.2907	R2
South Indian Ports	7.29	0.054429	2.053489	9.39791789	R3
Total	47441.79	2380.127	2109.047	51930.96254	
	C1	C2	C3	Grand Total	

$$N = 3 \times 3 = 9, C.F = \frac{G^2}{N} = \frac{(423.4613)^2}{9} = \frac{179319.4726}{9} = 19924.38584$$

Total Sum of Squares (T.S.S.) = $\sum X_i^2 - C.F.$ = $51930.96254 - 19924.38584 = 32006.58$

S.S. Between Countries (Column) = $\frac{1}{3} \sum Ci^2 - C.F$

$$= \frac{1}{3} (85287.3616 + 4678.97041 + 3971.268) - C.F$$

$$= \frac{1}{3} (93937.6003) - 19924.38584 = 11388.1757$$

S.S. Between Ports (Row) = $\frac{1}{3} \sum Ri^2 - C.F$

$$= \frac{1}{3} (77242.3056 + 19928.97 + 19.06457569) - 19924.38584$$

$$= \frac{1}{3} (97190.34) - 19924.38584 = 32396.78 - 19924.38584 = 12472.3942$$

Error sum of square = T.S.S - [S.S.C + S.S.R]
 = $32006.58 - [11388.1757 + 12472.3942] = 8146.0101$

ANOVA

Source of variation	D.F.	S.S	M.S.S (S.S/D.F)	F Value Cal.	F Value Tab.
Between Ports (Row)	2	12472.3942	6236.1971	3.06	6.94
Between Countries(Columns)	2	11388.1757	5694.08785	2.79	6.94
Error	4	8146.0101	2036.5025	-----	
Total	8	32006.58	-----		

Decision: From the table, the value of F at 5% level of significance is 6.94. Since, the calculated value of F for different Countries (Columns) is 2.79. Since calculated value is less than the table value; Null hypothesis H_0 : (i) is accepted

Hence the Calculated value of F for different ports (Rows) is 3.06. Since calculated value is less than the table value; Null hypothesis H_0 : (ii) is accepted.

In connection to the above work we are able to depict the following concluding remarks about what we have achieved in the process.

Conclusion

This has remained a time consuming exercise but at the end we have arrived at the best conclusion. The study over a three successive years of export from three different ports to three different countries has revealed a fact, by and large, that the increase in demand of vegetables from different countries and export corporation choosing export destination for export have a little impact over the long time span. In a way this reflects that (1) Inclination to purchase imported items by the different countries have declined or nearly remains constant and/or (2) either the steady demand or less profitability reflects weak marketing strategies or poor attention towards quality control and maintenance in the export bound items. In some cases it indicates additional government control imposed on export or import as the case may be. Each case arising their from, as discussed above, becomes case study in future and can be indicative for amendments in further business activities that follow.

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