RESEARCH REVIEW JOURNALS
Volume-03
Issue-05
May-2018

ISSN: 2455-3085 (Online)
RESEARCH REVIEW International Journal of Multidisciplinary
www.rrjournals.com [UGC Listed Journal]

A Study on Managing Perishable Foods with Special Reference to Fruits and Vegetables in Trichy, TamilNadu, India

[1]Dr. G. Balamurugan & *[2]Anithakumari. P

[1]Assistant professor, Department of Management Studies, Anna University (BIT- campus), Tiruchirappalli, Tamil Nadu (India)
*[*2]PG Student, Department of Management Studies, Anna University (BIT- campus), Tiruchirappalli, Tamil Nadu (India)*

ARTICLE DETAILS

Article History
Published Online: 19 May 2018

Keywords
perishable foods, retailer, customer

***Corresponding Author**
Email: anithalakshmi132[at]gmail.com

ABSTRACT

This paper aim to manage perishable foods with special reference to fruits and vegetables in Trichy. Fruits and vegetables are one of the most important component of a retail chain and act as a strategic product in attracting the customer. Due to lack of transportation, storage facilities, and lack of knowledge to recycle of fruits and vegetables are wasted in trichy. The demand for fruits and vegetables is growing year by year with greater potential for the future. Perishable fresh vegetables move to end customer

1. Introduction

India being the world's largest producer of milk and second largest producer of fruits and vegetables, about 40 to 50 per cent of the total output valued of $440 billion ends up being wasted. "Given the expected growth in grocery retail to $847.9 billion by 2020 from $500 billion in 2012, there are some changes expected by the industry as a whole to ensure three significant areas of handling food collection, storage and transportation to be more cost effective for retailer. "A quantum jump in the size and growth of food processing sector is needed, which would be in sync with the Government of India's vision of doubling farmer's income by 2022. Which is how, the processing minister Harsimrat Kaur Badal, announced at the end of the three day World Food India fair in November that USD11.25 billion investments were committed in the country's food processing sector. She added, with government funds put together, the total investments signed have reached USD18.84 billion.

Food wastage

Food Services emerge as a key segment of Indian economy. Indian Food Services market in India (organized and unorganized) is estimated at Rs 3,37,500 crore in 2017 and is projected to grow at a CAGR of 10 per cent over the next five years to reach Rs 5,52,000 crore by 2022.

But at the moment, India is currently only processing 10 per cent of its food, resulting in enormous food waste. In its 2015 report, The CSR journal named the United Nations Development Programme as estimating up to 40% of the food produced in India as being wasted. 'About 21 million tonnes of wheat are wasted in India', the report states. In a recent Food and Agriculture Organization (FAO) study on 'Save Food' reported 1.3 billion tonnes of food is being wasted annually in India and China.

This is reflected in India slipping further in the 'Global Hunger Index' to 100 this year out of 119 countries and only Pakistan and Afghanistan are lower ranked Asian countries in the list.

The future of food

India, one of the world's largest producers of food, is also the largest producer of milk and second largest producer of fruits and vegetables. This huge raw material base, paired with a growing 1.3 billion population, presents vast investment and opportunities for the packaging industry. As a result, there is food waste; and opaque minimum support price for the producers of the food

2. Literature Review

Various papers are considered for literature review to gain more information about perishable foods.

Raghunathan and Yeh (2001) found that value of continuous replenishment programs affect the characteristics of demand. They argued that when inventory reductions are there due to continuous replenishment programs, demand variance increases

Jack P.C. Kleijnen et al (2005) transition to markets endangering sustainability, as these markets show increasing production and consumption of perishable fresh food—implying substantial waste. This waste is expensive for both the FSCNs themselves and society at large; for example, in the Netherlands this shrinkage amounts to one billion Euros per year. Retail outlets—including supermarkets—must manage their replenishments trying to balance shrinkage and stock-outs; shrinkage occurs because supermarkets discard fresh-food products because best-before-dates have expired. The fundamental causes of waste in FCSNs are product quality deterioration and lack of supply chain coordination. Hence, FCSN require redesign for sustainable reduction of shrinkage; for example, such redesign may be enabled by RFID (radio frequency identification). Redesign also creates a competitive

advantage for the individual company, enabling its survival in a very competitive environment;

Neergaard et al (2007) state that qualitative approach is the best way to use to generalize from empirical investigations. Furthermore, compared with other inquiry methods, personal interview has obvious advantages, such as effective information collection and direct communication with interviewees

Bo Wei (2011) the purpose of the paper is to research the cold chain management in supermarket by illustrating the case of a supermarket in Sweden. It aims to find out how the supermarket handles the fresh food cold chain by the perspective of cost and effectiveness.

Zaniyah Widyaningrum et al (2012) Good performance measurement system is required to assess the success of supply chain. However, choosing the most appropriate indicator is not easy as it depends on the system's characteristics. Sea fishery industry characterized as perishable products, seasonal in production, and highly dependence on nature (uncontrollable). Motivated by the uniqueness of the sea fishery industry, this work proposed a performance measurement system for the sea fishery supply chain. The performance of the proposed model is evaluated using Indonesian sea fishery supply chain case, mostly consists of small and medium enterprises (SME). This instrument has six dimensions; efficiency, flexibility, responsiveness, product quality, process quality, facilities, and government involvement.

Bikram K. Bahinipati (2014) Supply chain planning in the fruits and vegetables (F&V) supply chains, dealing with short life cycled products in a competitive marketplace, integrates the complex network of farmers, food processing and supply to end customers to enhance operational effectiveness. This planning framework aggregates data from multiple sources, such as customers, super markets, famer cooperatives and contract farmers, to provide visibility of demand supply status for inter-enterprise collaboration. The supply chain analysis has considered the aspects of business planning, supply and demand management, inventory, transportation, logistics optimization from the perspective of information sharing to satisfy the need of the end customers. Further, this work assesses the sustainability of change in the management of procurement activities and ICT infrastructure supporting the e-market service mode, and builds a collaborative control framework that could provide insight to the managers of the food producing industries.

Prashant Bornare (2016) describes traditional management of supply chain for fruits and vegetables at mandi level and its problems associated. New practices adopted by the private firms and regulators in order to make the supply chain efficient providing benefits to farmers and final consumers. Degradation patterns and different temperature requirements of perishable items are also discussed for efficient management of goods. Important aspects related to the challenges in managing distribution by companies, such as those dealing in airline catering services and milk based products are illustrated.

Ramulu Bheemappa (2017) the modern agricultural system is a characteristic well understood by farmers but not easily defined with specificity. Still, the distinctions between modern and traditional systems have powerful implications for the future development of the global food system—even though it is important to recognize that few, if any, systems fall entirely into either the modern or traditional categories. Traditional systems perhaps the most important difference between the categories is the way farmers see themselves and their roles. Traditional farmers, for example, often say that they seek to work effectively with resources at hand. That is, they use the land, rainfall, seeds, tillage methods and power sources they have to produce what nature offers.

Nilima N. Puranik (2018) present a case in application of fuzzy logic to the study of impact of different factors on profit of producer, whole seller and retailer, in the case of marketing of perishable agricultural produces. A scenario in perishable food supply chain management modelling and optimization approach focusing on loss minimization along supply chain is presented based on real market data treated with analysis based on fuzzy logic.

3. Statement of the problem

It is widely documented that perishable food is an impediment to productivity of fresh produce sector in general and trading practices in particular. While studying of perishable food have taken toll in Times of India, little or none has been done focusing on perishable food goes to waste. The percentages of the total lost whileleaving determination of their impact to the profit margins

4. Need of the Study

- It is filling such a gap through determining the impact of perishable food to retail outlets.
- It also a need to explore various mechanisms that could be reduce the rate of perishable food in regional background.

5. Limitations of the Study

- Due to very large size of the population, only a selected sample of customers could be contacted; and hence they may not be the true representatives of the population.
- Due to fast pace of life, some customers were not able to do justification to the questionnaire.
- The data was collected solely on the basis of information given by consumers selected in the sample.
- Personal biases of the consumers might have come while answering the questionnaire

6. Research Methodology

6.1 Objectives

- To identify the factors affecting the quality of perishable foods
- To identify the Wastages happening in different stages till its consumption

- To know the customer satisfaction level based on quantity and quality
- To know the perishable fruits and vegetables loss is diverted

6.2 Research procedure

Data was collected via both primary and secondary methods. Primary data was collected using questionnaire. A sample is taken from the population of trichy city who shopped at organized retail store. The sample has been taken 24 retailer, 86 customer for the analysis using convenience sampling. To obtain the representative non probability sample is used. In this study the method of selecting sample is convenience sampling. Secondary data was collected from journals and research papers.

The questionnaire's reliability was tested using cronbach's alpha test and a value of .766 for retailer .719 for customer was got proving that questionnaire is valid.

For retailer

Reliability Statistics	
Cronbach's Alpha	N of Items
.766	18

For consumer

Reliability Statistics	
Cronbach's Alpha	N of Items
.719	24

6.3 Data analysis and interpretation

Simple percentage analysis, Chi-square test and small one sample t- test (retailer)

6.3.1 Simple percentage analysis

1. Left over foods during home consumption

Consumption					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Dump at right Garbage place	45	52.3	52.3	52.3
	Just throw at any place	10	11.6	11.6	64.0
	Donate For street people	16	18.6	18.6	82.6
	Sell for reuse	14	16.3	16.3	98.8
	5.00	1	1.2	1.2	100.0
	Total	86	100.0	100.0	

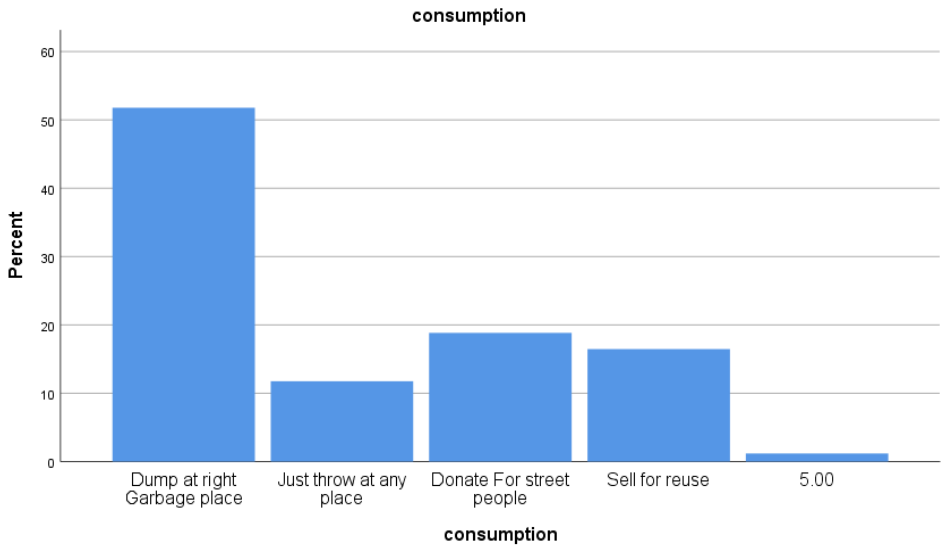

Figure 1.1

From this analysis, majority of the respondents are left over foods are dump at right place

2. Perishable Loss is diverted by retailer

Loss					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hazardous waste	9	37.5	37.5	37.5
	Charitable	4	16.7	16.7	54.2
	Animal composting	10	41.7	41.7	95.8
	Communal	1	4.2	4.2	100.0

	Total	24	100.0	100.0	

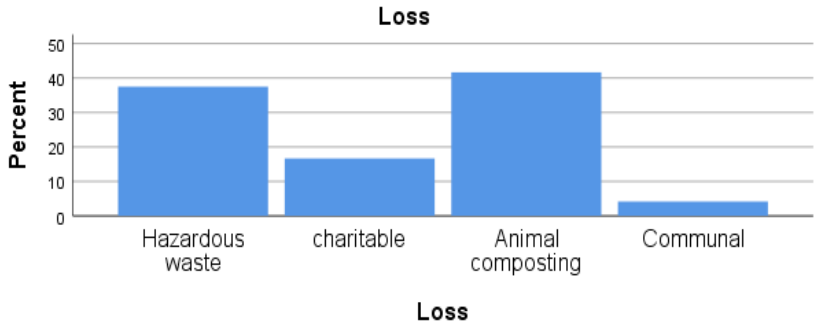

Figure 1.2
From this analysis, majority of the respondent are loss is diverted into biogas production

3. Perishable good waste is generated in store due to this

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Damage during transportation	20	83.3	83.3	83.3
	Poor handling	3	12.5	12.5	95.8
	Lack of cold storage	1	4.2	4.2	100.0
	Total	24	100.0	100.0	

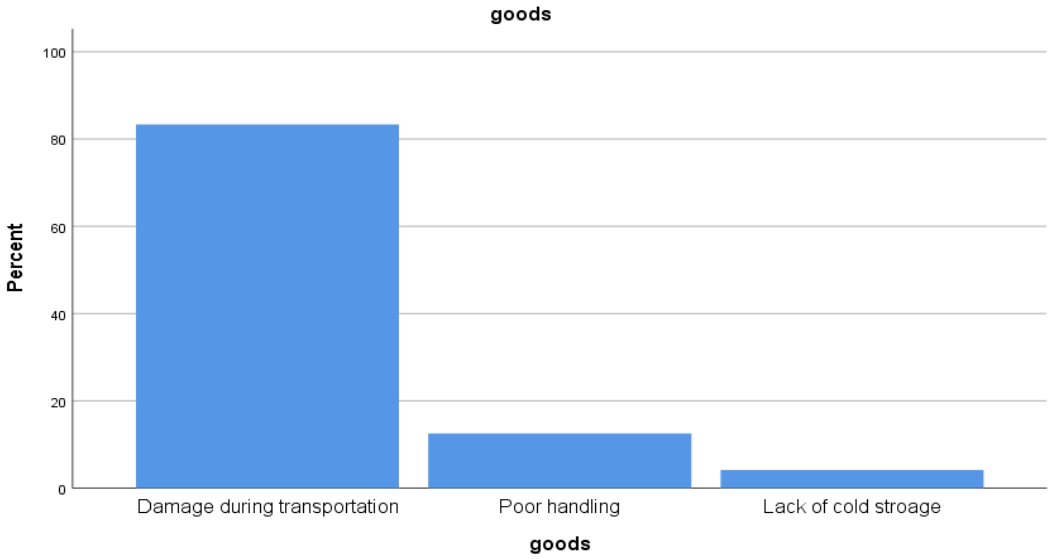

Figure 1.3
From this analysis, majority of the respondent are waste generated during transportation

6.3.2 Chi- square test

Chi square was done to find out the existence of significant association between gender and the factors affecting the quality of perishable foods

The factors affecting the quality of perishable foods is color, tenderness, spot damage, taste and smell, hardness of fruits and vegetables

Hypothesis 1

H0: There is no significant association between the gender and factors affecting the quality of perishable foods

H1: There is significant association between the gender and factors affecting the quality of perishable foods

1. Color

Chi-Square Tests			
	Value	**df**	**Asymp.Sig. (2-sided)**
Pearson Chi-Square	4.723[a]	4	.317
Likelihood Ratio	6.411	4	.171
Linear-by-Linear Association	.036	1	.849
N of Valid Cases	86		

The calculated value 4.723 is lesser than tabulated value 9.488. H1 rejected and H0 is accepted so there is no significant association between the gender and factors affecting the quality of perishable foods, X^2(4, N=86)

2. Tenderness

Chi-Square Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	2.693[a]	4	.610
Likelihood Ratio	3.722	4	.445
Linear-by-Linear Association	.047	1	.828
N of Valid Cases	86		

The calculated value 2.693 is lesser than tabulated value 9.488. H1 rejected and H0 is accepted so there is no significant association between the gender and factors affecting the quality of perishable foods, X^2 (4, N=86)

3. Spot damage

Chi-Square Tests			
	Value	**df**	**Asym.Sig. (2-sided)**
Pearson Chi-Square	13.988[a]	4	.007
Likelihood Ratio	14.307	4	.006
Linear-by-Linear Association	5.208	1	.022
N of Valid Cases	86		

The calculated value 13.988 is greater than tabulated value 9.488. H0 rejected and H1 is accepted so there is an significant association between the gender and factors affecting quality of perishable foods, X^2 (4, N=86)

Hypothesis 2

H0: There is no significant relationship between quality and quantity on customer satisfaction level

H1: There is significant relationship between quality and quantity on customer satisfaction level

The customer satisfaction level depends on quality of service, attraction of promotions. Shopping environment, information regarding promotions visibility of promotions

1. Quality of service

Chi-Square Tests			
	Value	**Df**	**Asym. Sig. (2-sided)**
Pearson Chi-Square	5.861[a]	12	.923
Likelihood Ratio	5.095	12	.955
Linear-by-Linear Association	.362	1	.547
N of Valid Cases	86		

The calculated value 5.861 is lesser than tabulated value 21.026. H1 rejected and H0 is accepted so there is no significant relationship between quality and quantity on customer satisfaction, X^2 (12, N=86)

2. Attraction of promotions

Chi-Square Tests			
	Value	**df**	**Asy.Sig. (2-sided)**
Pearson Chi-Square	10.985[a]	12	.530
Likelihood Ratio	10.481	12	.574
Linear-by-Linear Association	.273	1	.601
N of Valid Cases	86		

The calculated value 10.985 is lesser than tabulated value 21.026. H1 rejected and H0 is accepted so there is no significant relationship between gender and identify the factors of fruits and vegetables, X^2 (12, N=86)

3. Shopping environment

Chi-Square Tests			
	Value	**Df**	**Asy.Sig, (2-sided)**
Pearson Chi-Square	25.471[a]	12	.013
Likelihood Ratio	23.266	12	.026
Linear-by-Linear Association	3.105	1	.078
N of Valid Cases	86		

The calculated value 25.471 is greater than tabulated value 21.026. H1 accepted and H0 is rejected so there is a significant relationship between maintain quality and quantity and satisfaction, X^2 (12, N=86)

6.3.3 Small one sample t- test

H0: There is no significant relationship between managing perishable foods with retailer

H1: There is significant relationship between managing perishable foods with retailer

	T	df	Mean Difference
Procure	15.402	23	1.58333
Proper	9.326	23	1.83333
Special	15.402	23	1.58333
Extension	8.566	22	1.78261
Facilities	8.108	23	1.54167
Days	5.412	23	1.83333
Goods	11.630	23	1.20833
Causes	9.559	23	1.75000
Decline	9.305	23	2.66667
Deteriorated	18.798	23	1.08333
Consumption	6.065	23	1.62500
Type	13.844	23	1.25000
Stock	8.877	23	1.87500
Reduce	11.577	23	2.16667
Loss	10.496	23	2.12500
Barriers	8.550	23	1.95833
Track	10.112	23	1.91667
Sorting	9.479	23	2.20833

To check the small sample t test calculated value is greater than tabulated value .So null hypothesis is rejected.

7. Suggestion and conclusion

The study is mainly focus on managing perishable foods with special reference of fruits and vegetables in trichy. The retail store should plan the production quantities and training for employees to reduce the quantity of food waste Raw materials transportation with good packaging methods and materials in refrigerated environment long travelling distance of fruits and vegetables with poor packing methods and transportation will minimize the wastage. When the contamination of food source is identified. Surplus food can be recovered the degree in which human consumption. The customer satisfaction level is depends on shopping environment. Its seems that the wholesaler gives most importance to the experience, in comparison with retailer & producer. The consumer perspective is that storage-life of 2-3 days is the popular requirement.

References

1. Ahumada O, Villalobos JR. Operational model for planning the harvest and distribution of perishable agricultural products. InternationalJournal of Production Economics, 2011; 133(2):677-687
2. Blackburn J, Scudder G. Supply chain strategies for perishable products: the case of fresh produce. Production and Operations Management, 2009; 18(2):129-137.
3. Brody, A. (2008). How Green Is Food Waste?Food Technology, 62(6), 121–126.
4. Bogataj, M., Bogataj, L. and Vodopivec, R. (2005), Stability of perishable goods in cold logistic chains, International Journal of Production Economics, Vol. 93/94, pp. 345-356.
5. Ferguson, M., M. E. Ketzenberg. 2006. Information sharing to improve retail product freshness of perishables. Prod. Oper. Manag. 15(1): 57–73.
6. Flamini M., M. Nigro and D. Pacciarelli (2011). Assessing the value of information for retail distribution of perishable goods. Eur. Transp. Res. Rev., 3, 103-112.
7. Guilbert, S., Gontard, N., and Gorris, L.G. (1996). Prolongation of the shelf-life of perishable food products using biodegradable films and coatings. LWT-FoodScience and Technology, 29(1), 10-17.
8. Gustafsson, K., G. Jonson, D. Smith and L. Sparks (2006). Retailing Logistics & Fresh Food Packaging, Managing Change in the Supply Chain. Kogan Page Limited.
9. Hallsworth, A. and A. Wong (2012). Fresh produce, the supply chain and the environment- acase study. World Transport Policy and Practice, Vol. 18.3, 13-24.
10. Hanssen, T.S. and T.A. Mathisen (2011). Factors facilitating intermodal transport of perishable goods-transport purchasers viewpoints. European Transport, 49, 75-89.
11. Institute of Food Science and Technology, 1993. Shelf-life of foods: guidelines for its determination and prediction. London: s.n.
12. Kumar, S., Pal, S., & Joshi, P. K. (2004). Vegetable Sector in India: An Overview, Impact of Vegetable Research in India. National Centre for Agricultural. Economics and Policy Research ICAR, New Delhi, 9-33
13. Lawande, K. E. (2004). Status of Onion and Garlic Research in India, Impact of Vegetable Research in India, National Centre for Agricultural Economics and Policy Research. ICAR, 59-64. New delhi.
14. Lewis, C. (2002). Food Freshness and “Smart” Packaging. U.S. Food and Drug Administration FDAConsumer Magazine, 36(5). Retrieved fromhttp://www.fda.gov/Food/default.htm
15. Mena, C., Adenso-Diaz, B., Yurt, O. (2011). The causes of food waste in the supplier-retailer interface: Evidences from UK and Spain. Resource conservation and recycling. Vol.55. No. 6. Pp. 648-658.
16. Novaes, A.G., Lima, O.F. Jr, Carvalho, C.C.D., and Bez, E.T. (2015). Thermal Performance of Refrigerated Vehicles in the Distribution of Perishable Food. Pesquisa Operacional, 35(2), 251-284.

17. Parfitt, J., Barthel, M., Macnaughton, S. (2010). Food waste within food supply chains: quantification and potential for change to 2050. Philosophical transactions of the royal society B , pp. 3065-3081.
18. Rong, A., R. Akkerman and M. Grunow (2011). An optimization approach for managing fresh food quality throughout the supply chain. Int. J. Production Economics, 131, 421-429.
19. Ruben R, Boselie D, Lu H. Vegetables procurement by Asian supermarkets: a transaction cost approach. Supply Chain Management: An International Journal, 2007; 12(1):60-68
20. Santos, M.D., Queirós, R.P., Fidalgo, L.G., Inácio, R.S., Lopes, R.P., Mota, M.J., Sousa, S.G., Delgadillo, I., and Saraiva, J.A. (2015). Preservation of a highly perishable food, watermelon juice, at and above room temperature under mild pressure (hyperbaric storage) as an alternative to refrigeration. LWT-Food Science aTechnology, 62(1), 901-905.
21. Scenario in Perishable food supply chain Year 2015 Proceding of Allana Institute of Science By Dr. Nilima Puranik
22. Shi F., Zhang F., and Qu X. (2010), Optimizing distribution strategy for perishable foods using RFiD and sensor technologies, Journal of Business & Industrial Marketing, 25/8 (2010) 596–606
23. Smith, D. and L. Sparks (2004). Temperature controlled supply chains. In: Bourlakis, M.A., Weightman, P.W.H. (Eds.), Food Supply Chain Management. pp. 179–198, Blackwell Publishing, Oxford, UK.
24. Tatlidil, F., Kiral, T., Gunes, A., Demir, K., Erdemir, G., Fidan, H., Demirci, F., Erdogan, C., & Akturk, D. (2003). Economic analysis of crop losses during pre-harvest and harvest periods in tomato production in the Ayaşand Nallıhan districts of Ankara province,TÜBĐTAK-TARP 2387: 86. Ankara, (in Turkish)
25. Teimoury, E, H. Nedaei, S. Ansari, and M. Sabbaghi (2013). A multi-objective analysis for import quota policy making in a perishable fruit and vegetable supply chain: A system dynamics approach. Computers and Electronics in Agriculture, 93, 37–45.
26. Trienekens, J. and P. Zuurbier (2008). Quality and safety standards in the food industry,developments and challenges. International Journal of Production Economics 113,107–122.
27. Tslros, M., and Heilman, C. (2005). The Effect of Expiration Dates and Perceived Risk on Purchasing Behavior in Grocery Store Perishable Categories. Journal of Marketing, 69(2), 114-129.
28. Unnevehr, L.J. (2000). Food safety issues and fresh food product exports from LDCs.Agricultural Economics, 23(3), 231-240.
29. Wang, X., Fan, Z.P., Wang, Y., and Li, M. (2015). A laboratory exploration for multiperiod perishable food pricing. British Food Journal, 117(9), 2214-2233
30. Waheed, A., Iqbal, M. J., & Shah, F. H. (1986). Postharvest losses in vegetables. Pakistan Journal of Scientifi c and Industrial Research, 29(4), 268-273
31. WRAP (2009). Waste arising in the supply of food and drink to households in the UK. Available at:
32. http://www.wrap.org.uk/downloads/RSC002005_March_24_2010_FINAL_Amended_26_May_2010.cf0bfef8.8904.pdf Risorsa consultata il 21/02/2011

