



FOOD SUPPLY CHAIN IMPLICATIONS ARISING FROM CUSTOMER REJECTION OF SLIGHTLY DEFECTIVE FOOD ITEMS BASED ON AESTHETICS. A CONCEPTUAL FRAMEWORK.

Balashankar Ramdas* Narendra Singh Chawda**

**Assistant Professor, Pillai Institute of Management Studies & Research, New Panvel, Navi Mumbai.*

***Associate Professor, Pacific Academy of Higher Education in Research University, Udaipur.*

Abstract

Food products that are perfect in every respect ranging from aesthetics to taste is a basic requirement put forward by the majority of customers which in turn has prompted the supply chain stakeholders ranging from suppliers to retailers to upgrade their own quality standards. The problem which arises is that food products found to have even minor defects like dissimilar coloration or abnormal shapes find themselves to be rejected despite being nutritionally fit, safe and edible for use. This leads to massive rejection of food at the farm level as well as the pre retail level leading to not only economic losses but also causes widespread environmental issues across the entire food supply chain.

This paper which is purely conceptual in nature explores how the customer influenced aesthetic standards leads to rejection of food products and examines the outbound consequences for logistics and supply chain efficiency, food wastages, environmental losses and collaborator participation. The paper incorporates food aesthetics bias theory, Principal agent theory as well as supply chain waste theory with the singular aim of linking aesthetic food standards to supply chain consequences. The paper has also provided five research propositions which can be employed for empirical testing in the future. The results of the research implies that irrational standards of aesthetics as perceived by the customers is a major contributor to massive amounts of food waste, and it has been observed that the retailers are the quality inspectors resulting in indiscriminate rejections. The paper proceeds to pinpoint the implications for almost all the stakeholders of the supply chain along with the farmers, policymakers and also distributors with the aim of reducing wastage and providing suggestions with the main purpose of improving the sustainability of the logistics and supply chain sustainability.

Keywords: *Aesthetic Perfection, Food losses, Sustainable Supply Chain, Circular Economy and Economic Losses.*

Introduction

It goes without saying that wastage in the area of food resources has turned out to be a major challenge in the sphere of sustainability which in turn has threatened global food systems. While food losses occur at various steps in the supply cycle which not only includes the production stage but also during processing and later transportation and final consumption, it often results in rejection and disposal of edible plants, vegetables and fruits because more often than not it fails to meet the specifications laid down by the retailers and final consumers.

A basic truth in the way consumers judge the quality of food which means whether it is fresh, uncontaminated and also not subjected to artificial ripening methods is simply by how it looks to the eye. This becomes a cause for food produced like fruits and vegetables with abnormal shapes, black spots and scars or even abnormal sizes to be discarded even though from a nutritional and health aspect they are perfectly good to consume. With the rise of malls the problem has steadily worsened as



the grocery kings have started setting down strict rules as to how the food must look to cater to the aesthetic viewpoint of the consumers.

Now rejection of food is not limited to the grocery malls but happens in the entire stretch of the food supply chain. It begins with the farmers, the main producers, who become the first victims as they may not be able to sell their produce once it is affected by natural spots or stains. Next in line are the shipping companies who end up paying extra to handle and dispose of the food deemed unusable by the customer. Finally it is the environment which takes the biggest hit as all the resources which includes water, energy and labour used to cultivate and harvest the food end up being wasted.

This paper aims to develop a conceptual framework which shows exactly how high appearance standards lead to food waste and supply problems. It also suggests alternative ways to sell or salvage this wasted food which includes recycling or sending it to varied markets which may help to overcome the challenges.

Research Objectives

The paper has the following objectives:-

1. To examine how consumers are the primary cause of food products which may be only slightly defective due to their demand for aesthetically perfect food.
2. To identify the supply chain mechanisms that promote high standards of food aesthetics
3. To analyse the environmental and economic consequences as a result of food rejections due to aesthetic defects
4. To develop a conceptual framework linking aesthetic standards to the food supply chain
5. To propose theoretical propositions that can help in empirical testing for the future.

Theoretical Foundations

1. Food aesthetics Bias theory – It is seen that consumers have an inclination to judge food products as acceptable and healthy on the basis of it being visually appealing. This perception of the food that pretty food is healthy food leads to a bias that pretty food is also nutritious which may not be the case. This bias ironically leads to a higher willingness to pay from the viewpoint of the customer even though a financial incentive is offered to help consumers pick the better option. (Hagen, 2020)
2. Principal – Agent Theory – This theory explains how food losses occur due to aesthetic defects as a result of misaligned incentives and information asymmetry. While retailers put their foot down in terms of aesthetics they have absolutely no idea of the suffering caused to the farmer due to their stand as farmers incur heavy financial liabilities as they are not able to sell their produce due to forced rejection of food which is perfectly edible and their only defect is that they were slightly out of shape.
3. Supply chain waste Theory delves into the systemic inefficiencies, improperly designed incentives and also market failures which drives the losses of edible foods. It differentiates waste into food loss which occurs upstream and food waste which occurs downstream. It has proceeded to propose frameworks like Food waste hierarchy to optimize the food recovery process. (Papargyropoulou et al., 2014)

Literature Review

A study done by Kechagias et al. (2024) proposes a practical framework which has three pillars of sustainability—environmental, economic, and social which in turn categorically assesses the food loss



across the entire food supply chain.(De Hooge et al., 2018) is of the opinion that there is no insight into the decision making process of the supply chain stakeholders who are responsible for assessing the aesthetical quality of the food products and the criteria applied to determine its suitability for the end consumer.Suher et al. (2021) studied that while imperfections in natural foods negatively influenced the consumers choice of selection , on the other hand they openly preferred the processed foods even though in some cases the imperfections were obvious as they believed that human care was applied during processing and hence it is preferable. The findings of Xiao et al 2023, has provided sufficient methods to the retailers to curtail rejection of aesthetically poor produce and it is quite cost effective. The paper has looked into the psychological aspect of the process. The paper has used the schema incongruity theory to explain the phenomenon. Irani and Sharif (2016) has in their paper concluded that the problems plaguing food security is reflecting in its genesis and is common to all countries, regions and communities. If any interventions to the food security crisis is called for then it can only be resolved by detecting the underlying factors which drives them in the first instance.Arowosegbe et al in their paper has revealed that reducing food wastage will be a boon not only for sustainability of environment but will also contribute to economic profits as the secret actually lies in optimizing the food supply chains and this can in fact lead to a reduction in cost savings as well as bring prosperity to the organization . The enhancement of economic resilience. As per Derqui et al. (2016) , they are of the opinion that most businesses rationalize the effects of food waste looking at economic criteria ignoring the social, ethical and environmental issues due to which visible food waste that can impact the bottom line is made negligible. It is through multi stakeholder collaboration only that a firm's profit can get a boost and hence the opportunities for mitigating the issue arise from increasing the visibility of food waste that goes into the dust bin as well as addressing the food waste on the plate. Another study done by Jill Dutton believes that educating the customers on the topic is the key to limit wastage. Emphasis is placed on education and storytelling across all channels where farmer partnerships, are highlighted to show that avoiding wastage of fruits and vegetables can actually support the farmer and in turn can reduce the cost for the customers.(In The Eye of the Beholder: How 'Ugly' Produce Is Reshaping the Food Waste Conversation, 2025) .XU (2020) states that by adopting high cosmetic standards, retailers can motivate farmers to exert greater effort in improving cosmetic quality, e.g., by using better seeds and applying more pesticides. As for the drivers of high cosmetic standards, we find an increase in customers' willingness-to-pay for aesthetically pleasing products induces the retailer to adopt a higher standard or a lower standard. The retailer is more likely to adopt a higher cosmetic standard when the unit price in the processing market increases. The impact of harvesting cost variability on optimal cosmetic standards is non-monotonic. As for food loss, we find that a higher cosmetic standard does not necessarily lead to a higher food loss. When the harvesting cost variability is small, it has limited impact on food loss; when the variability is medium, it lowers food loss; when the variability is large, it increases food loss. Crama et al. (2023) believes compared to a low cosmetic standard, food loss may not go up substantially due to a high standard and in fact on the other hand could lower food loss when the price premium is high and the relative difference between the rejection rates under both standards is low. As a result imposing a ban on aesthetic standards may not work out and could lead to a backfire and result in a high food loss.

Research Gaps

We have multiple studies pointing out that cosmetics specifications in food are a major source of food loss however there is a big deficit of empirical data to support this theory. There is insufficient data on the amount of foods which are getting wasted which can be solely attributed to cosmetic specifications alone and also scarce research work has been done on the food losses occurring at the upstream end as



a result of the cosmetic standards set by the retailer. The focus of this conceptual paper has been to address the above mentioned gaps by developing a theoretical framework which seeks to link the retailer set cosmetic specifications to supply chain outcomes and proceeds to propose testable propositions which can help in doing empirical research in the future.

Conceptual Framework

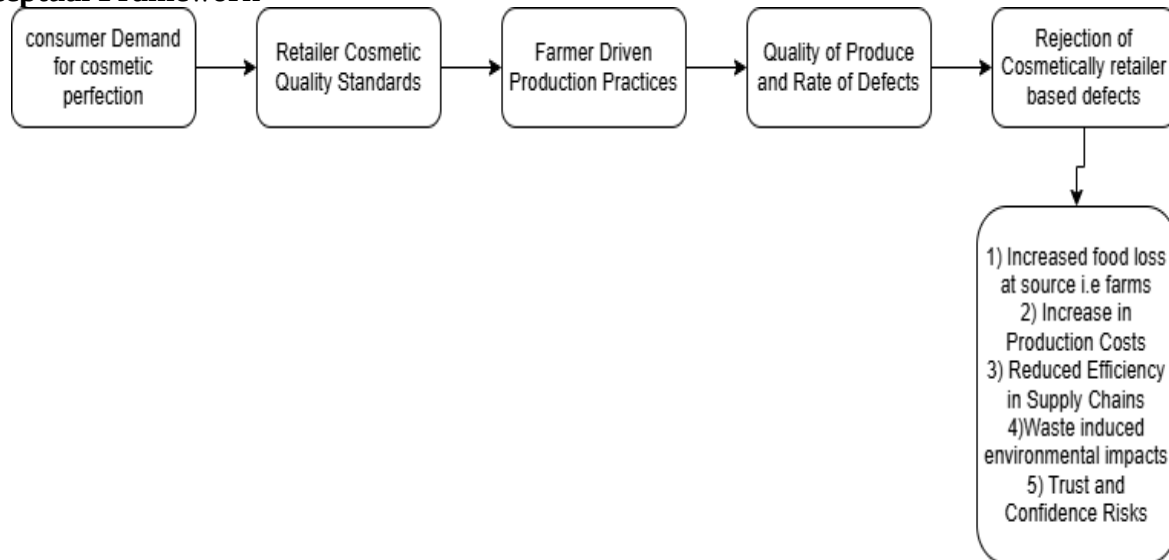


Fig 1. Conceptual Framework

Supply Chain Implications

1. Loss of food at source at the farms – The stringent standards thrust upon the farmers leads to tremendous losses at the source as farmers are forced to discard their produce just on visual inspections fearing non acceptance by the end consumers on the basis of aesthetics as per Akonstantinidou (2024).
2. Upward rise in the cost of final Production – Farmers are now forced to invest a significant amount in high quality seeds, treated water, fertilisers, pesticides, mechanized farm equipment and better packing to meet the aesthetic standard dictated by the customer. (Xu, 2020).
3. Adverse effects on the supply chain- the entire supply chain gets disturbed on account of rejections which directly leads to inefficiencies. These can be due to orders being cancelled, shelf lives getting reduced drastically and in the worst case scenario loss of image and trust in the supplier.
4. Waste induced Environmental Impacts- Great amounts of food loss can choke the environment and cause massive damages including carbon emissions due to burning of the waste, depletion of resources like water and fertilisers and then contamination of water due to dumping of waste and rotten produce in landfills. .Akonstantinidou (2024)
5. Perceived care Inference ;Suher et al,2020 observed that perception on the part of customers also contributed to the acceptance or rejection of the product. Generally it was found that unprocessed food had a greater chance of being rejected as the perception was that care was not taken much during the processing while processed goods which are tanned and canned are not much rejected due to the perception that quality standards may have been adhered to by the processor.



Research Propositions

P1: Consumer demand for cosmetic perfection positively influences retailer quality standards and produces rejection rates.

P2: Demand for better quality by consumers drives efforts by farmers to improve the quality of their resources to yield better produce.

P3: Higher the rejection rates of the final produce higher will be supply chain inefficiencies at all the stakeholder's levels.

P4: Alternative methods of the distribution channel need to be developed which in turn brings down the food waste but improves the utilisation efficiency of resources.

P5: Since rejection of food produce is purely on cosmetic grounds, customer awareness training can greatly bring down instances of food rejection.

Discussions

This paper through the conceptual model points out that irrational aesthetic perfectionism is not merely a consumer weakness but a structural driver of resource damage leading to disruptions in the food supply chains concerned with agricultural produce. It is noted that it is the retailers who have gained the power to dictate on cosmetic standards of the produce and thus have appropriated the position of the gatekeeper to restrict the flow of produce from the farmers which do not meet the specifications. This kind of rejection of goods on the basis of miniscule defects leads to massive economic losses, harm to the environment and finally issues of trust at both the local and international level.

On the other hand it is surprising to know that there are complex non linear dynamics coming into play which in turn shows that higher aesthetic standards do not always translate into higher food losses. Immense opportunities have also opened up in the streams of product design and also marketing strategies as a result of a finding that perception also plays a huge part in identifying the imperfections of the food produced.

Managerial Implications

1. Farmers – Adopt fail safe methods to meet customer standards by using cost efficient practices as well as reigning in the excessive use of toxic pesticides.
2. Retailers – They should consider bringing a slight relaxation in the cosmetic standards just bringing down rejections or open separate channels for slightly imperfect produce
3. Logistics & Supply Chain Providers – Logistics firms should develop redistribution networks which can be used to divert the imperfect produce to secondary markets, secondary processors or food banks catering to the underprivileged in the society.
4. Policymakers- Reform standards that reduce the current intense focus on aesthetics and provide incentives for organisations taking initiatives to implement food waste reduction.
5. Marketing- Take advantage of customer perceptions to develop a positive narrative for food with minor defects.

Conclusion

This conceptual paper has shown that the major critical control valve is the cosmetic standards. It is this mechanism that the retailers successfully translate into specifications that in turn influence the practices adopted by the farmers for maintaining the aesthetic standards. It also manages to control the cost of production as well as the quantity of food waste which ends up in the landfill upstream. The paper has smoothly integrated the Food aesthetics bias theory with the Principal – Agent theory and



Supply Chain waste theory which reveals that solutions cannot be always addressed with the help of technology without taking into consideration the aesthetic marketing norms and consumer awareness training methods.

Cosmetic rejections on a massive scale can and does create a moral contradiction as the losses at the farmers end seem unfair in the face of global food insecurity. Meaningful progress demands proper coordination across all the stakeholders like retailers creating parallel product lines or farmers going organic to reduce damages and marketing reshaping the narrative to boost customer confidence. Only through this approach of bringing together technological innovation with cultural change can the food supply chains move beyond the shackles of aesthetics to systems that promote food for its nutritional value and sustainability.

References

1. Hagen, L. (2020). Pretty Healthy food: How and when aesthetics enhance perceived healthiness.
2. Journal of Marketing, 85(2), 129–145. <https://doi.org/10.1177/0022242920944384>.
3. Change product standard requirements to reduce food waste - Action Library (EN). (n.d.). <https://www.theclimatedrive.org/action-library/change-product-standard-requirements-to-reduce-food-waste>.
4. Government of Flanders & Department of Agriculture and Fisheries. (2020). The Impact Of Cosmetic Quality Standards On Food Losses In The Flemish Fruit and Vegetable Sector.
5. www.vlaanderen.be/landbouw/studies. https://unece.org/DAM/trade/agr/FoodLossChallenge/2017_Study_Quality_standards_and_food_loss_Flanders_Belgium.pdf.
6. Insistence on cosmetically perfect fruits & vegetables | Open case studies. (n.d.).
7. <https://cases.open.ubc.ca/insistence-on-cosmetically-perfect-fruits-vegetables/>
8. Papargyropoulou, E., Lozano, R., Steinberger, J. K., Wright, N., &Ujang, Z. B. (2014). The food waste hierarchy as a framework for the management of food surplus and food waste.
9. Journal of Cleaner Production, 76, 106–115. <https://doi.org/10.1016/j.jclepro.2014.04.020>.
10. Kechagias, E. P., Gayialis, S. P., Panayiotou, N., & Papadopoulos, G. A. (2024). A Holistic Framework for Evaluating Food Loss and Waste Due to Marketing Standards across the Entire Food Supply Chain. *Foods*, 13(20), 3273. <https://doi.org/10.3390/foods13203273>.
11. De Hooge, I. E., Van Dulm, E., & Van Trijp, H. C. (2018). Cosmetic specifications in the food waste issue: Supply chain considerations and practices concerning suboptimal food products. *Journal of Cleaner Production*, 183, 698–709.
12. <https://doi.org/10.1016/j.jclepro.2018.02.132>.
13. Suher, J., Szocs, C., & Van Ittersum, K. (2021). When imperfect is preferred: the differential effect of aesthetic imperfections on choice of processed and unprocessed foods. *Journal of the Academy of Marketing Science*, 49(5), 903–924. <https://doi.org/10.1007/s11747-021-00783-1>.
14. Irani, Z., & Sharif, A. M. (2016). Sustainable food security futures. *Journal of Enterprise Information Management*, 29(2), 171–178. <https://doi.org/10.1108/jeim-12-2015-0117>.
15. Arowosegbe, O. B., Ballali, C., Kofi, K. R., Adeshina, M. K., Agbelusi, J., &Adeshina, M. A. (2024). Combating food waste in the agricultural supply chain: A systematic review of supply chain optimization strategies and their sustainability benefits. *World Journal of Advanced Research and Reviews*, 24(1), 122–140. <https://doi.org/10.30574/wjarr.2024.24.1.3023>.



16. Derqui, B., Fayos, T., & Fernandez, V. (2016). Towards a more sustainable food supply chain: opening up invisible waste in food service. *Sustainability*, 8(7), 693.
<https://doi.org/10.3390/su8070693>.
17. In the Eye of the Beholder: How 'Ugly' produce is reshaping the food waste conversation. (2025, September 24). *thepacker.com*. Retrieved June 15, 2026, from.
18. <https://www.thepacker.com/news/sustainability/eye-beholder-how-ugly-produce-reshaping-food-waste-conversation>.
19. Akonstantinidou. (2024, December 3). Rethinking cosmetic standards in the EU to combat food waste. ROSETTA. <https://rosetta-project.eu/rethinking-cosmetic-standards-in-the-eu-to-combat-food-waste/>.
20. XU, J. (2020, March). Too good to eat? Cosmetic standards and waste in the agricultural supply chain.
<https://ink.library.smu.edu.sg/>.
Retrieved June 15, 2026, from https://ink.library.smu.edu.sg/etd_coll/284/.