



MANAGEMENT PRACTICES OF FOOD WASTE BY MARKETS AND FAIRS ADMINISTERED BY LOCAL AUTHORITIES

Presented by:
Shameerah Khan DOMUN
Senior Health Inspector, Grand Port District Council





OUTLINE OF TOPICS

1. Introduction to food waste and food losses
2. Scope of the study
3. Methodology used during the course of the study
4. Findings & Discussions
5. Conclusion
6. Recommendations



INTRODUCTION

FOOD WASTE

Good quality food, fit for human consumption but which goes unconsumed and is discarded either before or after it is spoiled
(Lipinski *et al*, 2013)

FOOD LOSS

- Reduction in quality or quantity of a food
- It is the unintended outcome of processes and limitations from production to distribution whereby the food has incurred reduction in quality and has become unmarketable (FAO, 2015)

GENERATION OF FOOD WASTE

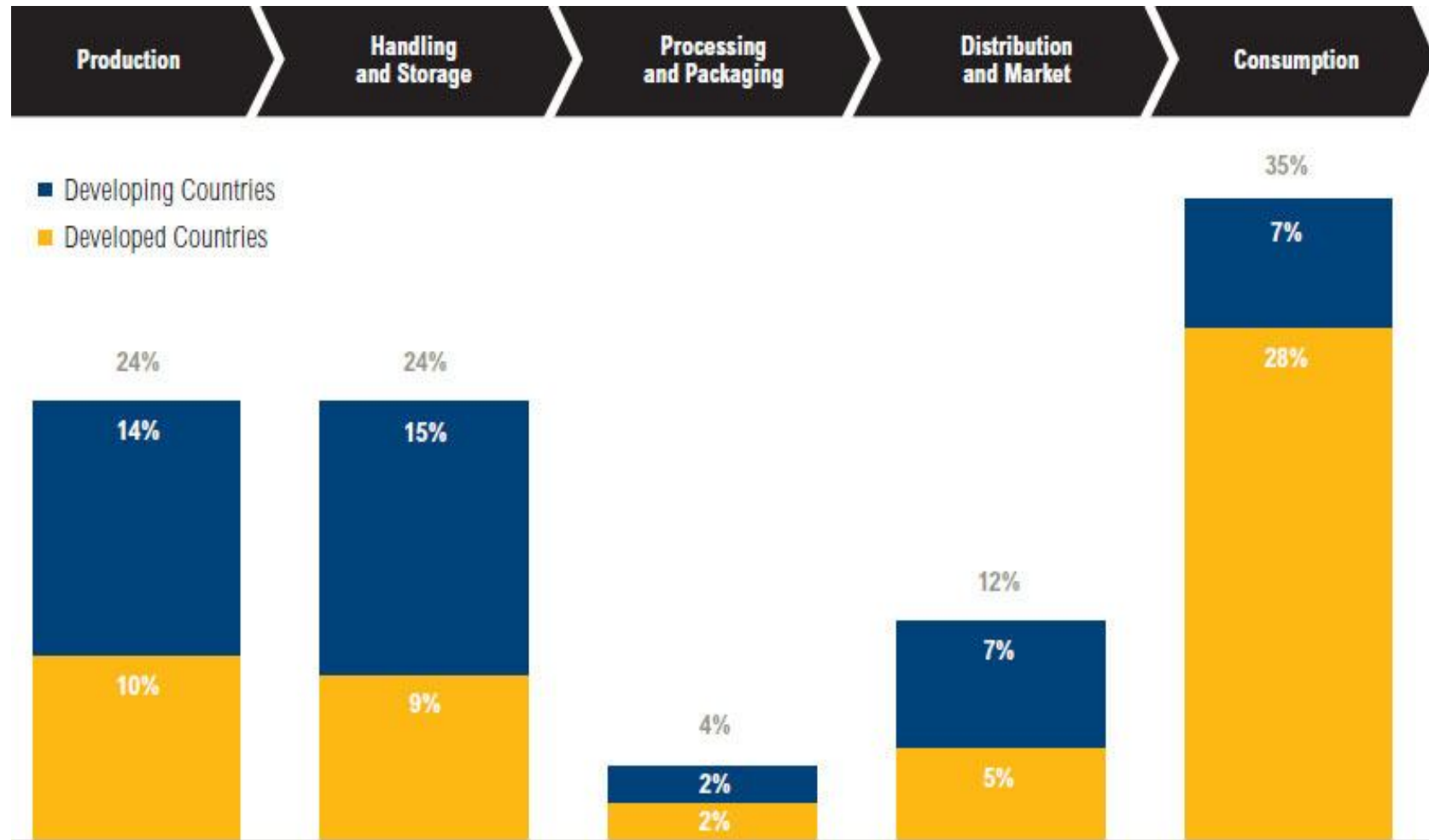


Figure 1: The total of food lost and wasted in the food value chain (100% = 1.5 quadrillion)

(WRI, 2013)



FOOD WASTAGE – A WORLDWIDE CONCERN

- 1/3 of the food produced for human consumption is lost or wasted along the food supply chain (1.3 billion tonnes yearly) (FAO, 2015)
- 870 millions people suffering from chronic hunger and 795 millions people are undernourished (FAO, 2016)
- Food losses and wastage represent a lost of resources and depletion of the environment in the production process
E.g.: Land, Water, Labour, Energy (FAO, 2016)



IMPACTS OF FOOD WASTE

a. Waste of resources such as land , water and energy

- Destruction of natural forests to provide additional land for the cultivation of crops (FAO, 2013)
- 70% of the global fresh water is used for irrigation and food production (Bloom, 2010)
- Using up fossil fuel unnecessarily during production, transportation and storage of food that goes uneaten (Bloom, 2010)

b. Food wastage leads to economic lost

Value associated with wasted and lost food is estimated to be around 1 trillion USD yearly at global level (FAO, 2015)

c. Contribute to climatic changes

- Food wastage is the third greatest source of greenhouse gas emitter in the world which leads to climate change (FAO 2011)
- The estimated carbon food print of unconsumed food is approximately 3.3 Gigatonnes of carbon dioxide (FAO 2013)



SCOPE OF STUDY

- Assess the management practices of food waste generated in markets and fairs administered by the Local Authorities
- Not limited to food wastes and losses that was meant for human consumption
- To some extent, the management of organic waste generated from parts of animals and plants which is not intended for human consumption like green waste or parts that cannot be consumed has been considered



METHODOLOGY



OBJECTIVES AND METHODOLOGY

No	Objectives	Approaches
I	Determination of the average amount of waste generated by markets and fairs	Key-Informants Approach
II	Identification and analysis of management practices of food waste generated at the level of Local Authorities	Key-Informants Approach & Observation
III	Identification and analysis management practices of food waste at the level of Food traders in the Markets and Fairs	Structured Interview
IV	Comparison of practices related to preservation of food, segregation of waste, promotional offers and frequency of waste collection between urban and rural areas	Structured Interview
V	Propose recommendations in connection with the management of food waste.	Secondary data Collection

DATA COLLECTION

Interview of Food Vendors

Simple Random Sampling

Structured Questionnaires

371 Food Vendors questioned from **43** **MARKETS & FAIRS**

Key-Informants Interview

Informal Conversation

Health Inspectors
Food Vendors
Refuse Collectors

32 Key-informants questioned

Tonnage Reading

Readings collected from officers in Local Authorities by phone

Readings collected for 2 weeks in winter & 2 weeks in Summer



DATA ANALYSIS

- Percentage was used to allow comparison of data as the sample size for the different food category were different
- Use of the following statistical tools:
 - a) Microsoft Excel Spreadsheet 2007
 - b) The Statistical Package – IBM SPSS STATISTICS 20
- The formulated hypotheses were tested at 1% significance level



FINDINGS & DISCUSSION



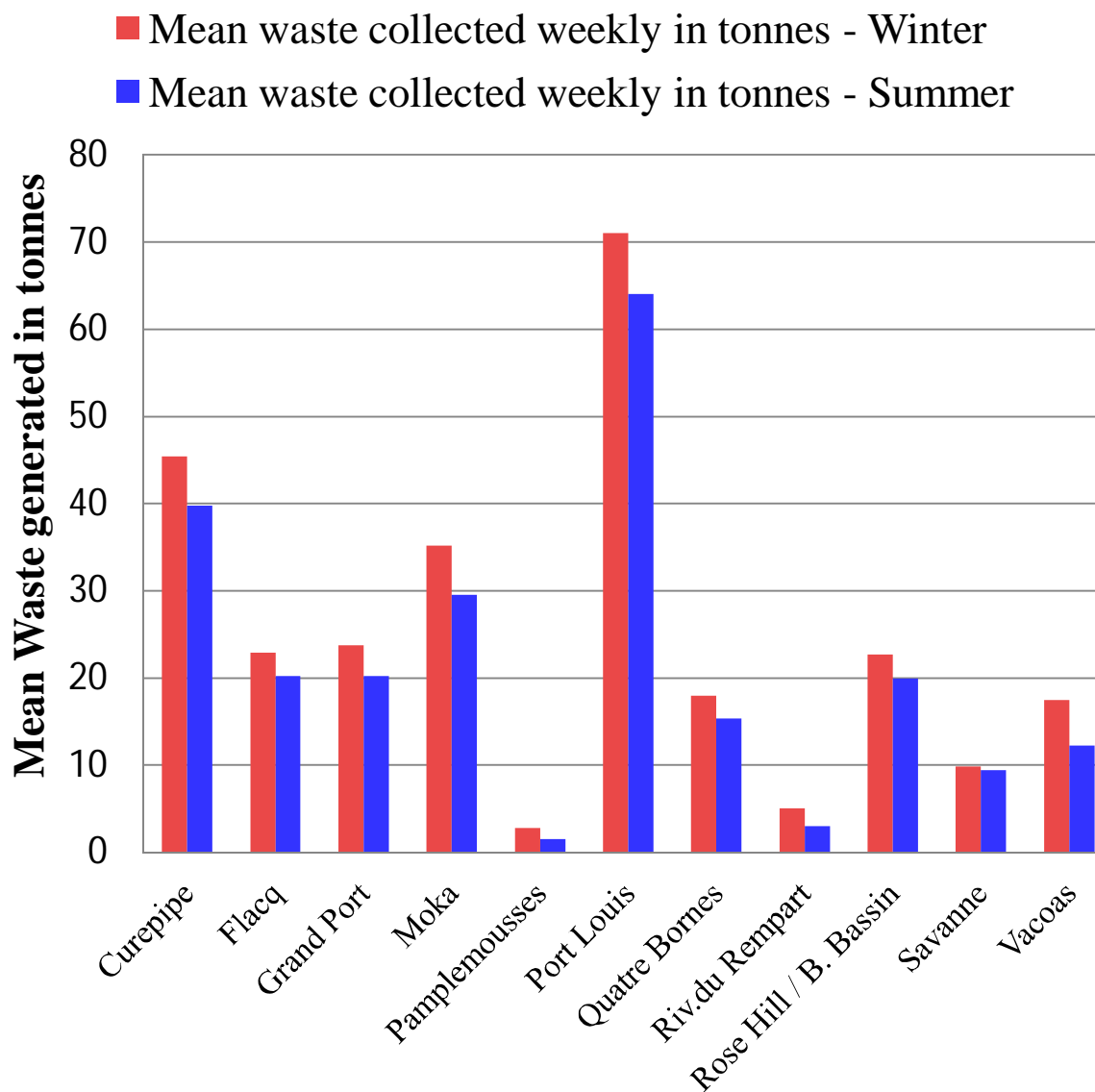
MEAN WASTE COLLECTED WEEKLY FROM MARKETS AND FAIRS

- Mean waste collected:

Summer: 21.39 ± 17.94
tonnes

Winter 24.93 ± 19.69
tonnes

- Statistically significant difference between the two periods (*p-value was less than a significance level of 0.01*)





WASTE GENERATION IN MARKETS & FAIRS

Main reasons food is discarded by food vendors:

- Off appearance /texture (36.4%)
- Off odours (63.3%)
- Deteriorated/spoiled (88.9%)
- 87.5% of cooked food vendors discard their surplus

Major components of the waste generated from Markets & fairs:

- Deteriorated food as a whole (58%)
- Only deteriorated parts (48.5%)
- Leaves & Green wastes (44.5%)
- Inedible parts (17.5%)

Overstocking of products on display causes food at the bottom of the pile to be more prone to bruises and physical damages (NRDC, 2012)

Desire to achieve cosmetic perfection (NRDC, 2012)

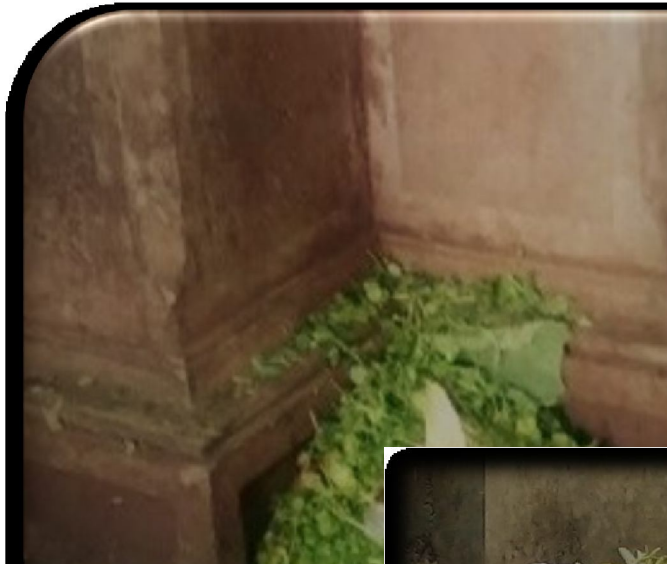
Making food available until closing time (NRDC, 2012)

FACTORS BEHIND WASTE GENERATION IN MARKETS AND FAIRS

Date marking issues (Food legislation in force does not provide for 'best before date' & 'use by date') (WRAP, 2011)

Poor infrastructures and inadequate storage facilities within market & fairs

Prevailing climate – high humidity and warm temperatures make food more prone to deterioration (WRI, 2013 and FAO, 2011)



PRECARIOUS DISPOSAL OF FOOD WASTE



DISPOSAL OF WASTE IN MARKETS & FAIRS

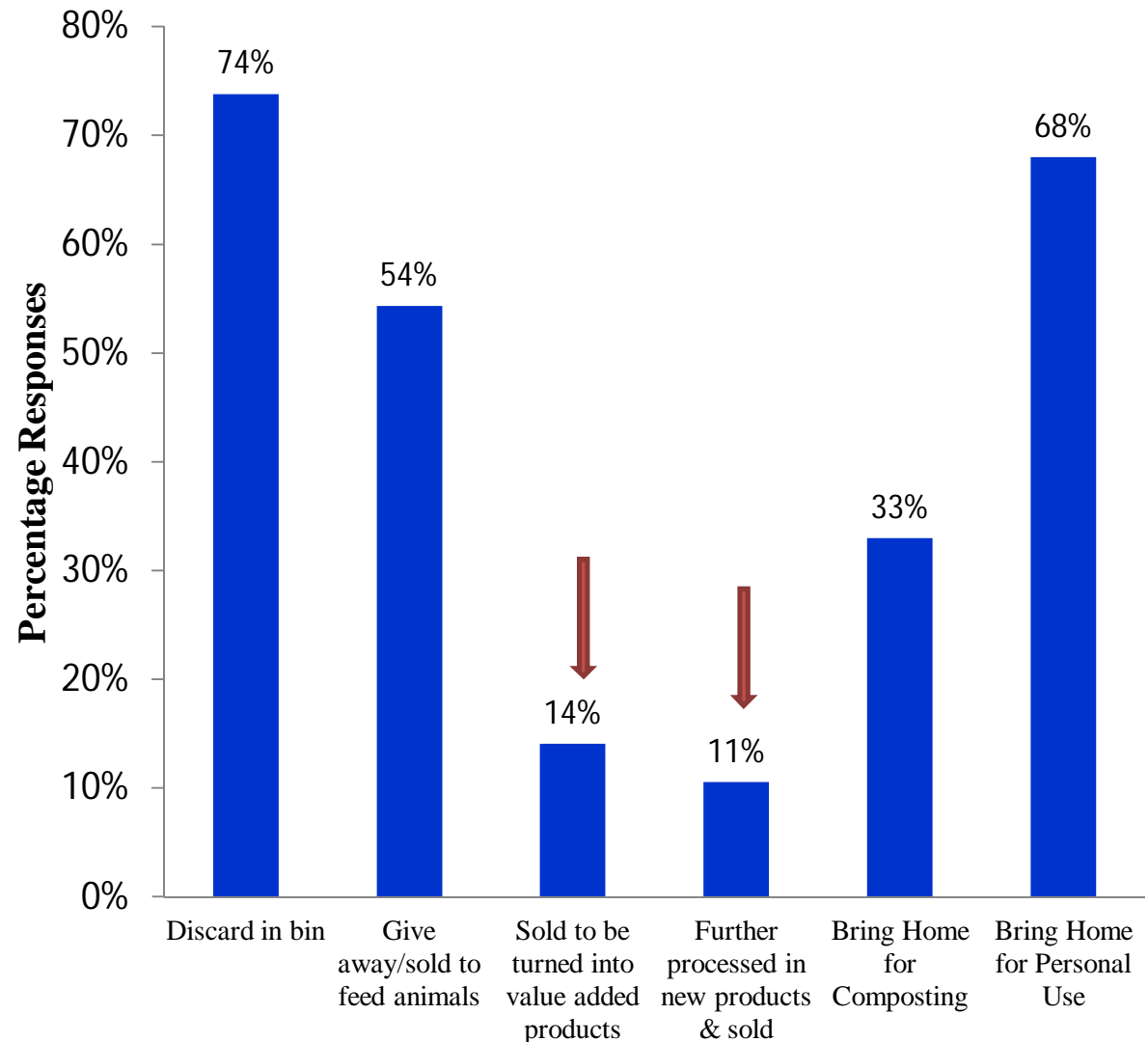
- 30% of the food vendors discarded their waste directly on the floor
- The improper disposal of waste can be attributed to absence or sparsely distributed common bins in market place and infrequent collection of waste from the food sections
- Most Food Vendors (79.8%) **do not** segregate their waste

REASONS:

- a) Unawareness of food vendors on ways to recycle or re-use the food waste generated (FAO, 2015)
- b) Inadequate facilities and space (FAO, 2011)
- c) No incentive from the Local Authorities to promote segregation

MANAGEMENT OF FOOD WASTE

The low response rate for value addition and further processing of unmarketable food could be linked to the fact that there is no mechanism in place to educate/train food vendors how these *'valueless'* products could be recovered and recycled into useful profit-making products (EC, 2015 and Rohm *et al.*, 2015)



Fate of blemished food that has lost market value

MANAGEMENT OF FOOD WASTE

II

Hypotheses & Statistically significant association Chi-Square Test	Explanation
Between region and observed frequency of waste removal from food section by Local Authorities <i>(p-value < 0.01)</i>	Higher frequency in urban areas could be linked to the higher flow of customers or more funding available to provide more frequent scavenging service
Between region and promotional offers on blemished or surplus of food <i>(p-value < 0.01)</i>	More promotional offers from rural areas as villagers are more tolerant and does not assess fitness for consumption only on physical attributes (Srivastava and Kumar, 2011)
No significant association between region and practices to extend shelf life of food <i>(p-value >0.01)</i>	Cold rooms are readily available and most of the households are equipped with a refrigerator whereby food can be stored if cold rooms are not accessible or cannot be afforded



CONCLUSION





CONCLUSION

- Above 95% of the waste generated from market and fairs are organic in nature
- The mean tonnage of waste from market and fairs was 254.78 ± 23.24 tonnes weekly
- No provision and mechanism in place at the level of Local Authorities to comply with section 59 and 60 of the Local Government Act 2011 – No management of Food Waste by Local Authorities
- Most Food Vendors found it easier to discard their waste or surpluses despite it was still fit for consumption instead of segregating, redistributing or further processing it into value added products.



RECOMMENDATIONS





RECOMMENDATIONS

- Improvement of **infrastructure** within markets and fairs so that food vendors can store and prolong the shelf life of food on site
- **Training** of food vendors to manage the food waste generated properly
- Educate consumers to change their mindset of looking for ‘perfect’ food as flawed produce are equally good and nutritious
- **Develop markets for rejected food** – E.g. ‘Pay as you feel’ concept or use of mobile application to provide a network for food recovery & use
- **Anaerobic digestion** of unavoidable organic waste to produce electricity



LIST OF REFERENCES

1. EC, 2015. *Sustainable, Safe and Nutritious - Food New products with high added-value* [online]. Available at: <http://www.icsu.org/publications/reports-and-reviews/review-of-targets-for-the-sustainable-development-goals-the-science-perspective-2015/SDG-Report.pdf> [Accessed: 19 July 2016].
2. FAO, 2011. *Global food losses and food waste – Extent, causes and prevention* [online]. Rome: FAO. Available from: <http://www.fao.org/docrep/014/mb060e/mb060e.pdf> [Accessed on 20 July 2016]
3. FAO, 2013. *Food Wastage Footprint. Impacts on Natural Resources – Summary Report* [Online]. Rome: FAO. Available from: <http://www.fao.org/docrep/018/i3347e/i3347e.pdf> [Accessed on 20 August 2016]
4. FAO, 2015 a. *Global Initiative on Food Loss and Waste Reduction* [online]. Rome: FAO. Available from: <http://www.fao.org/3/a-i4068e.pdf> [Accessed on 15 November 2016]
5. FAO, 2016. *Key facts on food loss and waste you should know!* [online] Available at: <http://www.fao.org/save-food/resources/keyfindings/en/> [Accessed 17 July 2016].
6. Lee, J., 2013. *Factors Affecting the Oxidative Stability of Foods-Interesterified Soybean Oil with High Intensity Ultrasound Treatment and Trona Mineral in Packaged Fresh Meats* [Online]. Thesis. Utah State University. Available from: <http://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=2965&context=etd> [Accessed on 05 February 2017]



LIST OF REFERENCES

7. [LIPINSKI, B.](#), [HANSON, C.](#), [WAITE, R.](#), [SEARCHINGER, T.](#), LOMAX, J. and KITINOJ, L., [2013] *Reducing food loss and waste* [online]. Washington DC 20002, World Resources Institute. Available at: https://www.wri.org/sites/default/files/reducing_food_loss_and_waste.pdf [Accessed: 17 July 2016].
8. NRDC, 2012. *Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill* [Online]. New York: NRDC, (IP: 12-06-B). Available at: <https://www.nrdc.org/sites/default/files/wasted-food-IP.pdf> [Accessed on 25 January 2017]
9. ROHM, H., BRENNAN, C., TURNER, C., GUNTER, E., CAMPBELL, G., HERNANDO, I., STRUCK, S. AND KONTUGIORGOS, V., 2015. Adding Value to Fruit Processing Waste: Innovative Ways to Incorporate Fibers from Berry Pomace in Baked and Extruded Cereal-based Foods—A SUSFOOD Project [Online]. *Foods*, 4, 690-697. Available at: <http://www.mdpi.com/2304-8158/4/4/690/htm> [Accessed on 10 January 2017]
10. UNDP, 2016. *Sustainable Development Goals* [online]. Available from: <http://www.undp.org/content/undp/en/home/sustainable-development-goals.html> [Accessed on 13 December 2016]



LIST OF REFERENCES

11. WRAP, 2011. *Consumer insight: date labels and storage guidance*. Wales:WRAP
12. WRI, 2013. *Reducing food loss and food waste* [online]. Washington DC 20002, World Resources Institute. Available at: https://www.wri.org/sites/default/files/reducing_food_loss_and_waste.pdf
[Accessed 15 June 2016]



Thank You...