Assessment of Organic Household Wastes Management System and its impact on the Improvement of Home Economics in Kandahar- Afghanistan

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Abstract

Household waste is the main source of air pollution and water contamination in Kandahar Afghanistan. Organic waste forms a high percentage and the main origin of organic waste is food residue, gardens and other compostable materials. This study aims to find the relationship between organic household waste management and home economics in Kandahar Afghanistan. Three districts and the center of Kandahar City have been selected for the study. Non-probability sampling methods specifically convenience sampling have been applied with a sample size of 200. Primary data has been collected via questionnaire and survey conducted by four trained fourth-year university students. This study found in household waste composition about 36% is organic waste and in Kandahar province 56.64% of wastes are organic waste. In average 9.8 kg organic waste is collected from every single house. Animal manure ranked as first source and vegetables second, among vegetables spinach has the most remnant. It showed that 44% of people eat 6-8times vegetable a week and 37% of people consume 3-5 times fruits a week. Promoting of biogas system is recommended as a possible solution way.

Key words: Biogas; Home economics; Kandahar City; Organic household waste.

1. Introduction

In view of growing environmental, economical, cultural and social challenges, wastes are the biggest problems for developing countries including Afghanistan. Waste production has increased significantly by developing countries and population during last decades (Suocheng et al., 2001). Waste is defined as different types of materials that are not useful and do not represent any economic value to the owners (Maria et al., 2011). Considering negative consequences of food waste which reported by FAO are classified as Environmental, economic and social such as: green house gases emissions, nutrient loss, inefficient farmland use and decreased food security cost about € 2.4 trillion globally in 2014 (Food and Agriculture Organization of the United Nations, 2014). Management and recycling of organic household waste has a vital role and influence on the enhancement of home economics. Each household is responsible to collect their waste and throw out them in bin. As waste management are global problem and recently many scholars conducted researches about waste management.

Liisa Elorinne- Anna and her colleague (2020) research result showed that education has consequential role in sustainable food waste. Ghorbani and his colleague (2017) revealed that the components of pricing economic motivation as well as education and socio-economic factors for decreasing of household waste production and

the results of their research showed that three variables including staying at home during the day, home type and family size explained 21% variations of demand for waste collecting services.

In addition Saeedi (2019) research indicates that in Kandahar City 26,4% of population are disposing their waste in open area, about 2% of people are burning their waste and almost 2,8% of residents are discharging their waste in drainages. A research finding expressed that people are not satisfied with current waste management services in Afghanistan (Mangal, 2023).

Considering of reviewed papers and their findings there has not been any specific study in Kandahar city regarding the impact of organic household waste on enhancement of home economics. This study explores the relationship between household waste and home economics. The study aims to investigate the effectiveness and long-term sustainable household waste management on Home Economics.

2. Methods and Study Site

Kandahar is one of the most historical cities and the most populated province after Kabul which has extremely warm and dry spring and summer. Kandahar province covers 250km^2 area of the country and the capital city of this province is in southern part of Afghanistan. This province is laid at 1005m above the mean sea level and is the second largest province (MRRD, 2006). This province is located in the south part of Afghanistan. Kandahar has 18 districts, among these districts three districts and center of Kandahar have been selected as study area.

2.1. Study Design

This study was conducted in the finite population and respondents were selected from center of Kandahar and three other districts. Residents of Daman district (n=50), Arghandab district (n=50), Dand district (n=50) and Kandahar City (n=50). Selection of these three districts as study site was due to the availability of primary data. Study is designed in the framework of a large study. Total sample is 200 (n=200). Non-probability sampling method especially convenience sampling was applied in this study. Regarding the current situation of Kandahar all respondents are students of Afghanistan National Agriculture Science and Technology University, so girls are not allowed to present at their classes all of the respondents are boys.

2.2. Data Collection

Data were collected through questionnaires and face-to-face interview by four trained individuals. The enumerators were trained in order to conduct well data collection and two days, workshop presented by researcher at Agricultural Economics and Extension faculty in ANASTU University. Through this workshop, the enumerators were trained in order to be familiar with the purpose of study, sampling techniques, primary data collection methods and tools of data collection.

Data on socio-demographic features, contain age, level of education, family size, economic situation and residence were collected by pre-designed questionnaire.

Questionnaires were focusing on organic waste specifically, wastes which were remained after utilization of vegetables and fruits. Majority of people in Kandahar city consume vegetables and fruits. Vegetable is a common diet in Kandahar out of three one will be vegetable and fruits are consumed as a part of their diet.

3. Results of the Study

In a final outcome of the study there are seven waste products which are included: overproduction; time on hand; transportation; processing itself; stock on hand; movement and making defective products. The elimination of this waste reduces the cost of production. The management of household waste management especially organic waste directly impact on improvement of home economics. This study shows households have to consume vegetables and fruits because mostly, due to their accessibility and availability in the markets. This study found that residents of Kandahar are adapted with utilization of vegetables. Vegetables are cheaper than other food products because of their seasonably characteristics people prefer to consume them. As much as green products consume the much organic waste increase in household level. Organic and compostable wastes give the possibility to household to design and build a biogas system in small level; the biogas system can cover the need of gases with houses, even though this can solve the shortage of fuel in the national level.

There are many types of wastes which are categorized by different characteristics. The main types are Organic waste, food, garden, wood for composting and other compostable waste, furniture, mattresses, soil,

miscellaneous combustible and non-combustible, sanitary, hazardous and other unspecified waste, paper, Glass, Dense plastic, card packaging and plastic films.

Table1. Composition of waste from households (Digest of Waste and Resources Statistics, 2015)

No	Category	Value (%)
1	Organic waste (food, garden, wood for composting and other compostable waste)	35.8
2	Furniture, mattresses, soil, miscellaneous combustible, and non-combustible, sanitary, hazardous and other unspecified waste	14.9
3	paper	14.0
4	Glass	6.8
5	Dense plastic	6.6
6	Card packaging	5.2
7	Plastic films	3.8
8	Wood	3.8
9	Metals	3.7
10	Textiles	2.9
11	**Electrical and electronic equipment waste**	**2.3**

Table1. Shows that the organic waste is ranked as the first value and makes around 36% of total wastes composition. Organic waste contains food residue, garden and other composting and compostable waste. The lowest value is taken by electrical and electronic equipment waste which is 2, 3 %.
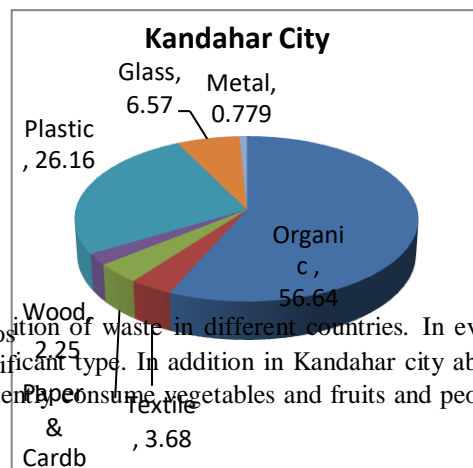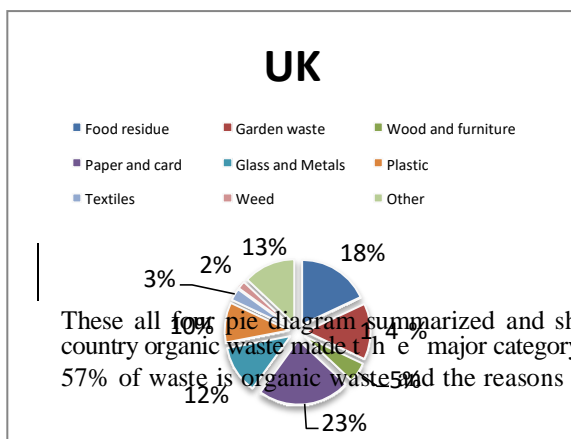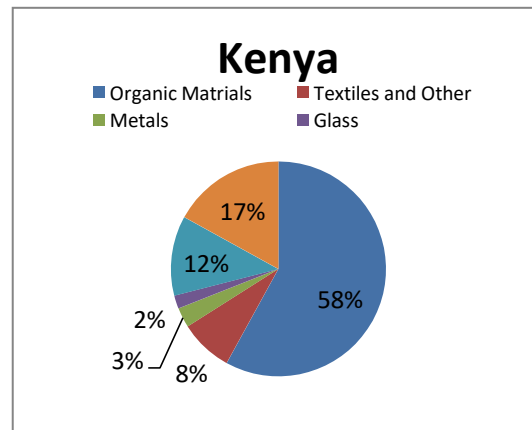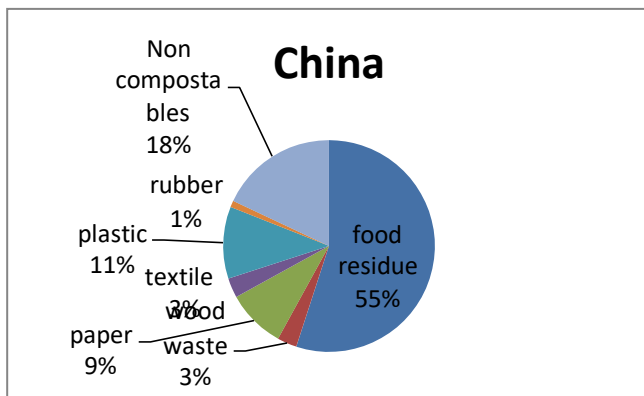
These all four pie diagram summarized and shown the composition of waste in different countries. In every country organic waste made the major category and is the significant type. In addition in Kandahar city about 57% of waste is organic waste and the reasons are people frequently consume vegetables and fruits and people

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at least have one cow in their houses. As much frequency of vegetables and fruits is high in diets rotation the much organic waste is produced (Rahmani, 2019; H.Jouhara et al, 2017).

Table 2. Waste production per day in household level.

No	Organic Waste produced per day /kg	Frequency	Percentage (%)
1	0-3	21	10,5
2	4-7	57	28,5
3	8-11	43	21,5
4	12-15	41	20,5
5	16-19	38	19
	Total	**200**	**100**

Waste production per day in household level is calculated and its average is 9, 8 kg per day. The highest percentage which is produced per day is 28, 5 % which is from 4-7 Kg waste per day. There are some houses among these 200 houses which discard 1, 5 kg per day, meanwhile there are some houses which produce 17, 5 kg per day.

Table3. Main sources of organic waste in Kandahar.

No	Items (Xi)	Frequency (Fi)	Percent %
1	Vegetables	56	28
2	Fruits	29	14,5
3	Animal manure	64	32
4	Food residue	28	14
5	Animal by products	23	11,5
	Total	**200**	**100**

Organic waste has many origins and sources, survey shows that organic waste contains many types; the significant source of organic waste is animal manure and in second rank vegetables is also mentionable.
Those families which keep animals in purpose of dairy, meat and work, their main source of organic waste is animal manure, otherwise vegetables and fruits are at the first rank.

Table4. Composition of waste based of its vegetable type resources.

No	Vegetables	Frequency / Fi	Percent %
1	Cauliflower	24	12
2	Cabbage	14	7
3	Leek	30	15
4	Spinach	32	16
5	Potato	26	13
6	Egg plant	16	8
7	Others	58	29
	Total	**200**	**100**

Table 4 shows that vegetables have a distinct role in organic waste. 32 respondents said that spinach has more than half remnant. Other vegetables vary season to season and included; Mint, squash, okra, green onion, coriander and green been which made 29

Table5. Frequency of vegetables utilization per week

No	Class	Frequency	Percent %
1	0-2	29	14,5

2	3-5	52	26,00
3	6-8	88	44,00
4	9-11	19	9,5
5	12>	12	6,00
Total		**200**	**100**

Table 5 shows that majority of the people are eating raw or cooked vegetables. It shows that 26% of the people are eating three to five times in a week and 44% of the people are eating 6-8 times a week which makes the highest percentage.

Table 6. Frequency of fruits utilization per week

No	Class	Frequency	Percent %
1	0-2	62	31
2	3-5	74	37
3	6-8	42	21
4	9-11	14	7
5	12>	8	4
Total		**200**	**100**

Beside vegetables, utilization of fruits is also usual in Kandahar. 37% of respondents said they eat 3-5 times fruits in a week. With utilization of fruits, production of waste is also increased. The type of fruits differs one season to another season. The most common are: watermelon, melon, pomegranate, peach and fig.

Table 7 Discarding methods of organic waste

No	Methods	Frequency	Percent %
1	Composting	4	2
2	Feeding animals	28	14
3	Burning	12	6
4	Using directly as Manure	65	32,5
5	Collecting by municipality	43	21,5
6	Discarding in open area	48	24
Total		**200**	**100**

Table7 shows people still do not compost their organic waste and most of the people directly use as manure. The waste which is left after consumption of fruits and vegetables feed to their animals. A significant part of waste is collected by municipality, but this is limited in center of province.

Table8. Family size in Kandahar

No	Family members	Frequency	Percent %
1	2-4	2	1
2	5-7	24	12
3	8-10	66	33
4	11-13	72	36
5	14-16	26	13
6	17>	10	5
Total		**200**	**100**

Table 8 shows that most families are large and 36% of respondents said that they are 11-13 people in their family. In average in every family member are 10.89. Family size has a direct effect on the amount of organic waste in household level.

As the findings of this study is analyzed by simple statistical indexes, these indexes contribute at least in three diet one of them is vegetable and there are inadequate marketing activity and services such as: cleaning, washing, grading and packaging regarding to fruits and vegetables there for almost half of vegetables and fruits remain as waste. As seasonal characteristics of fresh vegetables and fruits after a period of time they completely or partially decay and directly discard in bins. This research found that people never have been thought about recycling of the organic waste and by increasing of family size waste amount increase, too. A small part of respondents replied that they recycle their waste, but this recycling is not productive.

3.1. Discussion

Generally, this research found that number of family member has direct effect on amount of waste production and almost more than 50% percent of waste is organic waste in different countries. While in Kuala Lumpur city of Malaysia per capita household waste is about 0, 8-1, 3 Kg per day and 50% of household is organic waste (Bavani and Phon, 2009). Let's compare with Kandahar, as this research has shown mostly families are collective and number of people in family are more than Malaysia. In Kandahar majority families have 11-13 members in a single house and in average every family produce 9, 8 Kg waste per day, if the per capita calculates it will be 0, 8 Kg per day. In Kabul City approximately more than 70% of waste is organic mainly consist of food waste, paper and grass which are compostable (Ullah et al, 2022). But in Kandahar including these three sources of organic waste animal manure also shows its part. Both researches infer in both cites Kabul and Kandahar vegetables are main food of people. This study shown that 14% of respondents utilize organic waste (food residue, vegetables and fruits remnant in purpose of feeding their animals, hence in Kabul city those who are poor, unemployed, low skilled and marginalized have been collecting wastes and among 1992 worker 187 workers are engaged in collecting organic waste. It shows however in Kabul City livestock is not very common, but people collect organic waste (Azimi et al, 2020). The higher proportion of food waste was mainly attributed to the occurrence of huge quantities of cores of locally grown seasonal honey melons and water melons that were consumed in higher amount due to their cheaper availability (Ghaforzai and Sajid Ullah, 2023), the same vegetables consumption and fruits have seasonal reasons and cheaper prices in Kandahar, in addition low income families usually depend on vegetables. Comparing all related articles in Afghanistan and other counties, we reach in one result that organic waste has perceptible role in household and main sources of organic wastes are approximately same.

4. Conclusion

In aspect of economical, environmental and social concerns the air pollution and water contaminated are the serious challenges that developing countries have been facing with for many decades. Wastes are one of mentionable sources of this problem. Wastes not only accelerate the environmental problems but also influence on home economics, too. To control these concerns and empower home economics household waste management has vital value. In household level the composition of waste vary family to family, but generally in whole household and countries organic waste makes majority part of waste.

About 85% population of Afghanistan directly and indirectly are busy in agriculture sector and this sector makes their main source of income. As most people earn their needs from agriculture and economically they are in tough situation, there are some capacities which can help to ameliorate their lives. Regarding energy Afghanistan is not a self-sufficient country and every year import a significant amount of fuel and gas. The prices of energy are higher than any other international markets. First, every household is capable design and build a small biogas system in household level. There are three important benefits: 1- the needs of cooking gas have been supplied. 2- The wastes are managed well, and air pollution and water contaminated somehow can be controlled. 3- Almost every family is farmer and composted organic manure can be used for fertility of soil.

In conclusion, there is a positive relationship between home economics and household waste management system. As much waste's mange, compost and collect be better the more home economics improve.

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