

# **Evaluation Of Effects Of Sewage Farming Vegetables To Consumers And Their Awareness In Peri-Urban Areas: A Case Study Of Ruai, Nairobi County.**

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## **Abstract**

Food safety has become everybody's concern and it's difficult to find anyone who has not encountered an unpleasant moment of foodborne illnesses at least once. Food borne illnesses are a result of consumption of contaminated food with micro-organisms, pathogens, heavy metals and other toxic elements. Due to lack of land and water for farming in Nairobi most farmers utilize the land along the sewage which is usually owned by the government and do their farming with the sewage water. Most of the vegetables consumed in Nairobi is produced with sewage water and I wanted to know how the produce affects the consumers since the water contains heavy metals, pathogens and micro-organisms. Sewage vegetables are sold everywhere in the market and they take biggest share in the market. Those who produce using clean tap water are mostly not able to take their produce to the market since consumers come to buy the vegetables at the farm. I realized that vegetables produced using clean water was very few to satisfy the population and so most farmers sold to friends. I used a stratified random sampling technique, I used questionnaire and interview method to collect data from the consumers, I interviewed consumers both from their homes and in the market place since most people consume what they sell. I adopted statistical package for social sciences method for data analysis.

## **CHAPTER ONE**

### **1.0 INTRODUCTION**

#### **1.1 Background information**

Today the number of Africans living in cities is 40 percent of the total population and half of the world's population lives in cities and towns (Hania Zlotnik, 2008). Due to the large population in the urban areas people depend on urban and peri urban agriculture for food. Access to clean water for irrigating vegetables in the urban areas is a problem and hence they use waste water for production.

Globally ,urban farming is believed to produce roughly 20 percent of the world's food supply with half of this food being grown using waste water which includes; domestic and industrial effluent combined with domestic waste .It is widely perceived as the cause of stench and disease but it is not so for the urban farmers who produce with the waste water and sell it to the consumers (koigi, 2011).Some chemicals and microbial organism that bring food safety issues are found in the sewage water and hence grow with the plant and ends up being consumed by the consumer

There has been an increase in consumer awareness for food safety and hazard free products especially by the middle and high income consumers and also most of the educated consumers. Consumer awareness of food safety and nutrition helps reduce risks of food borne illnesses (R.Bhuvneswari, 2015). The emergence of diseases originated by food in the recent years has put food safety into question. At the same time, social economic developments have increased consumer interest in consuming safe food. There is an increase of consumer's interest in environment friendly products. The changing consumer's expectations combined with unfavorable health incidence have increased the importance of studies concerning food safety (Gamze Aydin eryilmaz, 2015).

The study was focusing on the on food products especially vegetables produced in urban and peri-urban areas using waste water and then sold to consumers in Nairobi. this study was evaluate the effects of sewage produce to the health of the consumer and also consumer awareness of the hazards of sewage produce.

## **Objectives**

### **Main objective**

To evaluate the effects of sewage farming produce to consumers and the health risks they experience.

### **Other objectives**

To determine the safety of vegetables grown in the urban and peri-urban areas.

To determine consumer awareness of the hazard of sewage produce and their perception towards it.

To determine the factors influencing consumer awareness of food safety.

To determine consumer willingness to pay for more safer vegetables

### **Operational definition of terms.**

Food safety- refers to limiting the presence of those hazards whether chronic or acute, that may make food injurious to the health of the consumer.

Urban and peri-urban agriculture-agriculture practices within and around cities which compete for resources (land, water, energy, labor) that could also serve other purposes to satisfy the requirements of the urban population (UN, 2015)

Waste/sewage water farming-this is the use of waste water for irrigating crops in agricultural land

#### **Limitation of the study**

I had limited time to collect my data and hence this affected the sample size because with more time I could have collected more data. It was complicated to convince consumers to feel the questionnaires and also it was very expensive travelling to ruai for data collection.

## **CHAPTER TWO : LITERATURE REVIEW**

### **Sewage farming in urban and peri-urban areas**

20 million hectares of the world's farms are irrigated with sewage in many fast growing megacities and in most countries a quarter of the vegetables produced are grown in sewage effluent, clean water is desperately short supply where sewage is plentiful. (Fred .p., 2004). According to Scott, sewage is most likely the biggest source of water for urban and peri-urban farming which provides an estimated one fifth of the world's food and almost 100 percent of crops grown in the cities rely on sewage water since there is no other source of water for farming farmers should be helped to do it in a better way since banning the practice is impracticable.

The crops grown in sewage farms are contaminated with pathogens and micro-organisms such as bacteria, viruses, parasites and chemical substances which cause very many diseases ranging from diarrhea to cancer (WHO , 2017). Other includes abdominal pain, vomiting and even death. There is an increasing number of bacteria that are multi-resistant against common antibiotics and cannot be treated by current therapies. Antibiotic resistance has led to the need for more expensive drugs, which many cannot afford, resulting in increased morbidity and mortality (Prof Laura .P., 2018).

Consumer level of awareness of food safety is affected by various factors such as gender, education level, household income (Gamze *et al.*, 2015). The high income and middle income consumer are willing to pay (WTP) higher premium for safe vegetables than the low income consumers who buy their vegetables in the wet markets (Ngigi *et al.*, 2011)

## **CHAPTER THREE**

### **METHODOLOGY**

#### **Study area**

The study was conducted in kasarani subcounty, nairobi county. It was focused on ruai and njiru ward since they ,ruai is a peri urban area and hence most farming takes place there since nairobi sewage company is located there and hence nairobi sewage river passes through this area.

#### **Data source**

Primary data which I collected by use of questionnaires which I administered to the consumers and interviewing the consumers

#### **Sampling technique**

I used stratified random sampling technique where by I administered questionnaires in each strata based on the size of the stratum I used zoning method to ensure that I capture consumers from different areas.

#### **Data analysis**

I used statistical package for social sciences(spss) to analyse the objectives of this study according to the data collected from consumers.

## **CHAPTER FOUR**

### **4.0 RESULTS**

#### **4.1 Health risks from sewage produce**

The main crop grown along the sewage in Ruai is vegetables mostly kales and other indigenous vegetables. A high percentage of consumers are affected by vegetables produced by sewage water. 77.4 percent said they experienced health risks after consuming vegetables produced with sewage water while 22.6 percent did not experience any health risk. This results shows that a significant amount of people are affected by sewage produce. According to the consumer and who have experienced the health risks, the instance at which you experience the health risks is different among consumers, some do not experience the effects immediately after consuming the vegetables, it takes some time and the health risk may be severe. To others they experience the health risks immediately after consumption such as diarrhea and stomach upset.

The low income consumer disagreed that the health risks were as a result of irrigation of the vegetables with sewage water since they were the main consumers of the vegetables and hence were trying to justify them.

health risk after consuming vegetables

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	24	77.4	77.4	77.4
no	7	22.6	22.6	100.0
Total	31	100.0	100.0	

#### 4.2 Consumer awareness of sewage farming and perceptions

are you aware of sewage water produce

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid no	8	25.8	25.8	25.8
yes	23	74.2	74.2	100.0
Total	31	100.0	100.0	

A high percentage of the consumers are aware of sewage water produce although most of them are not able to differentiate between the sewage water produce and the fresh water produce. Some said that sewage produce are more green than the fresh water produce and are more large and retain freshness more than the fresh water.

Consumer awareness is affected by other variables as shown in the table below

Variables		Percentage of consumer awareness	Out of
Level of education	Primary	100	100
	Secondary	83.3	100
	Tertiary	37.5	100
Occupation	Employed	66.7	100
	Unemployed	100	100
Financial status	Above kshs 20000	61.9	100
	Below kshs20000	100	100

There is a significant difference between consumer awareness of sewage produce and level of education, occupation and financial status. Consumer who are educated to primary level, and the unemployed and below 20000 are more aware of sewage water produce, this is because most of them live close to the sewage river and also interact much with each other for the unemployed and visit the farms.

#### 4.3 Perception and preference

The employed consumers and with tertiary education and financial status above 20000 considered the water used to grow vegetables and wash them in the market as an important factor to them and also agreed that consumer should be careful on the produce on the quality of vegetables they purchase. A large percentage of consumers preferred vegetables produced with fresh water but under a condition that they are affordable, I found out that despite the health risks with sewage produce the price of the produce in the market was a key factor to the consumers in the area.

#### 4.4 Willingness to pay for safer vegetables.

Crosstab

			household financial status		Total
			above 20000	below 20000	
the willingness to pay for an extra shilling for safer vegetables	0 shilling bundle	Count % within household financial status	1 <sub>a</sub> 4.8%	5 <sub>b</sub> 50.0%	6 19.4%
	less than 5 shilling bundle	Count % within household financial status	12 <sub>a</sub> 57.1%	4 <sub>a</sub> 40.0%	16 51.6%
	more than 16 shilling bundle	Count % within household financial status	8 <sub>a</sub> 38.1%	1 <sub>a</sub> 10.0%	9 29.0%
Total	Count % within household financial status	21 100.0%	10 100.0%	31 100.0%	

There is a significant difference in the household income in relation to willingness to pay for safer vegetables. Household with higher income are more willing to pay an extra shilling for safer vegetables.

## Conclusion

This study concludes that 77 percent of the consumers experience health risks after consuming sewage vegetables. It concludes that sewage water produce affects consumers' health. It also concludes that consumers' consumption decision is highly affected by the household financial status, occupation and level of education.

## Recommendation

Due to the scarcity of fresh water in Nairobi county, sewage water should be treated and released when clean , this is due to the pathogens and metals in the water. The government should also input policies to control farming along the sewage water because banning sewage farming is not possible. The government should also ensure that the sewage water should be disposed through pipe to avoid contamination of the fresh river water and ensure companies dispose their waste in an environment friendly way.

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