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Irine Cheronno and David Jakinda Otieno

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**Peri-urban food traders' preferences for open-air market design and management attributes in
Nairobi, Kenya**

Irine Cherono* and David Jakinda Otieno**

Department of Agricultural Economics, University of Nairobi

PO Box 29053 – 00625 Nairobi, Kenya

*presenting author: iryntoo@gmail.com, iryntoo@yahoo.com

**corresponding author: jakinda1@yahoo.com

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Abstract

Open-air markets are a popular market channel for most agri-food products in developing countries. In the peri-urban areas of Kenya, these are the most convenient sources of fresh fruits and vegetables for many households. However, the haphazard organization and management of these markets often results in insecurity and other economic losses. Yet, no empirical study has delved in the analysis of the extent of these challenges and remedial measures. In order to address this critical policy issue and advance knowledge in this area, the present study analyzed peri-urban food traders' preferences for the design and management attributes of open-air markets in Nairobi, Kenya. A total of 120 agri-food traders were randomly selected and interviewed from open-air markets. The results of a choice experiment survey showed that traders prefer the management of these markets through clearly structured county government procedures, allocation of market space on monthly rotational basis and restriction of space to each user. Further, the study observed that traders prefer comprehensive services provision based on competitive tendering processes. These findings call for reforms in the management and design of open-air markets in order to improve service delivery and security of all participants.

Key words: Open-air markets; design – and management – attributes; trader preferences; Kenya.

1. Introduction and Research Issue

Open air markets refer to gazetted market places with few or no permanent structures where buyers and sellers meet periodically and operate either on a daily basis or on a regular cycle (Mwithirwa, 2011). This type of market is often preferred because of its convenience, competitive prices and a variety of produce and plays a role in ensuring food availability and accessibility. Open-air markets are also instrumental in incubating new businesses, facilitating the expansion of existing business and promoting income earning opportunities (Tangires, 2003). Organization of open-air markets is diverse in different countries. In Hungary, stalls are acquired either through lease or succession and there are designated sections for both services and dealers selling household goods. The booths are arranged in a row along the market and traders selling the same kind of goods are close to each other (Czako and Sik, 1999). In Ethiopia, open-air markets operate in juridical space and have an organized system of sections that sell similar products most of which are agricultural. In addition, security is provided through organized police system (Helgerson, 2012).

In Kenya, open air markets are an important source of fresh fruits and vegetables for majority of households living in both rural and urban areas. The county governments are responsible for their management through taxes levied on traders. In Nairobi, open-air markets are managed by the county government who are responsible for space allocation to traders, maintenance of sanitation and hygiene in the market. Traders operating in these markets pay taxes to market attendants who then submit to the county government responsible for budgeting resources towards operational expenses including salaries, electricity, maintenance and occasional improvements in infrastructure. Services for agri-food waste collection in these markets are often out-sourced from the private sector and paid for by the county government. Cash inflows in most cases are not sufficient to cover operating expenses with little or no investment of these funds in market improvement. Other challenges facing these markets include lack of modernized storage facilities, inadequate space, poor access to piped water, poor sewer system, high rates of crime, inadequate sanitation facilities and environment degradation (Ogeya, 2014). Generally, poor design as result of non-consultation of traders in the design of open-air markets has led to market congestion, insecurity, inadequate space and sanitation, inadequate drainage and lack of modernized storage facilities. There is therefore an urgent need to consult traders on market design and management matters so as to enable smooth operations.

2. A Review of Knowledge Gaps

Previous studies have focused on challenges facing open air markets such as space utilization, and solid waste management. For instance, Amuko (2013) noted that weak or inadequate coordination framework was the main cause of inadequate trading space and poor sanitary facilities in Kawangware market in Nairobi. Further, there is often a huge rise in conflicts on space use in such markets due to uneven customer flow or distribution in the market. Ogeya (2014) also observed that encroachment of open-air markets by other illegal businesses including car parking and car wash. Muthoka (2006) noted that contracting of private sector entities in solid waste management could be an option but is often riddled with corruption and nepotism. These studies on open-air markets offer insights on various issues. However, none of them has focused on the traders' preferences when designing the markets hence this is the gap in literature. Understanding traders' preference for attributes necessary for the design and management of open-air markets will help the county governments in developing interventions to address market inefficiencies, reduce insecurity and congestion.

3. Methodology

3.1 Choice Experiment Design

The study applied a choice experiment (CE) design approach (Adamowicz *et al.*, 1998). The design and management of open-air markets is conceptualized to entail two sets of features/attributes; compulsory and voluntary attributes. Compulsory features are mandatory requirements/ground rules that ensure compliance with the rules, rights and freedoms envisioned in the Constitution of any country. In project and programme design, compulsory features are the regulations that must be adhered to in order to ensure one traders' participation in and use of market space and facilities does not harm or exclude other individuals. These are: all those who are interested in selling in the market must register and provide a certificate of good conduct; each trader should not be allocated a stall/market space more than twice a year; an individual cannot hold more than one stall in different markets at the same time; each commodity will have a designated area for sale to prevent mixture of food, clothes and shoes; selling in non-designated areas is prohibitive and would be penalized through a fine.

In addition to the compulsory attributes, a second set of features (the voluntary ones) were included. These are attributes that allow traders flexibility to choose levels that they prefer. Four optional attributes and their possible levels were identified through a comprehensive review of existing literature and were validated by key informant discussions with trader representatives. The voluntary attributes agreed on are

(Table 1): management of open-air market; amount of space/size of stall; duration of operation before a rotation/period of using of allocated space by one trader and; price to be paid per term.

Table 1: Open-air market design and management attributes

Attributes	Possible levels
Who should manage the open-air market	County government
	Traders' association
	Private company
Size of market space per trader (in square metres)	Small: 3*3
	Medium: 5*5
	Large: 8*6
Duration or period of using the space per term	One week
	One month
Daily charges for use of the allocated market space (price) in Kshs	200
	350
	500

Note: Kshs 95 was equivalent to 1 USD\$ at the time of the survey.

Management committee will be involved in doing procurement and providing services such as sanitation, refrigeration and storage facilities, monitoring adherence to use of space and providing fair mechanisms for dispute resolution. Following statistical design guidelines of ChoiceMetrics (2009), various scenarios/options of well-designed markets were formed from the attributes shown in Table 1 above. An example of the open-air market scenarios is given in Table 2.

Table 2: Illustration of open-air market design Alternatives

Attribute	Market design A	Market design B	Neither A nor B
Management	County government	Traders Association	
Space (square metres)	Five by five	Three by three	
Frequency(weekly/monthly)	Weekly	Monthly	
Price	200	350	
Which one would you prefer?			

3.2 Sampling, Data Collection and Analysis

A random sample of 120 agri-food traders were interviewed in four main open-air markets in Nairobi; Kangemi, Kariokor, Kawangware and Muthurwa. Each respondent was shown one of the six profiles comprising two open-air market options (market design A or B) and were asked which alternative they preferred. In each CE question, a neither option was included to allow flexibility to opt out in case alternative A and B didn't capture respondents' preference range. During the interview, respondents were asked to consider and compare all attributes in the options provided before they make a choice. The CE data was analyzed using the standard multinomial logit (MNL) model (Greene, 2007).

4. Results and Discussion

4.1 Characterization of traders in open-air markets

The socio-economic characteristics of traders in open-air markets are shown below in Table 3 below. Slightly more than half of the traders interviewed were female and had an average of 7 years experience in horticultural products marketing; mainly fruits, tomatoes, vegetables and onions. Although most open-air markets are characterized by unwarranted disposal of wastes in non-designated areas and extreme filth arising from poor drainage systems, only slightly less than a third of the traders considered poor sanitation as a problem. This observation is not surprising because some of the traders evade payment of market cleaning charges and opt to dump wastes in non-designated areas. The major value addition, which is done by traders is packaging. About two thirds of the traders belong to a development group and a third of the development groups offer savings. The mean number of years for formal schooling completed is 11. Half of the respondents have average monthly income above Kshs 20, 000. This is within the general income range observed for small-scale traders in the country.

Table 3: Descriptive statistics for variables

Variable	Distribution (n = 120)
Percentage of traders selling horticultural products	57.5
Average years of operation in the open-air market	7 (4.6)
Do you consider poor market sanitation to be a problem (% of traders)	26.7
Do you package the products that you sell (% of traders)	38.3
Membership to development groups (% of traders)	64.2
Membership to a savings scheme (% of traders)	29.2
Average number of years of formal education completed	11 (3.3)
Monthly income level above Kshs 20,000 (% of traders)	50.0
Average age of respondent in years	33 (7.7)
Percentage of female respondents	56.7

*standard deviations for continuous variables are shown in parentheses.

4.2 Assessment of traders' preference in the design of the open-air markets

The results on traders' preferences for the design of open-air markets are shown in Table 4. Four of the six attributes included in the model are statistically significant at the 10% level; management by county government, medium space, monthly payment of market and price. Generally, traders prefer management of the markets to be done by county government rather than management by traders' associations. This could be attributed to the fact that traders fear uncertainty and that they trust the county government in improving efficiency in the market place. Also, with the rising insecurity in the country due to illegal gangs and cartels, traders believe that the government-affiliated institutions are better placed to provide enough security than private entities.

The results also revealed that traders prefer medium space size as opposed to small space size. The preference for medium space size could be attributed to the fact that traders prefer a space size that can accommodate more of their produce so as to prevent encroachment of circulation paths due to limited space. This could help to reduce congestion in the markets. The results further showed that traders prefer rotation on monthly basis as opposed to weekly basis. This could be attributed to the fact that traders prefer a longer time period so as to sell most of their commodities before the time of rotation elapses. The negative sign of the price coefficient is consistent with demand theory, which postulates that rational consumers would generally be willing to pay less for more of a good or service. Further, the statistical significance of price permits computation of the willingness to pay (WTP) measures reported in Table 5.

Table 4: Multinomial logit estimates for market design and management attributes

Variable	Coefficient	Standard error	p-value
Management by county government	0.827**	0.298	0.0054
Management by traders' associations	0.442	0.294	0.1334
Small market space	2.183*	1.084	0.0439
Medium market space	1.070	0.691	0.1215
Rotation on monthly basis	1.337***	0.337	0.0001
Price per term (Kshs)	-0.004**	0.002	0.0560

Note: statistical significance levels: ***1%; **5%; *10%.

Table 5 below shows traders' WTP for various market designs attributes. The WTP values show that traders were willing to pay positive premiums for most of the attributes used in choice analysis except management by traders' association. The results showed that the traders were willing to pay Kshs 214 to ensure management by county government as opposed to private company, Kshs 277 for allocation of medium space size, KShs 347 for allocation of space on a monthly basis. The preference for management by county government over traders' associations could be attributed to the fact that traders fear uncertainty if a private company is employed by government to manage the market. Another factor could be the rising insecurity in the country hence traders trust that the government will be able to deploy more security personnel to guard the market. Traders showed a significant WTP for medium space as compared to small and large space. This is because traders' aim is to make profit hence they are willing to pay less for a just moderate space. Traders also have a positive preference for allocation of space on a monthly basis than weekly allocations to enable them sell all their merchandise before duration of use of market space lapses.

Table 5: Marginal WTP values for market design and management attributes

Variable	Coefficient	Standard error	p-value
Management by county government	214.41	116.87	0.0666
Management by traders' associations	114.56	111.67	0.3050
Small market space	565.94	357.52	0.1134
Medium market space	277.44	158.36	0.0798
Rotation on monthly basis	346.69	146.50	0.0180

Note: statistical significance levels: **5%; *10%.

5. Conclusions and Policy Recommendations

This study assessed agri-food traders' preferences for the design and management attributes of open-air markets in peri-urban areas of Nairobi city, Kenya. The findings showed that despite the numerous challenges experienced by traders in these markets, they are putting effort in adding value to agri-food products through packaging. Arising from fear of frequent harassment by illegal gangs, traders prefer management of the markets by county government officials rather than trader associations. This calls for proper re-organization of the county government market boards to ensure the membership reflects genuine traders without infiltration by gangs and other vested interests that have previously been a major cause of insecurity. The preference for medium space that is allocated on a monthly rotational basis points to the urgent need for responsible management entities to map all market spaces, register all users and create a reliable space-time allocation schedule. This will ensure all agri-food traders have a fair chance of accessing and using available market spaces to trade. This would ultimately allow realization of the equity principle envisioned in the Bill of rights chapter of the country's constitution by eradicating discrimination of market space users. The implementation of these measures should be preceded with some awareness creation on the responsibilities of each trader so as to reduce conflicts and improper waste disposal that have been key problems in unregulated public amenities. This study assessed traders' preferences. Considering the multi-stakeholder nature of market operations, a more inclusive analysis of the opinions and potential resource contributions from other interested stakeholders in such markets would provide more insights on the design and management of the open-air markets in both peri-urban and rural areas of developing countries.

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