



## Research article

# Assessment of local stakeholders' preferences for foreign land lease design attributes in Kenya: A participatory choice-based survey approach

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## ABSTRACT

Global land acquisition and lease investments in developing countries by foreign companies have elicited a lot of controversy and interest in recent literature. Well-structured foreign land leases and investments might offer development benefits to the host countries including opportunities for employment, provision of capital for improvement of infrastructure and stabilization of food prices. However, most foreign land lease deals in Africa are often characterized by secret negotiations and lack of local stakeholder consultations. Consequently, the land deals often result in displacement of land owners and loss of their customary land rights such as grazing and fuel wood access rights. The situation is exacerbated by relatively low monetary compensation offered to the land owners by the foreign investors. In recent years, numerous protests by the excluded stakeholders have resulted to considerable loss of investments and disruption of livelihoods. Against this backdrop, the present study analyzed local community members' preferences for foreign land lease design attributes in coastal Kenya using choice experiment survey data from a random sample of 200 respondents. Results showed that respondents prefer varying payment levels in order to allow design of leases that incorporate the following attributes: short lease duration (up to 15 years); renewable leases after joint negotiations and; provision of formal employment to land owners' household members. These insights should be incorporated in the design of foreign land leases to promote harmony between land owners and leasers.

## 1. Introduction

Large-scale land leases are emerging as key components in the transformation of land acquisitions and use in developing countries. Land leasing is a form of tenancy arrangement whereby a landowner allows a tenant to use land under agreed upon terms without selling the land (FAO, 2004). There is considerable published literature on land leases in general (see for example, Fukunaga and Huffman, 2009; Pender and Fafchamps, 2005; Yoder et al., 2008) and other research documents (for instance, FIAN, 2010; Nunow, 2011; United Nations, 2010; Von Braun and Meinzen-Dick, 2009) on foreign agricultural leases in developing countries, especially in Africa. Further, a few recent studies (such as Cotula and Vermeulen, 2009; Vermeulen and Cotula, 2010; Nolte et al., 2016) have assessed the institutional administration of foreign land leases. However, there is lack of empirical insights on local community's preferences and acceptability of the leases. Although Smalley and Corbera (2012) assessed land deals in Tana Delta area in Kenya, their study was largely based on stakeholder organizations (mostly non-natives) working in the area rather than local residents and land owners.

Further, their research focused on documenting the processes used to arrive at the deals, but did not delve into pertinent issues that local stakeholders would prefer in the lease design framework. Duvail et al. (2012) also showed how such foreign land acquisitions are a new form of land grabbing in which established user-rights and public interest are disregarded by powerful actors. The present study contributes to the literature by investigating what the local communities (mainly farmers) in the area would want to be incorporated in the design of foreign leases in Kenya. Insights from such an analysis would help to minimize conflicts in future leases, considering that land is an important production input in most agriculture-dependent developing countries. Moreover, in the case of Tana Delta region of Kenya, land is an important investment base for farming, mineral extraction and oil exploration among other uses. Therefore, effective involvement of local communities in decision-making on the leases is important to safeguard their interests and assure them of sustainable livelihoods (Juma, 2011; Nolte et al., 2016).

Most foreign agricultural land leases are undertaken by food-importing countries that have scarce land and water supplies, but are

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relatively endowed with mineral resources and oil (Cotula et al., 2011; Lay and Nolte, 2018). Leasing of foreign land for food production is partly a response to shortages often caused by unpredictable global policies and food markets, for example agrifood export restrictions by some major food producers (Von Braun and Meinzen-Dick, 2009). Moreover, frequent oil crises and the need for sustainable energy sources (e.g., biofuels) are important drivers of foreign land leasing. In addition, some investors' preferences for foreign agricultural leases might be motivated by the view that such deals are relatively less prone to global economic shocks; and hence they would offer relatively better returns than other alternatives, including financial stock markets (Friis and Reenberg, 2010). Documented evidence shows that a decade ago, worldwide investors had expressed interest in about 47 million hectares of land in the developing world (Deininger et al., 2011). Recent statistics show that the size of land already acquired in Kenya is 478,103ha through 55 deals compared to 486,124ha in 21 deals in Zimbabwe, 735, 859ha in 77 deals in Tanzania, 1,348,052ha in 32 deals in Madagascar and 3,028,781ha in 140 deals in Mozambique (Land Matrix, 2019).

Foreign leases and investments might offer some development benefits to the host countries including opportunities for employment; provision of capital for improvement of infrastructure including roads, health and education facilities; and enhanced supply and stabilization of food prices. Moreover, as noted by Juma (2011) foreign land deals could offer the much-needed foreign direct investments (including technology and finance) in developing countries, if such deals are well-structured to benefit local people. Nolte et al. (2016) also observed that pathways for co-existence are possible in cases where communities retain land rights or access new market niches. However, most lease deals are usually characterized by lack of local stakeholder consultations. In a few countries such as in Mozambique and Tanzania where some form of local stakeholder consultations might be existent, these are usually confined to politically-connected village elders and elites, while excluding key social groups such as women and other land users. Moreover, community-level meetings on land matters are often dominated by local political leaders who promote the investor's objectives, for their personal gains at the expense of wider community interests (Salomao and Nhandumbo, 2009; Sulle and Nelson, 2009). Friis and Nielsen (2016) noted that Chinese investors used local middlemen to circumvent formal structures in negotiations, change land use without consulting local communities and caused massive environmental destruction in Laos.

In Africa, Vermeulen and Cotula (2010) observed that most foreign land leases are usually obtained through government allocations, without consideration of customary land tenure systems. Further, some lease deals are premised on the assumption that land is abundant or under-utilized in the host country, yet those lands have original inhabitants, including shifting cultivators (Cotula et al., 2009) and indigenous pastoral communities whose cultural values and priorities on land use ought to be respected. Consequently, the land deals often result to displacement of landowners and loss of their customary land rights (e.g., grazing and fuel wood access rights), loss of access to and right to protect environmental biodiversity such as medicinal plants, and disruption of livelihoods. Moreover, the monetary compensation offered for land is usually inadequate and, the investors provide limited local employment, mostly on short-term basis (Vermeulen and Cotula, 2010).

Generally, there is growing fear that the leases might be a conduit for joint land grabbing by the elite leaders and the foreign investors. Local communities in some countries (including Madagascar, Mozambique and Philippines) have protested in the recent past against their exclusion from foreign land lease negotiations and inadequate benefits (Von Braun and Meinzen-Dick, 2009). As such, Cotula and Vermeulen (2009, p. 1245) note that '...there is a need for vigorous public debate and government responsiveness to public concerns ...' in the host countries. Moreover, there is need for transparent and inclusive lease negotiations. Wisborg (2013, p.1215) argues for a human rights-based approach to land lease negotiations, which safeguards local people's rights to consultation, democratic participation and transparency in information

sharing as well as protection of their communal rights to use natural resources such as firewood, wild foods and water on the land. Jayne et al. (2014) noted that the expansion of large-scale land deals is likely to escalate localized land scarcity, restrict potential growth of smallholder agricultural development and increase pressure on the non-farm economy to absorb labour-force.

There are various foreign agricultural land lease investments in Kenya, including *jatropha* bio-fuel production by a Canadian Company, Bedford Biofuels (a 45-year lease agreement on 65,000 ha), oil seed production by a British Company, and horticulture production by a Qatar Company on 40,000 ha (all the three situated in Tana Delta region at the Coastal area of Kenya) and a recently terminated rice production project by an American Company (Dominion Group) in Yala wetland area in Western Kenya. Besides foreign investors, there are a few large local lease arrangements in the Tana Delta region; about twelve years ago, Mumias Sugar Company was granted a license by the government to convert a wetland area in the delta into sugarcane production and generation of eco-friendly biofuels. Also, the government has issued tenure rights and ownership of about 40,000 ha of land to a state corporation – the Tana River Development Authority (TARDA) to grow rice and maize. Further, various multinational companies have expressed interest to acquire huge amounts of land for various investment undertakings in the Tana Delta area. These include: Mat International Sugar Company's interest to acquire close to 30,000 ha in Tana Delta and a further 90,000 ha from adjacent counties and; Tiomin Kenya Limited company's interests in large size of land for extraction of titanium from the sand dunes of Tana Delta.

Starting from these considerations, the aim of the present study was to analyze local stakeholders' preferences for the foreign land leases in a case study in the coastal region of Kenya (Tana Delta area). In the recent past, local communities in this area held recurrent protests on account of loss of ancestral land rights, disruption of their livelihoods, inadequate compensation for land and poor working conditions on the leased farms. The most notable protests against land leases in the Tana Delta include those against planned investments by Bedford Biofuels Company and Mumias Sugar Company. While the current leases remain contentious, the investors in the site have plans for future extension of the leases. However, there is no clear policy framework to streamline foreign land deals; suffice to mention that, even recent land policy documents (e.g., Republic of Kenya, 2009, 2017) do not provide any guideline on foreign land lease negotiations and management. Indeed, although article 65 of Kenya's constitution (Republic of Kenya, 2010) restricts non-citizens' ownership of land on leasehold basis to a term not exceeding 99 years, foreign investors may exploit the loophole in section 9 of the Land Control Act of 2012 to acquire land indirectly by owning shares in public companies that own land (Republic of Kenya, 2012; Chapter 302, section 9 part 1c).

Further, the issue of local stakeholder participation in the management of foreign-held land leases is completely missing from the current national land reform agenda, which only focuses on acquisition, registration, use and tenure rights associated with land leases (Otieno, 2014). Moreover, legal loopholes, lack of political will to apply the law and overlapping claims on community land by national and county government authorities put the security of community lands at risk (Wily, 2018). In order to minimize potential conflicts on future leases, the present study investigated what local households would want to be incorporated in the design of such leases. The study offers insights that would inform the design of land lease policy aimed at providing a framework to guide negotiations and use of land by foreign investors.

## 2. Methodology

### 2.1. Study area

In Kenya, less than 20% of land is arable and agriculture which contributes 28% of the national gross domestic product is the main source of livelihood for more than 70% of the population (KIPPRA,

2016). Further, about 20% of the population usually experience chronic food insecurity; a quarter of these indeed, rely permanently on food assistance (KNBS, 2015).

The study was conducted in Tana Delta in the coastal area of Kenya. The Tana Delta covers an estimated area of 38,446 km<sup>2</sup> with a population density of 6 persons per km<sup>2</sup>. The agricultural land in Tana Delta is about 3,869, 000 ha; 88% of this is considered to be 'low potential' for farming activities (KNBS, 2011). Tana Delta is mainly inhabited by the *Pokomo* and *Orma* ethnic communities (farming and pastoralists, respectively). The main crops grown in the area include rice, mangoes, maize, beans and cashew nuts. In addition, Tana Delta is a key tourist destination; partly due to its proximity to beaches in Malindi and Mombasa. Also, it harbours fishing activities and mineral-oil exploitation prospects.

## 2.2. Theoretical framework

A choice experiment method (Adamowicz et al., 1998) was applied to investigate local stakeholders' preferences for foreign land lease design. The choice experiment (CE) method is a stated preference technique for *ex-ante* assessment of goods/services that are not yet available in the market and would not be easily evaluated through revealed preference approaches such as the hedonic pricing method (Louviere et al., 2000). Moreover, CE provides a hypothetical context that allows flexibility in the design of different product or service options (e.g., land lease types), and possible adjustments can be made before the goods/services are introduced into the market. The CE is preferred over other stated preference approaches, including contingent valuation (Mitchell and Carson, 1989), because it enables estimation of trade-offs for different components (attributes) of a good/service rather than the good/service *per se*, and possibly captures more information by allowing respondents to express preferences over a range of attribute levels and prices (Hanley et al., 2001).

Choice experiments have been applied to value a wide range of issues, including quality changes in environmental attributes (e.g., Adamowicz et al., 1998; Garrod and Willis, 1999; Alvarez-Farizo et al., 2007), food safety and consumer preferences (Tonsor et al., 2005; Loureiro and Umberger, 2007), farmers' preferences for genetic attributes of indigenous livestock (e.g., Ruto et al., 2008; Kassie et al., 2009) and rural landscape improvements (Campbell et al., 2008, 2009). A notable recent development is in the use of CEs to inform the design of policies or programmes, whereby attributes are defined in terms of various components of policy design, rather than characteristics of the goods themselves. Applications of this kind include investigation of water quality improvements (Hanley et al., 2006), development policy (James, 2010), farmers' preferences for disease-free zones (Otieno et al., 2011), consumer preferences for quality and safety attributes in artisanal fruit juices (Otieno and Nyikal, 2017), consumer preference for vitamin-A fortified sugar (Pambo et al., 2017), public preferences for design of farmland retirement projects (Yao et al., 2018), improving the design of agri-environment schemes (Latacz-Lohmann and Breustedt, 2019) and consumer willingness to pay for chicken welfare attributes (Otieno and Ogotu, 2019). In the present study, the CE method is applied to inform policy on the design of foreign land leases in Kenya. Such an application of the CE approach has not been made in the literature before.

## 2.3. Choice experiment design

The design of foreign land lease policy is conceptualized in this study to comprise two sets of features: compulsory, and voluntary or optional aspects. The compulsory features are the responsibilities and obligations that must be fulfilled by both parties (land owners and investors) in order to enforce the lease agreements. These include: legal acquisition of land within the provisions of the national land laws; full disclosure of national identity/origin by foreign investor; negotiation of land transactions with authorized actors only; full disclosure by investor on intended investment; contract duration must fit within the national legal lease limit of 99

**Table 1**

Voluntary CE lease design features.

Lease attributes	Description of attributes	Attribute levels
Lease duration (years)	Period for which an investor can use the land before the lease contract is renegotiated	15 years 25 years 55 years
Renewability of the lease	Whether the lease should be renewed or not, after renegotiation between the land owner and investor	Yes No
Lease size (% of total household land)	Proportion of total land that a farmer can choose to lease	10% of land 25% of land 50% of land
Employment to household members	Terms of employment that the land owner would prefer on investment on their leased land	Casual work Formal contract
Payment for land per ha (% of market price)	Desired compensation for leased land	50% (half of market price) 75% (three-quarter of market price) 100% (full market price)

years (Republic of Kenya, 2009); investors should clearly indicate what form of corporate social responsibility/public goods they will provide (e.g., investments in schools, roads, railways, water, hospitals); duration of notice from contract signing and implementation should be clearly specified to allow adjustment by the local community; incase of legal displacement of residents, resettlement in alternative land should be undertaken prior to project commencement; there must be a written agreement on legal mechanisms to monitor and periodically evaluate investor's compliance with the lease contract; and the local community must respect the lease agreement and avoid disruption of investments on the leased land.

The voluntary or optional features are those that allow land owners some choice/flexibility and these are the aspects that go into the CE design. As noted by Ostrom (1990), optional features enable individuals and communities to exercise collective action when confronted with a common problem, for instance uncoordinated land leases 'land grab' that may threaten people's collective livelihoods. The CE design process started with a critical review of key literature on foreign land leases (for instance, see Yoder et al., 2008; Cotula et al., 2009); interviews of officials in the Ministry of Lands and Kenya National Land Alliance; and focus group discussion at the community level in the study site. In line with suggestions by Bateman et al. (2002), the focus group discussion was also used to validate land lease attributes identified and possible levels for inclusion in the design. The use of participatory research methods (e.g., expert informant interviews and focus group discussion) possibly enabled the study to capture diverse views and insights in the design of land lease options. Further, it is envisaged that the application of participatory methods would enhance the contextual relevance and acceptability of development policy (Kassam, 1997); for instance, foreign land leases.

Five land lease attributes were selected from the validation process, for the CE design: lease duration; renewability of the lease; lease size; employment of household members; and payment for leased land per hectare (Table 1). Based on insights from the focus group discussion, three levels were used for three of the lease attributes, while the other two attributes had two levels. In order to safeguard the local community's land rights and protect them from potential land grabbing/abuse of the lease by a foreign investor, the *lease duration* is considered an important attribute that needs to be specified (and fixed) in the lease agreement. The proposed lease durations of 15–55 years provide sufficient time for at least a short term capital investment cycle and conform to the constitutionally allowed maximum lease period of 99 years in Kenya (Republic of Kenya, 2009). Comparably, lease durations for foreign agricultural investors in other African countries (e.g., Ethiopia, Ghana and Tanzania) range from 10 to 50 years (Cotula et al., 2009). The study introduces the

Suppose your opinion is sought on how foreign land leases should be designed. You are presented with different types of lease designs comprising combinations of various levels of lease features. Please compare the lease design options shown and choose the one you prefer most.

Attributes	Lease type A	Lease type B	Neither lease type A nor lease type B
	Lease duration (years)	55 years	
Renewability of the lease	yes	no	
Lease size (% of farm)	50%	10%	
Employment to household members	Formal contract	Formal contract	
Payment per ha for land (% of market price of land)	75%	100%	
<b>Which ONE would you choose?</b>			

Fig. 1. Illustration of CE design.

need to consult the local community (land owners) to determine *renewability of leases*. This would ensure accountability by the investors (for instance, whether the investor has fulfilled previous lease agreements or not) (Yoder et al., 2008). Further, prevailing socio-economic dynamics (e.g., population growth and emerging alternative investment activities) would also be considered to determine whether to renew the leases and how to structure subsequent ones.

Because of the high dependence on agriculture in Kenya, especially in rural areas including the Tana Delta, it was envisaged that farmers who opt to participate in the leases should retain at least half of their total *land size* in order to secure their livelihoods. Further, as noted by FIAN (2010) putting limits on size of land leasing (versus household land use) would ensure that land owners do not willingly lease/sell their land and later claim dispossession by investors. Considering high levels of unemployment and poverty in Tana Delta, it was deemed that provision of *employment* (either on casual basis or formal contracts) on lease investments would help to support local economic development. In this context, casual employment refers to temporary informal jobs (mainly unskilled) in which people earn daily or weekly wages with no other benefits. Formal contracts on the other hand entail written agreements in which workers (both skilled and unskilled) are paid at market rates and there is adequate provision of other welfare benefits such as health cover and leave allowances. Finally, *payment for land per hectare* is the compensation to land owners for the use of their land by the investor. Due to other potential benefits that individual land owners might derive from a lease agreement (e.g., employment of their household members), the payment for leased land is set between half and full market price. Ultimately, the price level that individual land owners choose depends on how they *trade off* price and other attributes of the lease design.

The CE design was generated following a two-stage procedure using NGENE software (ChoiceMetrics, 2009). First, a fractional factorial orthogonal design was generated from the validated attributes and this was used in an exploratory survey with a smaller preliminary sample of 40 respondents. Information gathered from the initial exploratory survey was analyzed to obtain prior parameters. In the second stage, the 'priors' were used to generate a *D-optimal* CE design (i.e., a design which yields data that enable estimation of parameters with low standard errors at relatively smaller sample) (Scarpa and Rose, 2008; Bliemer and Rose, 2010). The design had a high level of *D-optimality* (i.e., *D-efficiency*

measure of 88%). In addition, the design had a relatively good utility balance (i.e., a B-estimate of 82%), which shows that there was an insignificant likelihood of dominance by any alternative in the choice situations (Huber and Zwerina, 1996). The final design had 20 paired choice profiles that were randomly blocked into five sets of four choice tasks. Respondents were randomly assigned to one of the five sets. Each choice task consisted of two alternatives (A and B) and an 'opt-out' alternative (C) in which all land lease attributes were set at the 'zero level'. Choice alternative (C) is interpreted as the 'opt-out' option considering that the design was unlabeled as opposed to typical 'status quo' options in labeled CE designs (Veldwijk et al., 2014). As noted by de Bekker-Grob et al. (2010), the 'opt-out' option is suitable in capturing respondents' trade-offs between attributes in situations where there are no clearly defined current scenarios that are uniformly applicable to all respondents; for instance in our case, there was no common current lease design.

In order to reduce hypothetical bias inherent in stated preference studies as noted by Fifer (2011), the suggestions by Chowdhury et al. (2011) were followed during the survey, by asking respondents to consider only the attributes presented in the choice tasks and to treat each choice task independently. One of the choice tasks presented to respondents is illustrated in Fig. 1. In terms of number of attributes, levels and choice tasks, the design generated in this study fulfils the dimensions discussed in Caussade et al. (2005). A pretest of the CE questionnaire on a further 36 respondents showed that up to five choice tasks could be managed by a respondent.

#### 2.4. Sampling and data collection

Respondents were identified through systematic random sampling procedure, which entailed selection of every third household in a random route procedure. This sampling approach is deemed sufficient considering the low population density in the site and provides a representative sample in the absence of a comprehensive sampling frame. Further, random sampling enables hypotheses tests (Horppila and Peltonen, 1992).

Data was collected with the assistance of well trained enumerators in June and July 2012. The survey was conducted through face-to-face interviews using a comprehensive questionnaire including structured

questions and CE design. This survey mode is preferred to other potential approaches (e.g., mail surveys and telephone interviews) because it enables identification and verification of the relevant respondent, allows clarification of questions to respondents and entails relatively higher response rates (Bateman et al., 2002; Bennett and Birol, 2010). Moreover, poor distribution and limited access to communication infrastructure in a developing country such as Kenya preclude the use of other survey modes, including internet surveys. The questionnaire had four main sections: questions on respondent's residency duration and land ownership status were placed in section one; the second section captured awareness and perceptions on foreign land leasing in the area; section three had a brief explanation of the meaning and relevance of land lease attributes included in the study and their levels, followed by CE design profiles and choice question while; the final section had socio-demographic questions.

A random sample of 200 respondents (mainly household heads) were interviewed (excluding both the exploratory and pre-test respondents). This sample size conforms to minimum requirements for optimal CE designs (ChoiceMetrics, 2009) and previous studies on the application of the CE methodology on analysis of preferences (see for example, Feng et al., 2009).

### 2.5. Data analysis

The analytical framework for CE data is anchored on two important microeconomic principles; Lancasterian theory of value and random utility theory. An individual's total utility function is assumed to be separable into preferences for various components (attributes) of a product/service rather than the aggregate package of the product/service (Lancaster, 1966). Further, utility is considered to be a random variable that is unobservable (to the researcher). Instead, the researcher can indirectly assess utility by measuring the probability that given a particular choice set, rational individuals would only choose goods/services that they deem to offer the highest utility (Thurstone, 1927). Following McFadden (1973) and Manski (1977), utility from each choice situation has two components that can be expressed as:

$$U_{in} = V_{in} + \varepsilon_{in} \tag{1}$$

where  $U_{in}$  is the utility derived by individual  $n$  from choice alternative  $i$ ,  $V_{in}$  is the deterministic part of utility, and  $\varepsilon_{in}$  is the random component of utility.

Eq. (1) can be analyzed using multinomial logit (MNL) model, which assumes an extreme value type I (Gumbel) distribution with zero mean and scale parameter normalized to 1. However, the MNL entails restrictive assumptions. For instance, it imposes homogeneity of preferences and responses. This results in biased and inconsistent parameters. Further, the MNL assumes independence from irrelevant alternatives (IIA); thus, the relative odds of making a choice between any two alternatives is considered to be unaffected by addition or removal of other alternatives in the choice set. The IIA assumption imposes unrealistic substitution patterns (i.e., proportionate changes in choice probabilities) and fails to account for potential complementarities between choice alternatives (Train, 1998). In order to address the limitations of the MNL, the present study applies the random parameter logit (RPL). The choice of RPL or latent class model (LCM) to assess preference heterogeneity is an empirical issue. There are no theoretical considerations to choose one over the other (Greene and Hensher, 2003). Both methods were explored but the RPL fitted the data better.

The RPL model (also referred to as mixed logit, in the literature) eliminates the IIA restriction and accounts for preference heterogeneity by allowing continuous random variation of preference parameters over individuals in the entire population, in repeated choice situations. Following Revelt and Train (1998), the utility obtained by individual  $n$  from alternative  $i$  in choice situation (or time period)  $t$  can be specified as:

$$U_{int} = \beta_n X_{int} + \varepsilon_{int} \tag{2}$$

where  $X_{int}$  is a vector of observable variables,  $\beta_n$  is an unobserved coefficient vector for each individual and varies in the population with a density function  $f(\beta_n|\theta)$  whereby  $\theta$  are the parameters of the distribution (e.g., mean and variance). The  $\varepsilon_{int}$  is an unobserved random term assumed to be identically independently distributed (IID). Conditional on  $\beta_n$ , the probability that individual  $n$  chooses alternative  $i$  in choice situation  $t$  is given by:

$$L_{int}(\beta_n) = \frac{\exp(\beta_n X_{int})}{\sum_{j \in C} \exp(\beta_n X_{jnt})} \tag{3}$$

Let  $i(n,t)$  denote the alternative chosen by individual  $n$  in choice situation  $t$ . The probability of individual  $n$ 's observed sequence of choices (conditional on  $\beta_n$ ) is simply the product of standard MNL models assuming that the individual tastes,  $\beta_n$ , do not vary over choice situations for the same individual in repeated choice tasks (but are heterogeneous over individuals):

$$G_n(\beta_n) = \prod_t L_{int}(\beta_n) \tag{4}$$

The unconditional probability for the sequence of choices made by individual  $n$  is expressed as:

$$P_n(\theta) = \int G_n(\beta_n) f(\beta_n|\theta) d\beta_n \tag{5}$$

There are two noteworthy sets of parameters in this expression:  $\beta_n$  is a vector of parameters specific to individual  $n$  (representing the individual's tastes, which vary over people) and  $\theta$  are parameters that describe the distribution of the individual-specific estimates (such as the mean and covariance of  $\beta_n$ ). The objective in RPL is to estimate the  $\theta$ . This is usually done through simulation of the choice probability (because the integral in Eq. (5) cannot be computed analytically due to lack of a closed mathematical form). The log-likelihood function is expressed as:

$$LL(\theta) = \sum_n \ln P_n(\theta) \tag{6}$$

The  $P_n(\theta)$  is approximated by a summation over randomly chosen values of  $\beta_n$ . For a selected value of the parameters  $\theta$ , a value of  $\beta_n$  is drawn from its distribution and  $G_n(\beta_n)$ , i.e., the product of standard MNL models, is computed. Repeated calculations are done for several draws and the average of the  $G_n(\beta_n)$  is considered as the approximate choice probability:

$$SP_n(\theta) = \left(\frac{1}{R}\right) \sum_{r=1}^R G_n(\beta_n^{r|\theta}) \tag{7}$$

where  $R$  is the number of draws of  $\beta_n$ ,  $\beta_n^{r|\theta}$  is the  $r$ -th draw from  $f(\beta_n|\theta)$  and  $SP_n$  is the simulated probability of individual  $n$ 's sequence of choices. Following Train (2003), the simulation was based on Halton intelligent draws, which has been shown to yield more accurate results compared to independent random draws. Up to 100 Halton draws were used in the simulations. The simulated log-likelihood function is constructed as:

$$SLL(\theta) = \sum_n \ln(SP_n(\theta)) \tag{8}$$

The estimated parameters are those that maximize  $SLL(\theta)$ .

Trade-offs between land lease attributes and money, i.e., marginal willingness to accept (WTA) compensation were computed as (Hannemann, 1984):

$$WTA = \left(\frac{\beta_k}{\beta_p}\right) \tag{9}$$

where  $\beta_k$  is the estimated coefficient for a land lease attribute level in the

**Table 2**  
Respondents' socio-economic characteristics.

Variable	% of respondents (n = 200)
Main occupation	
Crop farming	90.0
Pastoralism	2.5
Fishing	3.5
Civil service	0.5
Trade/tour guide	3.5
Gender: male	57.0
Highest education level completed	
None	40.3
Primary school	40.8
Secondary school	17.3
Tertiary college and above	1.6
Income category (Kshs)*	
<8,000	48.7
8,001–15,000	32.5
15,001–25,000	12.8
>25,000	6.0

\* Eighty two Kenyan Shillings (Kshs) were equivalent to USD\$1 at the time of survey.

choice set and  $\beta_p$  is the marginal utility of the price attribute.

Finally, the overall WTA or compensating surplus (CS) measure for different foreign land lease policy scenarios were analyzed as (Hannemann, 1984):

$$CS = \frac{-1}{\beta_p} (W_1 - W_0) \quad (10)$$

where  $W_1$  represent the value of indirect utility associated with attributes of the foreign land lease scenario under consideration, while  $W_0$  is the indirect utility of the baseline scenario. Discrete choice analysis of individual preferences was undertaken using *NLOGIT* econometric software (Greene, 2007).

### 3. Results and discussion

#### 3.1. Socio-demographic features

About 90% of the respondents are crop farmers and they mainly grow maize, beans and mangoes (Table 2). The proportion of male and female respondents generally mirrors the composition of men and women (55% and 45%, respectively) in Kenya's national population estimates (KNBS, 2011). This sample composition is deemed appropriate in ensuring fair representation of stakeholders' views in land lease planning along gender dimensions. This in part, helps to correct gender inequalities that often arise when design of large-scale land deals neglects varying rights, needs and interests of men and women.

Some 41% of respondents have completed primary level of schooling, while more than one-third lacks formal schooling. About half of households have monthly income levels below Kshs 8,000. The results on education and income are consistent with the low national average levels of literacy and household incomes in Kenya; the Kenya National Bureau of Statistics (2018) showed that only 52% of Kenya's population had completed primary education and the national average monthly income was Kshs15,130 (about USD\$151). Indeed, these findings affirm the observations by Otieno (2013) that less than 35% of households in Coastal and Lower Eastern Kenya have monthly income levels above Kshs 20,000, and/or have members who completed formal education at secondary level and above.

#### 3.2. Residency and land ownership

Descriptive analysis of the survey data show that the average land ownership per household is 2.86 acres; about 71% of this land is cultivated while the rest is fallow. Thus, there is relatively more land available

**Table 3**  
Land ownership and residency profiles.

Variable	% of respondents (n = 200)
Residency status	
Local resident	61.5
Immigrant from upcountry/foreigner	38.5
Nature of land acquisition	
Inheritance	27.3
Purchase	20.7
Lease	3.0
Settled by government	21.7
Forest squatter	27.3
Membership to land management committee	12.6
Land property rights	
Possession of allotment letter	13.1
Possession of title deed	24.1
Lack of allotment letter and title deed	62.8
Tenure system	
Individual ownership	89.9
Group/communal	10.1

for leasing and other investments in Tana Delta. These findings are consistent with the land sizes noted by Smalley and Corbera (2012) in a study of land deals in the Tana Delta region.

This study found that about 61% of respondents are local indigenous residents of Tana Delta area, while the rest are immigrants from other parts of the country. Further, about 22% of respondents (mostly immigrants) acquired land through settlement by the government, while 27% are *self-imposed* squatters in forest land. In addition, a quarter of respondents acquired land through inheritance from relatives and the remaining one-fifth of them purchased the land where they live. It is notable that only a very small percentage of respondents live on land parcels that they acquired through lease arrangements. Only a few respondents (13%) belong to local land management committees where they could possibly influence decision making on land allocation and administration. This implies that the respondents sampled have minimal chances of using their 'administrative authority' to interfere with land use and management in their respective locations of residence (Table 3).

About 90% of respondents 'own' the land as individuals, but less than 60% have either an allotment letter or title deed to signify security of tenure. This has serious implications on the safety of transactions and investments made on the land in these sites. Greater tenure security combined with transferability of land serve as an incentive to improve agricultural land investments (Deininger and Jin, 2002). Indeed, as noted by Deininger (2011, p.236), '... if land rights are well defined, if land markets are not monopolized, and if information is accessible to all, voluntary transactions where land is valued at market prices should ensure that a mutually satisfying outcome is achieved'. Further, promoting respect for local land users' rights, for instance, through titling is important to ensure transparency and sustainability of large scale acquisitions (Borras and Franco, 2011; Hall, 2011).

#### 3.3. Perceptions on urgency of foreign land lease policy and its management

As noted by Constantin et al. (2017) anchoring land lease practices on national policies is important in order to avoid local stakeholders' vulnerability to land grabbing. In our study, majority of respondents (more than 90%) reported that it is important to develop a land lease policy to guide foreign-lease investments in Kenya. Further, they indicated that a policy targeted at streamlining foreign land leases was urgently needed. A somewhat surprising observation is that 16% of respondents indicated they didn't consider the design of a land lease policy to be an urgent priority issue; these comprise squatters in forest land in Tana Delta who fear possible loss of the illegally-held land to the government in case the policy is put in place.

In order to enhance the management of foreign-held land leases in

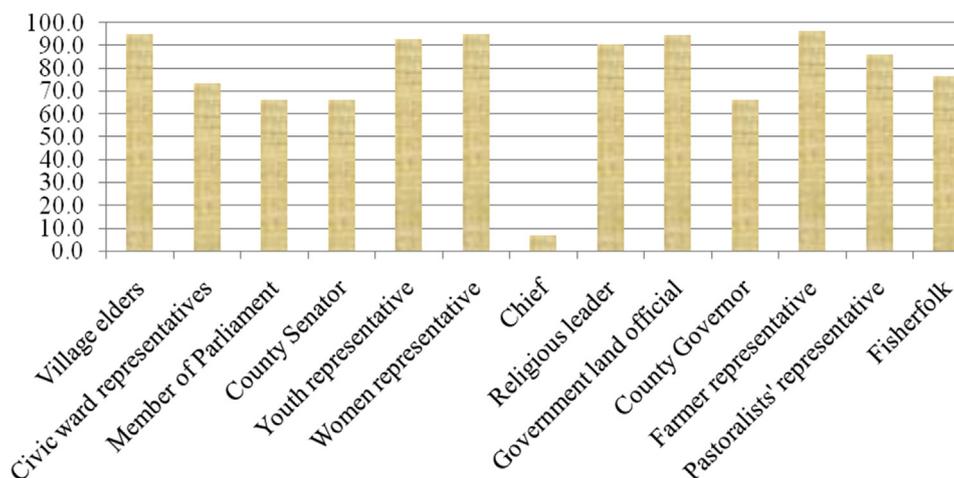


Fig. 2. Desired stakeholder composition in foreign land lease management committees (% of respondents).

**Table 4**  
Description of variables used in the choice analysis.

Variable	Description
SHORTDUR	Short lease duration of 15 years (1 = yes; 0 = otherwise)
LONGDUR	Long duration of 55 years (1 = yes; 0 = otherwise)
RENEW	Renewable lease agreement (1 = yes; 0 = otherwise)
LEASESIZ	Proportion of household land to be leased (10%; 25%; 50%)
FORMAL	Provision of formal employment to household members (1 = yes; 0 = otherwise)
PAY	Compensation for leased land; % of market price per hectare (50%; 75%; 100%)

**Table 5**  
Random parameter logit estimates for land lease attributes.

Variable	Coefficient	Standard error	t-ratio	p-value
SHORTDUR	0.776	0.267	2.906	0.004***
LONGDUR	-0.540	0.279	-1.936	0.053*
RENEW	0.403	0.162	2.484	0.013**
LEASESIZ	0.012	0.005	2.494	0.013**
FORMAL	0.459	0.163	2.820	0.005***
PAY	0.017	0.003	6.749	0.000***
Standard deviations of parameter distributions				
sdSHORTDUR	1.443	0.411	3.510	0.000***
sdLONGDUR	1.590	0.372	4.276	0.000***
sdRENEW	1.177	0.225	5.224	0.000***
sdLEASESIZ	0.037	0.007	5.653	0.000***
sdFORMAL	1.153	0.231	4.981	0.000***
Log likelihood	-671.612			
Adjusted pseudo-R <sup>2</sup>	0.23			
n (respondents)	200			
n (choices)	800			

Notes: statistical significance levels \*10%, \*\*5%, \*\*\*1%.

Kenya, respondents suggested inclusive management committee comprising various stakeholders. The most preferred members in the lease management committees include representatives of farmers, women, youth, village elders, government land officials and religious leaders (Fig. 2). Respondents generally do not prefer inclusion of their political leaders (such as members of parliament, county senators and civic ward representatives) in the proposed management committee for foreign land leases. Perhaps, this reflects the relative unease among local residents due to frequent land-related inter-community or inter-clan conflicts (on pasture, water and land-related resources) due to incitement by politicians. This is consistent with the observation of Cotula et al. (2011) that direct participation of land owners in negotiation and management of foreign land deals in Africa could offer more benefits than pure political representation, which is fraught with rent seeking

behaviour.

### 3.4. Preferences for land lease attributes

The coding of variables used in the land lease analysis is provided in Table 4. The utility parameters for all lease attributes were entered as random parameters assuming a normal distribution, except the price attribute that was specified as fixed in order to enable estimation of the distribution of WTA, by eliminating the risk of obtaining extreme negative and positive trade-off values (Revelt and Train, 1998).

Results of the RPL model are shown in Table 5. The RPL model provides a better fit as demonstrated by the improvement in the adjusted pseudo-R<sup>2</sup> from 8.3% in the MNL to 23% in the RPL, and log likelihood of -671.6 in the RPL compared to -721.6 in the MNL. Indeed, the estimated RPL model exhibits a good explanatory power; Domencich and McFadden (1975) noted that in discrete choice models, a pseudo-R<sup>2</sup> in the range of 20%–40% is comparable to adjusted R<sup>2</sup> of 70%–90% in conventional ordinary least squares regression models. Following Boxall et al. (2009), our model excludes the alternative specific constant because it does not add empirical value when the CE design uses an ‘opt-out’ option in which all attributes are set at the ‘zero level’ in the absence of uniformly known ‘status quo’. Similar specifications have been applied in Otieno et al. (2011), Otieno and Nyikal (2017) and Pambo et al. (2017).

Farmers prefer leases with short durations (up to 15 years) and renewable leases. Significant preference for the coefficient of short lease duration (SHORTDUR) is consistent with the observation during focus group discussion that, a relatively short lease can be easily re-negotiated. Generally, respondents feared that long-term leases of up to 55 years would be difficult to re-negotiate (at least during the lifetime of the land owner) and would lead to conflicts between developers and descendants of land owners. Renewable leases are preferred because they offer farmers flexibility to choose land use options at different times considering prevailing circumstances and alternative investments (for example, termination of an expired lease if alternative investments offer higher returns). Further, they prefer lease size to be increased based on negotiations. In addition, lease arrangements that provide formal contract employment to household members are preferred to those that offer casual/temporary work. This might be due to the need to uplift the currently low levels of income for majority of farmers and provide stable livelihoods.

The estimated coefficient for the price variable (PAY) is significant with the expected positive sign (for compensation, given rational individuals), and this permits computation of trade-offs between each lease attribute and money. All coefficients for the land lease attributes have highly significant standard deviations, showing that preferences for these attributes are heterogeneous. The estimated means and standard

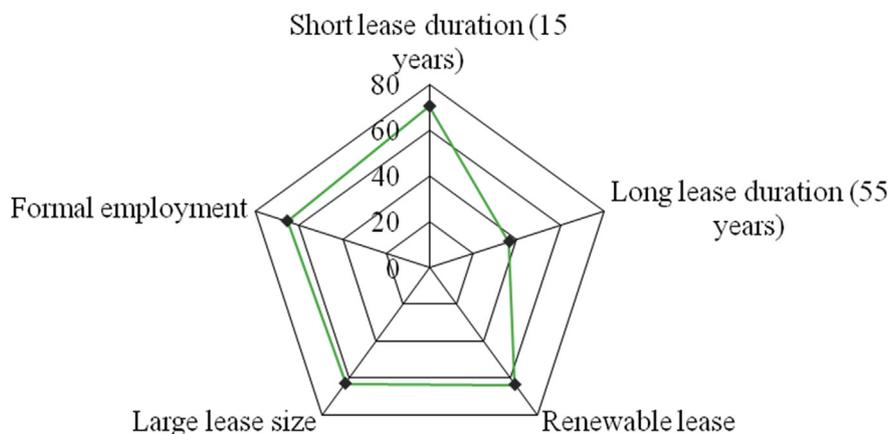


Fig. 3. Positive preference for land lease attributes (% of respondents).

Table 6  
Marginal WTA estimates for land lease attributes (Kshs).

Variable	WTA	t-ratio	p-value
SHORTDUR	4,547.38 (2,682.36 to 6,412.40)	2.44	0.015
LONGDUR	-3,162.36 (-4,722.03 to -1,602.69)	-2.03	0.043
RENEW	2,362.74 (1,349.73 to 3,375.75)	2.33	0.020
LEASESIZ	69.86 (37.92–101.80)	2.19	0.029
FORMAL	2,687.33 (1,629.33 to 3,745.33)	2.54	0.011

Notes: all WTA estimates are statistically significant at 5% level.

deviations of the normally distributed parameters also show the probability distribution of the population in terms of whether they place a positive or negative value on a particular attribute. Generally, over 60% of the farmers had a positive preference for all attributes included in the CE design (except long lease duration) (Fig. 3). In a descending order of magnitude, 70% of respondents had a positive preference for short lease duration, 65% preferred formal rather than casual employment, while 63% preferred both renewable leases and leases involving relatively large land. However, compared to medium leases (of 25 years) only 37% had a positive preference for longer leases of 55 years. Collectively, these attributes fully captured the lease preferences for more than half of the respondents.

The WTA results in Table 6 confirm that farmers have heterogeneous preferences for all the land lease attributes. The estimated WTA figures are interpreted as the extra amount of money/compensation per hectare that an individual would desire to be paid for a given attribute of the lease design, besides the market price of land. In particular, farmers are willing to accept between Kshs 2,682 to Kshs 6,412 for a lease duration of 15 years (considered as short duration in this study); Kshs 1,350 to Kshs 3,376 to allow renewability of leases; Kshs 38 to Kshs 102 to increase the lease size by 1% of farm size; and Kshs 1,629 to Kshs 3,745 to accept formal contract employment instead of casual employment. The estimated WTA figures for the land lease attributes seem reasonable, given

Table 7  
Attribute levels and compensating surplus for land lease policy scenarios (in Kshs).

Scenario	Attribute					Compensating surplus
	Short lease duration (15 years)	Long lease duration (55 years)	Renewable lease	Lease size (% of farm)	Provision of formal employment to household members	
1	✓			10%	✓	7,933.31 (3.12)
2	✓			10%		5,245.98 (2.67)
3	†	†	✓	25%		4,109.23 (2.75)
4	†	†	✓	25%	✓	6,796.56 (3.39)
5	✓		✓	50%	✓	13,090.44 (3.58)

Notes: t-ratios are in parentheses. ✓ indicates the attribute is present in a scenario at the non-zero level. † implies that the scenario has a medium lease duration of 25 years.

preference of politicians in land lease committees would thus be expected.

All CS estimates shown are significant at 1% level. CS estimates for scenarios with long lease durations (55 years) were found to be statistically insignificant and are thus omitted.

#### 4. Conclusions

This study assessed local community members' preferences for attributes that should be included in the design of foreign land leases in Kenya. Results show that farmers prefer relatively shorter leases (of up to 15 years). Renewable leases that allow flexibility to adjust lease arrangements in tandem with market dynamics and economic forces e.g., cost of living also seem reasonable to the local community. Moreover, leases that offer formal employment to land owners' household members are preferred to those that entail casual employment. Respondents are willing to be compensated significant amount of money in order to accept inclusion of *short duration, renewability and formal employment* in the design of foreign land leases. In order to offer insights on how potential lease designs could be implemented the study derived farmers' preferences for various lease policy scenarios. Results show that the most important lease features are lease size, renewability and formal employment. The design of future foreign lease arrangements should incorporate these features. In order to promote harmony between land owners and leasers, it is necessary to ensure transparent lease negotiations. In addition, foreign investors on leased land need to make full disclosure of their country's origin, lease intentions and investment plans, so as to address local people's fears of displacement.

Further, a local management committee that specifically deals with foreign land leases should be established, with a balanced composition of representatives of various key stakeholders including farmers, women, youth, village elders, government lands officials and religious elders. The insights from the study contribute to the literature by providing mechanisms that would enhance local community's acceptability, responsibility and participation in the leases; thereby possibly contributing to reduce public protests and disruptions of land-based foreign investments in developing countries. Future studies could offer further insights on farmers' perceptions on whether foreign land leases are beneficial to local livelihoods and development. Additionally, an analysis of foreign investors' preferences for lease dimensions would offer insights on optimal lease contract lengths and help to achieve equilibrium outcomes in the negotiations and designs.

#### Declarations

##### Author contribution statement

David Jakinda Otieno: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Willis Oluoch-Kosura: Analyzed and interpreted the data; Wrote the paper.

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##### Competing interest statement

The authors declare no conflict of interest.

##### Additional information

No additional information is available for this paper.

#### References

- Adamowicz, W.L., Boxall, P., Louviere, J., 1998. Stated preference approaches for measuring passive use values: choice experiments and contingent valuation. *Am. J. Agric. Econ.* 80 (1), 64–75.
- Alvarez-Farizo, B., Hanley, N., Barberan, R., Lazaro, A., 2007. Choice modeling at the market stall: individual versus collective interest in environmental valuation. *Ecol. Econ.* 60 (4), 743–751.
- Bateman, I., Carson, R., Hanemann, M., Hanley, N., Hett, T., Jones-Lee, M., Loomes, G., Ozdemiroglu, E., Pearce, D., Sugden, R., Swanson, J., 2002. *Economic Valuation with Stated Preference Techniques. A Manual*, Department for Transport. Edward Elgar, Cheltenham.
- Bennett, J., Birol, E., 2010. *Choice Experiments in Developing Countries: Implementation, Challenges and Policy Implications*. Edward Elgar, Cheltenham.
- Bliemer, C., Rose, J., 2010. Construction of experimental designs for mixed logit models allowing correlation across choice observations. *Transp. Res. Part B* 44 (6), 720–734.
- Borras, S.M., Franco, J., 2011. From threat to opportunity? Problems with the idea of a code of conduct for land-grabbing. *Yale Hum. Rights Dev. Law J.* 13, 507–523.
- Boxall, P., Adamowicz, W., Moon, A., 2009. Complexity in choice experiments: choice of the status quo and implications for welfare measurement. *Aust. J. Agric. Resour. Econ.* 55, 503–519.
- Campbell, D., Hutchinson, G.W., Scarpa, R., 2009. Using choice experiments to explore the spatial distribution of willingness to pay for rural landscape improvements. *Environ. Plan.* 41 (1), 97–111.
- Campbell, D., Scarpa, R., Hutchinson, G.W., 2008. Assessing the spatial dependence of welfare estimates obtained from discrete choice experiments. *Lett. Spatial Res. Sci.* 1 (2–3), 117–126.
- Caussade, S., Ortuzar, J.D., Rizzi, L.I., Hensher, D.A., 2005. Assessing the influence of design dimensions on stated choice experiment estimates. *Transp. Res. Part B* 39, 621–640.
- ChoiceMetrics, 2009. *The Cutting Edge in Experimental Design. Ngene 1.0 User Manual and Reference Guide*. Available from: [www.choice-metrics.com](http://www.choice-metrics.com).
- Chowdhury, S., Meenakshi, J., Tomlins, K., Owori, C., 2011. Are consumers in developing countries willing to pay more for micronutrient-dense biofortified foods? Evidence from a field experiment in Uganda. *Am. J. Agric. Econ.* 93, 83–97.
- Constantin, C., Luminita, C., Vasile, A., 2017. Land grabbing: a review of extent and possible consequences in Romania. *Land Use Policy* 62, 143–150.
- Cotula, L., Vermeulen, S., 2009. Deal or no deal: the outlook for agricultural land investment in Africa. *Int. Aff.* 85 (6), 1233–1247.
- Cotula, L., Vermeulen, S., Leonard, R., Keeley, J., 2009. *Land Grab or Development Opportunity? Agricultural Investment and International Land Deals in Africa*. International Institute for Environment and Education (IIEE), London, Food and Agriculture Organization (FAO) and International Fund for Agricultural Development (IFAD), Rome.
- Cotula, L., Vermeulen, S., Mathieu, P., Toulmin, C., 2011. Agricultural investment and international land deals: evidence from a multi-country study in Africa. *Food Security* 3 (Suppl 1), 99–113.
- de Bekker-Grob, E., Hol, L., Donkers, B., van Dam, L., Habbema, J., Leerdam, M., Kuipers, E., Essink-Bot, M., Steyerberg, E., 2010. Labeled versus unlabeled discrete choice experiments in health economics: an application to colorectal cancer screening. *Value Health* 13 (2), 315–323.
- Deininger, K., 2011. Challenges posed by the new wave of farmland investment. *J. Peasant Stud.* 38 (2), 217–247.
- Deininger, K., Jin, S., 2002. *The Impact of Property Rights on Households' Investment, Risk Coping and Policy Preferences: Evidence from China*. World Bank Policy Research Working Paper 2931. The World Bank, Washington, DC.
- Deininger, K., Byerlee, D., Lindsay, J., Norton, A., Selod, H., Stickler, M., 2011. *Rising Global Interest in Farmland: Can it Yield Sustainable and Equitable Benefits?* The World Bank, Washington, D.C.
- Domencich, T., McFadden, D., 1975. *Urban Travel Demand – A Behavioral Analysis*. North-Holland Publishing Company Limited, Oxford.
- Duvail, S., Medard, C., Hamerlynck, O., Nyngi, D., 2012. Land and water grabbing in an East African coastal wetland: the case of the Tana Delta. *Water Altern.* (WaA) 5 (2), 322–343.
- FAO (Food and Agriculture Organization), 2004. *Leasing Agricultural Land*. FAO Land Tenure Note, Rome.
- Feng, W., Jian, Z., Weisong, M., Zetian, F., Xiaoshuan, Z., 2009. Consumers' perception toward quality and safety of fishery products, Beijing, China. *Food Control* 20 (10), 918–922.
- FIAN, 2010. *Land Grabbing in Kenya and Mozambique. A Report on Two Research Missions and a Human Rights Analysis of Land Grabbing*. FIAN International Secretariat, Heidelberg.
- Fifer, S., 2011. *Hypothetical Bias in Stated Preference Experiments: Is it a Problem? and if So, How Do We deal with it?* PhD Thesis. The University of Sydney, Australia, p. 290.
- Friis, C., Nielsen, J., 2016. Small-scale land acquisitions, large-scale implication: exploring the case of Chinese banana investments in Northern Laos. *Land Use Policy* 57, 117–129.
- Friis, C., Reenberg, A., 2010. *Land Grab in Africa: Emerging Land System Drivers in a Connected World*. GLP Report No. 1, GLP-IPO. University of Copenhagen, Copenhagen. ISSN: 1904 5069.
- Fukunaga, K., Huffman, W.E., 2009. The role of risk and transaction costs in contract design: evidence from farmland lease contracts in U.S. agriculture. *Am. J. Agric. Econ.* 91 (1), 237–249.
- Garrod, G.D., Willis, K.G., 1999. *Economic Valuation of the Environment, Methods and Case Studies*. Edward Elgar, Cheltenham.

- Greene, W., Hensher, D., 2003. A latent class model for discrete choice analysis: contrasts with mixed logit. *Transp. Res. Part B* 37 (8), 681–698.
- Greene, W.H., 2007. LIMDEP Version 9.0/NLOGIT Version 4.0 Econometric Modelling Guide, Econometric Software. Plainview, New York.
- Hall, D., 2011. Land grabs, land control and Southeast Asian crop booms. *J. Peasant Stud.* 38 (4), 837–857.
- Hanemann, W., 1984. Welfare evaluations in contingent valuation experiments with discrete responses. *Am. J. Agric. Econ.* 66 (3), 332–341.
- Hanley, N., Colombo, S., Tinch, D., Black, A., Aftab, A., 2006. Estimating the benefits of water quality improvements under the water Framework Directive: are benefits transferable? *Eur. Rev. Agric. Econ.* 33 (3), 391–413.
- Hanley, N., Mourato, S., Wright, R.E., 2001. Choice modelling approaches: a superior alternative for environmental valuation? *J. Econ. Surv.* 15 (3), 436–462.
- Horpilla, J., Peltonen, H., 1992. Optimizing sampling from trawl catches: contemporaneous multistage sampling for age and length structures. *Can. J. Fish. Aquat. Sci.* 49 (8), 1555–1559.
- Huber, J., Zwerina, K., 1996. The importance of utility balance in efficient choice designs. *J. Mark. Res.* 33, 307–317.
- James, P.A., 2010. Using farmers' preferences to assess development policy: a case study of Uganda. *Dev. Policy Rev.* 28 (3), 359–378.
- Jayne, T., Chapoto, A., Sitko, N., Nkonde, C., Muyanga, M., Chamberlin, J., 2014. Is the scramble for land in Africa foreclosing a smallholder agricultural expansion strategy? *J. Int. Aff.* 67 (2).
- Juma, C., 2011. *The New Harvest: Agricultural Innovation in Africa*. Oxford University Press, New York.
- Kassam, Y., 1997. The combined use of the participatory dialogue method and survey methodology to evaluate development projects: a case study of a rural development project in Bangladesh. *Knowl. Policy: The International Journal of Knowledge Transfer and Utilization* 10 (1–2), 43–55.
- Kassie, G.T., Abdulai, A., Wollny, C., 2009. Valuing traits of indigenous cows in Central Ethiopia. *J. Agric. Econ.* 60 (2), 386–401.
- KIPPRA (Kenya Institute for Public Policy Research and Analysis), 2016. *Kenya Economic Report: Fiscal Decentralization in Support of Devolution*. KIPPRA, Nairobi.
- KNBS (Kenya National Bureau of Statistics), 2015. *Kenya Facts and Figures*. KNBS, Nairobi.
- KNBS (Kenya National Bureau of Statistics), 2011. *Statistical Abstract*, Nairobi.
- KNBS (Kenya National Bureau of Statistics), 2018. *Kenya Economic Survey Report*.
- Latacz-Lohmann, V., Breustedt, G., 2019. Using choice experiments to improve the design of agri-environmental schemes. *Eur. Rev. Agric. Econ.* 46 (3), 495–528.
- Land Matrix, 2019. *Global Land Matrix Database*. <https://landmatrix.org>. (Accessed 5 September 2019).
- Lancaster, K., 1966. A new approach to consumer theory. *J. Political Econ.* 74 (2), 132–157.
- Lay, J., Nolte, K., 2018. Determinants of foreign land acquisitions in low- and middle-income countries. *J. Econ. Geogr.* 18 (1), 59–86.
- Loureiro, M., Umberger, W., 2007. A choice experiment model for beef: what US consumer responses tell us about relative preferences for food safety, country-of-origin labeling and traceability. *Food Policy* 32 (4), 496–514.
- Louviere, J.J., Hensher, D.A., Swait, J.D., 2000. *Stated Choice Methods: Analysis and Applications*. Cambridge University Press, Cambridge.
- Manski, C., 1977. The structure of random utility models. *Theory Decis.* 8, 229–254.
- McFadden, D., 1973. Conditional logit analysis of qualitative choice behaviour. In: Zarembka, P. (Ed.), *Frontiers in Econometrics*. Academic Press, New York.
- Mitchell, R., Carson, R., 1989. *Using Surveys to Value Public Goods: the Contingent Valuation Methods, Resources for the Future*. Johns Hopkins University press, Baltimore.
- Nolte, K., Wytse, C., Markus, G., 2016. *International Land Deals for Agriculture. Fresh Insights from the Land Matrix: Analytical Report II*. Bern, Montpellier, Hamburg, Pretoria: Centre for Development and Environment, University of Bern. [www.landmatrix.org](http://www.landmatrix.org).
- Nunow, A.A., 2011. *The Dynamics of Land Deals in the Tana Delta, Kenya*. Paper Presented at the International Conference on Global Land Grabbing, 6–8 April, University of Sussex.
- Ostrom, E., 1990. *Governing the Commons: the Evolution of Institutions for Collective Action*. Harvard University Press, Cambridge.
- Otieno, D.J., 2013. Market and non-market factors influencing farmers' adoption of improved beef cattle in arid and semi-arid areas of Kenya. *J. Agric. Sci.* 5 (1), 32–43.
- Otieno, D.J., 2014. *More Inclusive Decision-Making Processes in Foreign Land Leasing: Policy Insights from Kenya*. Policy Brief No. 8, Centre for International Governance Innovation – Africa Initiative (CIGI-AI). [www.cigionline.org](http://www.cigionline.org).
- Otieno, D.J., Nyikal, R., 2017. Analysis of consumer preferences for quality and safety attributes in artisanal fruit juices in Kenya. *J. Food Prod. Mark.* 23 (7), 817–834.
- Otieno, D.J., Ogutu, S.O., 2019. Consumer willingness to pay for chicken welfare attributes in Kenya. *J. Int. Food & Agribus. Mark.*
- Otieno, D.J., Ruto, E., Hubbard, L., 2011. Cattle farmers' preferences for disease-free zones in Kenya: an application of the choice experiment method. *J. Agric. Econ.* 62 (1), 207–224.
- Pambo, K., Otieno, D.J., Okello, J., 2017. Analysis of consumer preference for Vitamin A-fortified sugar in Kenya. *Eur. J. Dev. Res.* 29 (4), 745–768.
- Pender, J., Fafchamps, M., 2005. Land lease markets and agricultural efficiency in Ethiopia. *J. Afr. Econ.* 15 (2), 251–284.
- Republic of Kenya, 2017. *Guidelines for Extension and Renewal of Leases*. The Kenya Gazette Notice No. 5734, 9th June, Nairobi.
- Republic of Kenya, 2012. *Land Control Act, Chapter 302*. National Council for Law Reporting, Nairobi. [www.kenyalaw.org](http://www.kenyalaw.org).
- Republic of Kenya, 2010. *Constitution of Kenya*. National Council for Law Reporting, Nairobi. [www.kenyalaw.org](http://www.kenyalaw.org).
- Republic of Kenya, 2009. *Sessional Paper No. 3 of 2009 on National Land Policy*. Ministry of Lands, Nairobi.
- Revelt, D., Train, K., 1998. Mixed logit with repeated choices: household's choices of appliance efficiency level. *Rev. Econ. Stat.* 80 (4), 647–657.
- Ruto, E., Garrod, G., Scarpa, R., 2008. Valuing animal genetic resources: a choice modeling application to indigenous cattle in Kenya. *Agric. Econ.* 38 (1), 89–98.
- Salomao, A., Nhandumbo, I., 2009. *Biofuels, Land Access and Rural Livelihoods in Mozambique*. Land Tenure in Africa Series. International Institute for Environment and Development (IIED), London.
- Scarpa, R., Rose, J., 2008. Design efficiency for non-market valuation with choice modelling: how to measure it, what to report and why. *Aust. J. Agric. Resour. Econ.* 52 (3), 253–282.
- Smalley, R., Corbera, E., 2012. Large-scale land deals from the inside out: findings from Kenya's Tana Delta. *J. Peasant Stud.* 39 (3–4), 1039–1075.
- Sulle, E., Nelson, F., 2009. *Biofuels, Land Access and Rural Livelihoods in Tanzania*. Land Tenure in Africa Series. International Institute for Environment and Development (IIED), London.
- Thurstone, L., 1927. A law of comparative judgement. *Psychol. Rev.* 34 (4), 273–286.
- Tonsor, G.T., Schroeder, T.C., Fox, J.A., Biere, A., 2005. European preferences for beef steak attributes. *J. Agric. Resour. Econ.* 30 (2), 367–380.
- Train, K., 1998. *Recreation demand models with taste differences over people*. *Land Econ.* 74 (2), 230–239.
- Train, K.E., 2003. *Discrete Choice Methods with Simulation*. Cambridge University Press, New York.
- United Nations, 2010. *Foreign Land purchase for Agriculture: what Impact on Sustainable Development? Sustainable Development Innovation Brief, Issue 8*, New York.
- Veldwijk, J., Lamboeij, M., de Bekker-Grob, E., Smit, H., de Wit, G., 2014. The effect of including an opt-out option in discrete choice experiments. *PLoS One* 9 (11), 1–9.
- Vermeulen, S., Cotula, L., 2010. Over the heads of local people: consultation, consent, and recompense in large-scale land deals for biofuels projects in Africa. *J. Peasant Stud.* 37 (4), 899–916.
- Von Braun, J., Meinzen-Dick, R., 2009. *Land Grabbing by Foreign Investors in Developing Countries: Risks and Opportunities*. Policy Brief No. 13 (April). International Food Policy Research Institute (IFPRI), Washington, DC.
- Wily, L., 2018. The community land act in Kenya: opportunities and challenges for communities. *Land* 7 (12), 1–25.
- Wisborg, P., 2013. Human rights against land grabbing? A reflection on norms, policies and power. *J. Agric. Environ. Ethics* 26, 1199–1222.
- Yao, L., Zhao, M., Cai, Y., Yin, Z., 2018. Public preferences for the design of a farmland retirement project: using choice experiments in urban and rural areas of Wuwei, China. *Sustainability* 10 (1579), 2–16.
- Yoder, J., Hossain, I., Epplin, F., Doye, D., 2008. Contract duration and the division of labor in agricultural land leases. *J. Econ. Behav. Organ.* 65 (3–4), 714–733.