https://doi.org/10.17221/62/2025-AGRICECON

Do farmers normalise land tenure insecurity? Evidence from a choice experiment in Uzbekistan

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Citation: Niyazmetov D., Soliev I., Theesfeld I. (2026): Do farmers normalise land tenure insecurity? Evidence from a choice experiment in Uzbekistan. Agric. Econ. – Czech, 72: 341–357.

Abstract: Land reforms can create tenure insecurity for farmers, a critical issue in developing countries with a dominant role of the state in agriculture. Our study focuses on Uzbekistan, characterised by a state-led transition from a more collective and socialist to a more individualistic and market-based approach to land allocation and management. To understand how farmers normalise tenure insecurity under land reallocation in Uzbekistan, we examine farmers' perceptions of tenure security under ongoing risks to their land tenure. We conducted a farm survey (n = 153), employing a novel approach to explore farmers' perceptions of tenure security and to elicit their preference patterns for key attributes of the land contract through a discrete choice experiment. We find that despite the institutionalisation of tenure insecurity, most farmers do not perceive it as a normal phenomenon. The choice model results show that farmers have the highest mean willingness to pay for contract security compared to other contract attributes. Our findings suggest that understanding and incorporating farmers' strong preference for secure land tenure is a crucial consideration for the design and implementation of land reform policies. Theoretically, our findings challenge the need for a dominant role of the state in agriculture.

Keywords: agrarian reform; dominant state; property rights; stated preferences

Land tenure security remains a widely discussed issue due to its significant impact on economic, social, and political aspects of life in developing countries. While some studies find evidence of social support for certain forms of land tenure insecurity (e.g. the 'credibility thesis' described by Ho 2014), the academic

Funded by the Volkswagen Foundation (Grant ID: 96 264), within the framework of the SUSADICA (Sustainable Agricultural Development in Central Asia) project and supported by the Open Access Publication Fund of the Martin-Luther-University Halle-Wittenberg.

https://doi.org/10.17221/62/2025-AGRICECON

literature predominantly provides both theoretical reasoning and empirical justification for strengthening land tenure security in developing countries (e.g. Lawry et al. 2017; Tseng et al. 2021). However, challenges to land tenure security are pervasive, especially in countries with a dominating role of the state and a significant socio-economic role of agriculture, and where the structure and enforcement characteristics of the land tenure system are often a controversial matter of policy debate and choice (Sikor and Müller 2009; Broegaard et al. 2017). In addition to the underlying legal system in a specific administrative location, land tenure security depends on how the state recognises, enforces, and legitimises farmers' land rights, as well as on farmers' perceptions of these rights.

Thus, the more holistic picture of land tenure security includes not only security of tenure in legal terms but also in terms of its de-facto implementation on the ground, and how these two are perceived by the key actors involved. An important research question that has attracted little attention so far and is addressed in this study is how frequently changing legal and de-facto tenure conditions are perceived by affected farmers. We want to know if there is a normalisation effect towards this risk after having experienced frequent reallocations of land tenure. Here, normalisation describes how farmers might become insensitive to tenure insecurity, perceiving it as a normal part of their environment after continuous exposure to state-driven land reallocations.

There are two basic sources of risk to land tenure security or risks to legal and de-facto tenure conditions: one that originates from the state or authorities and the other from private groups of people (Holden and Ghebru 2016). In that regard, our focus is on the systemic risk posed by a dominant state. Uzbekistan provides an exemplary case for such a study due to its Soviet past, exclusive ownership of agricultural land by the state, and significant rural population dependent on agriculture (Land Code of the Republic of Uzbekistan 1998, approved by Law No. 598-I; National Statistics Committee 2021). Farmers who lease land from the state have restricted crop choice rights, i.e. they are subject to state interventions in crop allocation, producing a mix of mandatory and non-mandatory crops (Akhmadiyeva and Herzfeld 2021). The state in Uzbekistan is the dominant actor, and ongoing and unpredictable policy interventions present a primary risk to land tenure security that can be observed in the example of state-initiated land reallocations (so-called land optimisation) within the 2008–2019 period (Zorya et al. 2019). It undermines land tenure security by premature termination of farmers' land lease contracts, initially agreed to last at least for 30 years. The government has attempted to address the issue of insecure land tenure through the policy on cooperatives that grants members novel rights (Presidential Decree of the Republic of Uzbekistan 2019, No. PP-4239). First, the land of farmers, as members of cooperatives, was to be exempt from further expropriation and reallocation programmes. Second, farmers were granted the right to independently decide which crops to grow. A recent study of policy implementation revealed the quasi-voluntary nature of membership in cooperatives, and that most of the interviewed farmers and key actors somewhat surprisingly regarded declared land tenure incentives as the least important to join cooperatives in the list of other factors (Niyazmetov et al. 2021).

This disregard for enhanced formal land rights on the part of farmers has motivated us to study the impact of continuous risk to land tenure on the farmers' perceptions of land tenure security more systematically. To investigate this, we designed and conducted a survey of farmers (n = 153) in Uzbekistan, which included a discrete choice experiment (DCE), with the aim to learn about farmers' experience with land reallocations, their perceptions of land tenure security, and their preference patterns regarding selected land contract attributes. Choice experiment, as a method for an indirect exposition of the respondent's preferences towards attribute-based choice options, has become a widely applied instrument in agri-environmental studies (Mamine et al. 2020). Land contract is the primary land title document in Uzbekistan that grants farmers the set of rights to use and manage the land for a specified period. Therefore, we have examined the land contract as a choice instrument to elicit farmers' preferences regarding its key attributes: contract duration, contract security, crop choice, and payment for the contract. Thus, our aim is to understand the extent to which farmers have normalised insecurity of land tenure under state-driven land policies. We wanted to test our assumption of whether continuous exposure to tenure insecurity led farmers to become insensitive to it.

The findings of this study contribute to literature at least in two ways. First, our methodological approach diverges from a conventional way of assessing the importance of land tenure security. Conventionally, the status and/or perception of land tenure security is evaluated against its impact on agricultural investment and productivity in the context of developing economies (Fenske 2011; Lawry et al. 2017).

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In contrast, we proceeded with the estimation of the importance of land tenure security framed against other land contract features, supplemented by the assessment of how farmers perceive that security. Second, we clearly focus on the value of land tenure security for the farmers per se in the context of the state-dominated institutional environment with implications for land policy design, which is not widely highlighted in the existing literature.

Land tenure: conceptual framework and its application

Land tenure security: Tripartite concept. Tenure security, like many concepts pertaining to the realm of socioeconomic relations, lacks a single definition (Arnot et al. 2011). To account for the multiplicity of tenure relations we build our conceptual framework on a tripartite notion of land tenure security with three components: legal, *de facto*, and perceived (van Gelder 2010). For the full tenure security to be held all these components should match in practice: that is, legal rights are fully enforced, and farmers feel confident about their rights in the future.

The foundation of our conceptual framework is the legal security embedded in a land contract or title. A standard land contract defines the scope and strength of a farmer's legal rights and obligations, which in turn determine the overall security of land tenure. In other words, a land contract grants farmers a bundle of rights that the government recognises de jure (Schlager and Ostrom 1992). The distinct characteristic of the land tenure system in Uzbekistan is that agricultural land is state property. Land contract is a main legal document, certifying the land title of a farmer in Uzbekistan. Farmers can rent the land from the state for up to 50 years as individual farms (Land Code of the Republic of Uzbekistan 1998, approved by Law No. 598-I). State property means complete legalisation of the land titling process. The state plays two opposing roles in the process. On the one hand, it functions as a contracting party that enters into a land agreement with farmers. On the other hand, it serves as a guarantor of the farmers' legal rights to the land, leading to a commitment problem (Acemoglu 2003).

The strength of legal security is determined by *de facto* recognition and enforcement of legal rights. Meinzen-Dick et al. (2020) highlight the existence of legal pluralism, noting that decisions of state actors can be preeminent and may be used against right-holders. The cardinal risk to land tenure security in Uzbekistan emanates from the premature termination of a land contract because of state policies. The increased uncertainty with the timing and scale of land reallocations can cause farmers to change their preferences over time. For example, contract features that they value most might shift from contract security to the rights of their own crop choice.

The third component, perceived security, captures the expectations and attitudes of the farmers regarding land tenure security in the near future. It is a combination of how a farmer evaluates the likelihood of losing rights to land and their level of worry or fear over that prospect. In fact, some scholars argue that it is the most influential component because farmers make decisions about future land investments and production based on their perceptions of tenure rights (Omura 2008; Bellemare 2013; Ma et al. 2015).

Our conceptual framework (Figure 1) is based on the concept of 'normalised' tenure insecurity. We adapt the concept of normalisation from Ashforth and Anand (2003, p.3) who 'examine how corruption becomes normalised, that is, embedded in the organization such that it is more or less taken for granted and perpetuated'. In this sense, for our case, tenure insecurity becomes normalised not only when it is institutionalised (i.e. via land reallocations) but also when farmers rationalise it by perceiving it as granted. However, our use of the term differs from its original application, where normalisation refers to individuals accepting and participating in unethical practices (Ashforth and Anand 2003). In our context, it describes how farmers come to perceive frequent land reallocations and ensuing tenure insecurity as a normal part of their environment. Rather than signalling complicity or acceptance of wrongdoing, this reflects how farmers adjust their expectations in response to ongoing institutional uncertainty.

Thus, our framework links all three components of land tenure security with the potential normalisation of tenure insecurity by farmers, which is explored in the following ways. First, there can be a mismatch when *de facto* security compromises legal security through frequent land reallocations and premature contract termination. Further, this continuous mismatch can cause farmers to value tenure security lower than other land contract attributes, and lead to the eventual normalisation of tenure insecurity. Second, if farmers perceive the likelihood of losing their land to be high and at the same time show little or no concern about this prospect, this overall perception of land tenure security by farmers may lead to the normalisation of land tenure insecurity.

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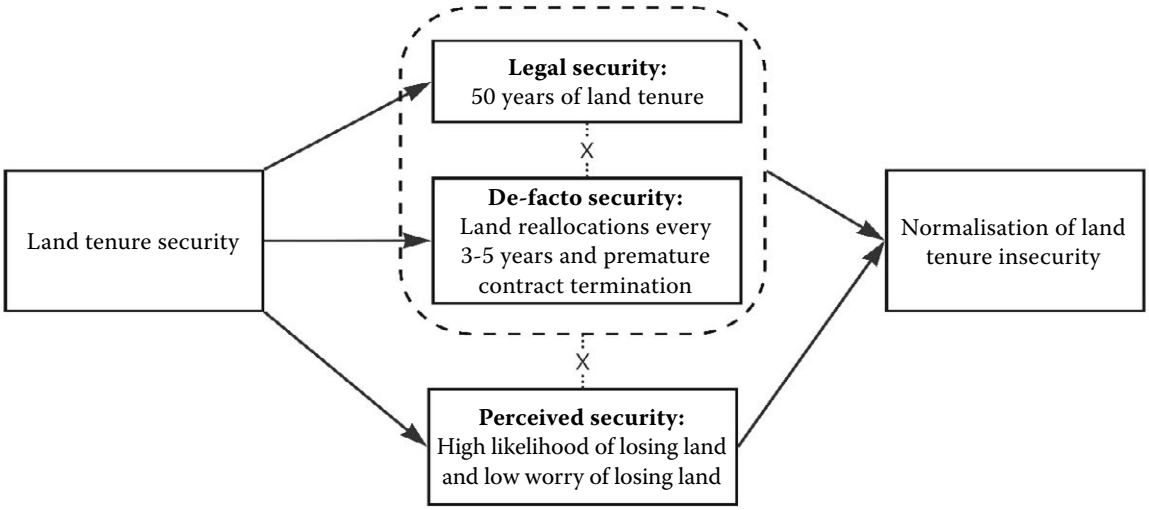

Figure 1. Conceptual framework for understanding the normalisation of land tenure insecurity

Dotted line refers to a mismatch; dashed box shows the joint effect
Source: Authors' own elaboration

Land tenure reforms in Uzbekistan: An overview. An overview of land reforms in independent Uzbekistan sheds light on the peculiarities of the country's land tenure system. Initially, the government pursued a cautious and incremental reform process, transforming state and collective farms into shirkats (cooperative farms) in the early 1990s (Zorya et al. 2019). Starting in the mid-2000s, a more ambitious phase of reforms dismantled the shirkats and redistributed land to newly established individual farms through long-term lease contracts with restricted crop choice and decision-making rights (Zorya et al. 2019). Crop choice restrictions in Uzbekistan are formally codified in the Land Code of the Republic of Uzbekistan (1998, approved by Law No. 598-I), which stipulates that land contracts may be terminated if farmers cultivate crops outside their designated specialisation: for instance, if a cotton farmer grows rice on land formally allocated for cotton production.

More recently, the state has introduced two parallel institutional reforms. The first is a shift in the state procurement system, particularly in the cotton and wheat sectors, where obligations have been shifted to large, often state-controlled, agribusinesses known as 'clusters' (Babadjanov and Petrick 2023; Djanibekov et al. 2024). The second, introduced through a 2019 decree, was the establishment of agricultural cooperatives. Legally, these were designed as a voluntary alternative to the cluster model, offering participants key incentives, including exemption from land expropriations and the freedom to choose their own crops. However, at the time of our data collection in 2021, the implementation of the cooperative policy was often top-down and involved forced participation, which had begun to reduce farmers' trust in the initiative (Djanibekov et al. 2024). Despite these formal changes, the on-the-ground reality is often shaped by more prevalent informal restrictions enforced by local authorities, who may impose production obligations and intervene in farmers' daily operations (Akhmadiyeva and Herzfeld 2021; Djanibekov et al. 2024).

Since the state retains full ownership of agricultural land, it has frequently engaged in land reallocations (Zorya et al. 2019). Land reallocations were dynamic, occurring through multiple waves of consolidation and fragmentation between 2008 and 2019, affecting tens of thousands of farmers. For example, Zorya et al. (2019) estimate that due to land consolidation, the number of farmers decreased from 218 600 in 2008 to 69 100 in 2011; however, land fragmentation led to an increase in the number of farmers to 132 356 by 2016. The last nationwide consolidation resulted in a further 40% decrease in the number of registered farmers by 2019 (Djanibekov et al. 2024). Officially, these reallocations aimed to improve land use efficiency, but in practice, they contributed to high tenure insecurity among farmers (Djanibekov et al. 2024).

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MATERIAL AND METHODS

Study locations

We conducted the fieldwork (March–June 2021) in the same areas where cooperatives were established in Uzbekistan in line with a new agricultural policy (Presidential Decree of the Republic of Uzbekistan 2019, No. PP-4239): Bulungur district in Samarqand province and Qibray district in Tashkent province.

Our rationale for sampling these farmers was twofold. First, they were the target of the new cooperative policy, which offered them enhanced tenure security through an exemption from land reallocations. Second, these farmers were exempted from mandatory cotton cultivation. This exemption granted them more freedom to diversify their crop portfolio – specialising in crops such as wheat, vegetables, and horticulture – allowing us to test their preferences for crop choice autonomy versus other contract attributes. The composition of our final sample reflects this diversity: 61% (n = 93) of surveyed farmers specialise in wheat and vegetables, 25% (n = 38) – in grapes, and 10% (n = 16) – in horticulture, with the remainder growing mostly vegetables (4%, n = 6).

As of the data collection period, there were, in total, two and eight formally registered agricultural cooperatives in Bulungur and Qibray districts, respectively.

Data collection

The data collection included both quantitative and qualitative methods. One of the authors conducted a survey of farmers, including the pre-test of the questionnaire in February 2021. A pilot test of the choice experiment was conducted with 13 farmers from the Qibray district. In addition, we sought feedback on the experimental design from the head of a local agricultural department and an international expert. The primary aim was to assess the clarity and relevance of the questionnaire and to refine the attribute levels based on farmers' feedback. Data collected during the pilot test were not included in the main analysis.

The sampling frame includes farmers, both formal members and non-members in the immediate vicinity of selected cooperatives. The selection of farmers with and without membership allows us to empirically test for differences between these two groups in their perceptions of land tenure security. We acknowledge that cooperative membership may be endogenous; therefore, this comparison should be interpreted as correlational rather than causal.

Regarding the members of cooperatives, we employed a simple random sampling based on an available list of farmers (Bryman 2016). Non-members were chosen based on purposive sampling from neighbouring communities. While we sampled from all ten cooperatives, the final sampling rate differed by location due to fieldwork constraints; the higher rate in Bulungur (85.1%) reflects better access to farmers, whereas outreach was more limited in Qibray (32.1%). We also aimed to achieve a balanced composition of members and non-members within each district's final sample. The target sample size was 200 farmers, but the final dataset includes 153 completed responses due to non-participation. The detailed composition of the sampling is given in Table 1.

The questionnaire had two sections. The first one comprised a discrete choice experiment, designed to reveal farmers' preferences regarding land contract attributes. The second one inquired about the land contracts of the farmers, their experiences with and attitudes towards land reallocation policy, degree of land use rights, their perceptions of land tenure security, and general demographic and socioeconomic characteristics (age, education etc.).

Research framework

Our general research approach includes two methodological instruments, through which we examine whether farmers normalise tenure insecurity (Figure 2).

Table 1. Sample of surveyed farmers

Surveyed farmers	Bulungur	Qibray	Total
Coop members (share in total members in district, %)	86 (85.1%)	26 (32.1%)	112
Non-members (share in total non-members in district, %)	31 (3.6%)	10 (1.6%)	41
Total	117	36	153

The share of sampled members is relative to the total population of cooperative members in each district: 101 in Bulungur and 81 in Qibray, the share of sampled non-members is relative to the total population of non-member farmers in each district: 866 in Bulungur and 627 in Qibray

Source: Authors' own elaboration

https://doi.org/10.17221/62/2025-AGRICECON

The novelty of our analytical approach to exploring normalisation of tenure insecurity is that, following the conceptual framework (Figure 1), we directly ask farmers about their subjective perceptions of tenure security (Table S1, Electronic Supplementary Material), and elicit their preferences for land contract attributes through a discrete choice experiment. Thus, a normalisation of tenure insecurity may be observed when farmers exhibit high expectations and low concerns regarding land loss, and prioritise attributes other than increased tenure security when selecting land contracts.

Discrete choice experiment: theoretical framework. Discrete choice experiment (DCE) is a method to elicit respondents' preferences for the selected attributes of certain products/services. DCE has gained momentum in the agri-environmental field due to its flexibility and relevance in valuing both market and non-market goods and services in this realm (Mamine et al. 2020).

We can describe the theoretical core of the method applied to our study. A farmer, *k*, is asked to make a choice between two land rental contracts (alternatives), *i* and *j*, which have different terms and conditions (attributes and levels). Thus, the choice is contingent upon utility, i.e. *Ui*, which a farmer assigns to specific characteristics of a land contract *i*, or any good or service. However, it is postulated that the full utility is known only to the farmer since there are sources, other than the selected contract terms, (e.g. *de facto* implementation of the contracts, past experience) that influence a choice. A random utility model (McFadden 1974) accounts for this and consists of two parts: the systematic part with observable (V_{ikt}) and the random part with unobservable (ε_{ikt}) components of the utility of a contract *i*, chosen by a farmer *k* in a choice situation *t*:

$$U_{ikt} = V_{ikt} + \varepsilon_{ikt} \quad (1)$$

The final tenet is a behavioural rule stating that a farmer seeks to maximise utility and will choose the alternative from a given choice set that offers the highest utility (Hensher et al. 2015). It is important to clarify that the DCE is not a direct measure of 'perceived tenure security'. Rather, the experiment reveals preferences for specific contract attributes. The strength of these preferences provides an indirect assessment of how much farmers value tenure security.

Identification of attributes and levels. The choice of attributes and their levels is a crucial step for DCE design. Selected attributes should be independent and relevant to the research question and decision context. Following land tenure and methodological literature (Hoyos 2010; Qin et al. 2011; Hensher et al. 2015), our research problem, and existing land tenure system in Uzbekistan, we have identified four attributes of the land contract to test the preferences of the farmers. Selected levels are based on contract terms, land policy, and farming practices in Uzbekistan. We have adjusted the final set of attributes and levels after the interviews with the head of a local agricultural department, an international expert, and one farmer, as well as pilot test of the questionnaire

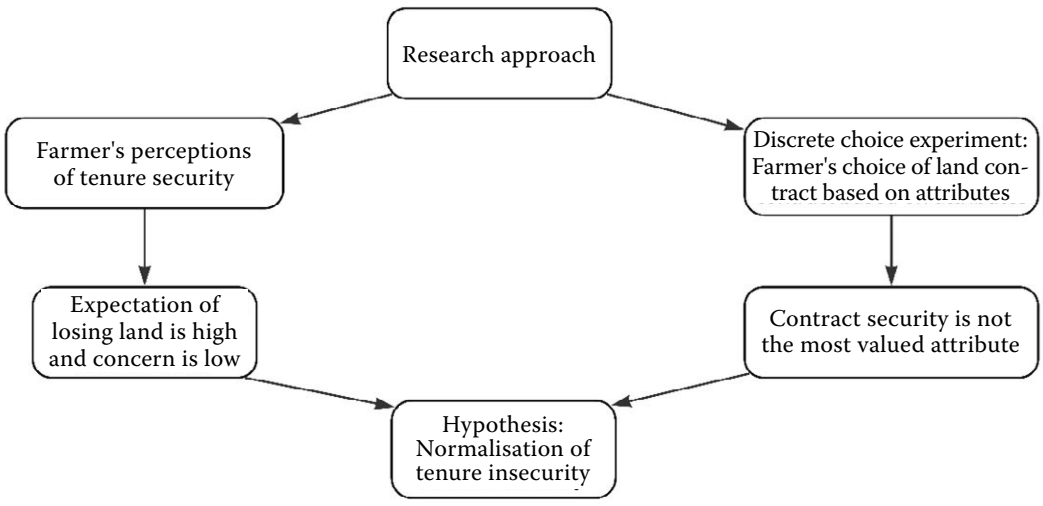

Figure 2. Research framework for the study of tenure insecurity normalisation

Source: Authors' own elaboration

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with farmers (n = 13) before the actual field survey. It is important to note that we specifically focus on the relative preferences of farmers for different contract attributes as revealed through the choice sets.

To ensure that choices were based on the specified attributes rather than on variations in farm size, each hypothetical land contract presented in the experiment was for a standardised plot of 10 hectares. The annual rental payment was specified on a per-hectare basis, and the total for the 10-hectare plot was also presented to farmers for realism.

The hypothetical land contract included the following attributes and levels (Table 2):

i) Land contract duration

The levels for contract duration were chosen to distinguish between official *de jure* norms and a hypothetical scenario reflecting the *de facto* tenure insecurity farmers face. The 30- and 50-year levels represent the legal minimum and maximum periods stipulated in Uzbekistan's Land Code of the Republic of Uzbekistan (1998, approved by Law No. 598-I). In contrast, the 10-year level is a hypothetical construct. We included this shorter duration because the *de jure* terms often do not reflect the reality on the ground, where frequent state-led land reallocations create significant uncertainty and shorten farmers' actual planning horizons. This hypothetical level was therefore essential for our experimental design to empirically measure the value

Table 2. Attributes and levels of a hypothetical land contract

	Attributes	Description	Levels
1	Land contract duration	The duration of a land contract for which a farmer can rent the land from the state. Existing legislation in Uzbekistan sets 30 years as the minimum period for the land contract. When the contract duration expires, we assume a 50% chance of renewing the contract.	10 years 30 years 50 years
2	Land contract security	A land contract specifies whether the land is protected or not from a risk (which we estimate as 50%) that land could be subject to reallocation or expropriation by the state before the expiration of the contract. When land is reallocated or expropriated, a farmer may (or may not) get compensation, the size of which is unknown.	The land is not protected from potential reallocation and expropriation before the expiration of the contract. The land is protected from potential reallocation and expropriation before the expiration of the contract.
3	Crop choice rights	A land contract might include a provision to grow the specific mandatory crop(s) regularly and impose a harvest quota for sale at a fixed price, which might be higher or lower than the current market price. The contract also might have a provision for local administration to order a farmer to grow certain crop(s) in some season(s). For example, in one season a farmer is obliged to allocate 50% of the land for cultivating pepper and carrots (or other crops) and a certain amount of the harvest must be sold to a specified buyer.	The farmer is obliged to grow only mandatory crops each season. The farmer is obliged to grow mandatory crops on 50% of his cropland. The farmer is free to decide which crops to grow.
4	Annual rental payment for the land contract (USD)	It is the annual rental payment by a farmer for the contract per hectare. The amount of the annual payment per ha is multiplied by 10, which is the total size of the offered land.	USD 96 per ha, USD 960 for 10 ha USD 288 per ha, USD 2 880 for 10 ha USD 480 per ha, USD 4 800 for 10 ha USD 671 per ha, USD 6 710 for 10 ha

Source: Authors' own elaboration

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farmers place on achieving longer, more stable contract terms.

ii) Land contract security

The literature on land property rights underscores the importance of protected land tenure for a variety of socio-economic and environmental reasons (Tseng et al. 2021). In our case, the security of the land contract is subject to the risk of premature termination of the contract, which takes into account the existing land reallocation policy. This attribute also reflects the provision specified in the Presidential Decree of the Republic of Uzbekistan (2019, No. PP-4239) on cooperatives, which exempts members of cooperatives from land reallocation and expropriation. For our experiment, we have assigned two levels to this attribute: the farmland is either protected (1) or not (2) from a risk of being subject to land reallocation or expropriation before the expiration of the contract. The risk of premature contract termination was assumed to be 50% based on the frequency of land reallocation, interviews, and pretesting of the questionnaire with farmers.

iii) Crop choice rights

Specification of crop choice rights is another crucial part of the farming business (Markussen et al. 2011). Farming under uncertainty increases the significance of use rights, of which arguably the most important one is the ability to independently decide on current crop allocation. Farmers in Uzbekistan are subject to formal and informal interventions in crop allocation on the part of state and local authorities (Akhmadiyeva and Herzfeld 2021; Djanibekov et al. 2024). The purpose of the crop choice attribute is to present farmers with the whole spectrum of decision-making in choosing crops. Existing land contracts specify the specialisation of the farmers, under which they are obliged to implement mandatory crop production structures. In addition to that, state and local authorities can impose the production of certain crops under crop placement plans. To operationalise this attribute, we have selected three levels that capture the degrees of farmers' rights in crop choice: the obligation to grow only mandatory crops, the obligation to grow mandatory crops in 50% of cropland, and the freedom to choose their own crop structure.

iv) Land contract rent

The cost attribute is an indispensable component of the land contract. In the context of Uzbekistan, though, the land contract does not directly indicate the price of the land lease. Instead, farmers pay an annual land tax per hectare, which is the proxy for the land contract rent. Since 2021 land tax varies depending on the specific normative land value, calculated by the Ministry of Agriculture, which determines land productivity. During the pre-test of the survey, we found that farmers (n = 13) on average paid land tax in the amount of USD 72 (or 750 000 UZS, the official exchange rate of Central Bank of Uzbekistan as of Dec 1, 2020 was 1 USD = 10 427 UZS) per hectare in 2020. To determine the range of levels for the price attribute we asked farmers to reveal how much they were willing to pay maximum per hectare for the secured land contract. A few farmers (n = 3) expressed their willingness to pay a maximum of USD 960 per hectare annually, but the rest of the farmers (n = 10) were willing to pay no more than USD 480 per hectare, considering USD 960 as an excessively high amount. Thus, to strike a balance, we have set USD 671 per hectare as the maximum level and USD 96 per hectare as the minimum level.

Econometric model. Our choice model is binary, in which farmers choose between two unlabelled contract alternatives. The generic nature of the contracts lends itself to adopting a conventional assumption that random terms of the utility model are independent of each other and follow Gumbel distribution (the random terms possess IID (independently and identically distributed) property, Train 2009, p.34). The probability that farmer k chooses alternative i in choice situation t depends on the model specification. For the standard multinomial logit (ML) model, which assumes fixed preference parameters across all farmers, the choice probability is expressed as:

$$P_{ikt} = \frac{\exp\left(V_{ikt}\right)}{\sum_{j=1}^{J} \exp\left(V_{jkt}\right)} \tag{2a}$$

For the random parameters logit (RPL) model, which accounts for preference heterogeneity by allowing coefficients to vary across individuals, the choice probability is the integral of the standard logit probabilities over the distribution of the random parameters:

$$P_{ikt}\left(\beta_k\right) = \int \left(\frac{\exp\left(V_{ikt}\left(\beta_k\right)\right)}{\sum_{j=1}^{J} \exp\left(V_{jkt}\left(\beta_k\right)\right)} \right) f(\beta \mid \theta) d\beta \tag{2b}$$

where: $V_{ikt}\left(\beta_k\right)$ – indicates that the utility depends on the individual-specific coefficients; $f(\beta|\theta)$ – the probability density function of the parameters β, which is governed by its own set of parameters θ (e.g. the mean and variance of the distribution).

Then, given the set of attributes and their levels, systematic (observable) component of utility V, as specified

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in Equation (1), for farmer k, from alternative i in choice task t, takes the following functional form:

$$V_{ikt} = \beta_0 \times SC_i + \beta_1 \times PER_{ikt} + \beta_2 \times SEC_{ikt} + \\ + \beta_3 \times CropF_{ikt} + \beta_4 \times CropH_{ikt} + \beta_5 \times PR_{ikt} \quad (3)$$

where: β_0 – alternative-specific constant (ASC); *PER* – contract duration; *SEC* – dummy for secure contract; *CropF* – dummy for free crop choice; *CropH* – dummy for half-free crop choice; *PR* – price (USD/ha/year); all variables vary by alternative *i*, choice task *t*, and respondent *k*.

We have opted to use dummy coding for categorical variables due to its equivalence to effects coding and convenience of interpretation (Hu et al. 2022). For estimation, all models were specified using a panel data structure to account for the multiple choice tasks completed by each farmer, and an alternative-specific constant (ASC) was included for the first contract alternative to capture any systematic preference not explained by the attributes.

The basic model could be estimated using fixed coefficients to explain the preferences of all farmers in the sample or random coefficients to account for unobserved preference heterogeneity among farmers for the presented contract terms (Uz et al. 2022). Thus, we have tested a standard logit model (ML) against a random parameters logit model (RPL) to estimate marginal utilities from the choice data. In the RPL model estimation, the coefficients for contract duration (*PER*), security (*SEC*), and crop choice (*CropF, CropH*) were specified as random parameters assumed to follow a normal distribution to capture preference heterogeneity. The price coefficient was kept fixed, and correlations between the random parameters were assumed to be zero.

The inclusion of the cost attribute allows for the estimation of the marginal willingness-to-pay (*WTP*) for each non-monetary contract attribute *m*. *WTP* is calculated as the negative ratio of the coefficient for a given attribute (βm) to the coefficient on the price attribute ($\beta 5$) (Gao et al. 2010).

$$WTPm = -\frac{\beta m}{\beta 5} \quad (4)$$

It is an important, though approximate, measure of how much farmers are willing to pay for contract security and enhanced crop choice rights. Also, *WTP* could be useful for designing land policy recommendations.

Experimental design. We have applied a randomised design approach using Sawtooth Software application (Sawtooth Software, Inc., USA) to construct our experimental design, which met the criteria of orthogonality, level balance, and minimum overlap (Bridges et al. 2011). We have found the experimental design to be statistically efficient (D-efficient) during the pre-test of its fitness to estimate main effect utilities given the expected minimum sample size (n = 150).

We have also considered the trade-off between statistical and response efficiency in designing a choice experiment (Johnson et al. 2013). To strike a balance between a cognitive burden, which reduces response efficiency, and statistical efficiency, we have opted for 12 random choice tasks, each with two alternatives (in total 24 alternatives) for presenting to the respondents. To account for order effects, we have created eight random versions (each with 12 choice tasks) of the choice questionnaire with different orders of contract attributes.

The choice between two contract options was, in essence, a forced one: farmers were not offered a status quo or 'none' (opt-out) alternative. The use of forced choice designs carries both limitations (Hoyos 2010) and advantages (Alberini 2012), and should be considered in relation to the specific context of the study.

Methodologically, including an opt-out alternative can reduce model efficiency by censoring data and weakening the estimation of preference structures (Bridges et al. 2011). Penn et al. (2019) further note that adding an opt-out option without defined attributes may lead to incentive incompatibility – that is, reducing the likelihood that respondents will truthfully reveal their preferences. Alberini (2012) finds that forced choice formats perform well in applied research, offering strong statistical efficiency and stable results across repeated choice tasks.

From a practical standpoint, the design reflects the institutional reality in Uzbekistan, where agricultural land is state-owned and rejecting a land contract effectively means exiting farming, as private agricultural land markets do not exist. Most farm households in our sample rely heavily on agricultural income and are highly dependent on land access. Even when subject to state-imposed constraints (e.g. mandatory crop production), farmers generally prefer to retain their land contracts. During pre-testing of the questionnaire, neither farmers nor local administration officials expressed concerns about the absence of a 'none' option. In fact, some respondents with expertise of choice experiments strongly recommended excluding it, noting that many farmers might otherwise select it by default, which would yield little information about their true preferences. During the actual

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fieldwork, respondents appeared comfortable making choices under the forced format.

We find that the forced choice design was both methodologically relevant and contextually appropriate for this study.

Before the survey, we provided farmers with a detailed description and meaning of the contract attributes and their levels. Furthermore, to frame the choice situation in a local institutional context and reduce hypothetical bias, we have presented and explained the storyline to the farmers (Table S2, ESM).

RESULTS

Descriptive statistics

First, we present the main demographic and socioeconomic characteristics of the sample farmers, both at an aggregated level and disaggregated by study locations (Table 3).

We can see that on average a farmer is middle-aged and has considerable experience in farming. Due to the Soviet legacy, primary school education is mandatory in Uzbekistan, so all respondents have one, and one-third have a bachelor's degree or higher. The fact that almost all farmers had experience with land redistribution indicates a broad coverage of state land policies. Respondents, on average, hold 19 ha of land, and the mean share (72%) of the farm income in the total household budget points to the high dependence of the respondents on farming for their livelihoods.

Model estimation results

We proceeded first with a standard logit model (model 1) that yielded significant parameter estimates for all variables, except for alternative-specific constant (ASC), which was expected since alternatives were generic (unlabelled) and farmers could not attach a specific preference for either one, based

Table 3. Main demographic and socioeconomic characteristics of the sample farmers

Variable	Total sample (n = 153)				Bulungur (n = 117)				Qibray (n = 36)			
	Mean/share	SD	Min	Max	Mean/share	SD	Min	Max	Mean/share	SD	Min	Max
Age (mean)	47	10	26	73	46	9.7	26	73	49	11	29	72
School (9–11 years, share)	66%				74%				42%			
Bachelor's or higher degree (share)	34%				26%				58%			
Experience in agriculture, years (mean)	23	10	5	60	22	5	5	60	23	11	8	50
Share of farm income in the total household budget	72%				74%				65%			
Experience with land reallocations (share), total	93%				94%				92%			
One land reallocation (share)	41%				44%				31%			
Two land reallocations (share)	22%				27%				6%			
Three or more land reallocations (share)	31%				23%				56%			
Land size (ha, mean)	19	8.2	2	49	20.5	7.1	7.5	49	13.4	9.3	2	46
Annual contract land rent (USD, mean)	79	24	14	144	83	25	14	144	67	19	38	105

Source: Authors' own elaboration

https://doi.org/10.17221/62/2025-AGRICECON

on their order (Table 4). The results of discrete choice models are interpreted in terms of the probability that a particular choice could be made. The estimation results show that farmers express the highest preference for a secure contract compared to other contract attributes, all else being equal. Thus, farmers are most likely to choose a contract with guaranteed security. At the same time, farmers, on average, prefer the right to independently decide on their crop production structure to being forced to grow mandatory crops. Farmers are the least sensitive to the contract duration attribute. An extension of contract duration (i.e. from 10 to 30 years, holding all else constant) would not make it more likely to be chosen than in the case of a change, for example, from fully mandatory crops to a half-mandatory crop structure.

Second, we ran a random parameters logit (RPL) model to test for unobserved preference heterogeneity among farmers (Table 4, model 2). While the mean parameter estimates were consistent with the multinomial logit (ML) model, the standard deviations of the random parameters, which directly measure the extent of preference variation across individuals, were all found to be statistically insignificant (P = 1.00).

Table 4. Multinomial logit (ML) and random parameters logit (RPL) model estimation results (pooled sample)

Variables	ML model 1		RPL model 2			ML model 3	
	Coeff. (s.e.)	*P*-value	Coeff. (s.e.)	*P*-value	SD (s.e.)	Coeff. (s.e.)	*P*-value
ASC	0.03 (0.06)	0.6041	0.03 (0.06)	0.602	–	0.03 (0.06)	0.561 1
Duration	0.005** (0.00)	0.0177	0.005** (0.00)	0.017 8	0.00 (0.14)	0.005** (0.00)	0.022 8
Secure contract (yes)	1.25*** (0.06)	0	1.25*** (0.07)	0	0.00 (3.16)	1.72*** (0.18)	0
Free crop choice	1.04*** (0.09)	0	1.04*** (0.09)	0	0.00 (4.71)	1.62*** (0.25)	0
Half-free crop choice	0.65*** (0.08)	0	0.65*** (0.08)	0	0.00 (2.59)	0.90*** (0.23)	0.000 1
Price[a]	–0.001 4*** (0.00)	0	–0.001 4*** (0.00)	0	–	–0.0014*** (0.00)	0
Location × secure contract			–		–	–0.57*** (0.18)	0.001 8
Location × free crop choice			–		–	–0.81*** (0.25)	0.001 4
Location × half free crop choice			–		–	–0.41* (0.23)	0.075 7
Education × secure contract			–		–	0.02 (0.14)	0.906 1
Education × free crop choice			–		–	0.27 (0.19)	0.172 1
Education × half free crop choice			–		–	0.29 (0.19)	0.122 3
Log-likelihood	–928.24		–928.24		–	–917.22	
Restricted log-likelihood	–1 272.51		–1 272.51		–	–1 272.51	
Pseudo R^2	0.27		0.27		–	0.28	
No. of observations	1 836		1 836		–	1 836	
No. of respondents	153		153		–	153	
No. of parameters	6		6		–	12	

***, ** and *significance at 1%, 5% and 10% level, respectively; [a]price coefficient and its standard error values were estimated in UZS and converted to USD for reporting purposes, using the official exchange rate of 10 427 UZS to 1 USD as of Dec 1, 2020 (https://cbu.uz/)

ASC – alternative-specific constant; s.e. – standard error

Source: Authors' own elaboration

https://doi.org/10.17221/62/2025-AGRICECON

Furthermore, the log-likelihood and pseudo-R^2 values for the RPL model were identical to those of the ML model. The combination of identical model fit statistics and the lack of significant preference variation indicates that the additional complexity of the RPL model is not warranted by the data. Therefore, based on the principle of model parsimony, we proceeded with the simpler and more robust ML model to test the impact of farmers' individual characteristics on their preferences.

To explore preference heterogeneity, we tested for the impact of individual farmer characteristics – cooperative membership, location, education, age, experience, landholding size, farm income share, and number of land contracts concluded – by interacting them with the contract attributes. For the sake of full analytical transparency, the complete results of all tested models, including the non-significant findings, are reported in Tables S16–S23 (ESM).

Our final preferred model (Table 4, ML model 3) excludes the non-significant covariates for reasons of parsimony, focusing instead on the primary effects of the contract attributes. When tested individually, only the location and education interaction terms proved to be statistically significant. Therefore, we included both in the final model to test their combined effects. We acknowledge that this approach has limitations. By not including all covariates in the final model, we may not capture the full spectrum of preference heterogeneity across the sample. The statistically insignificant findings, particularly for a theoretically important variable like cooperative membership, are themselves a relevant result. This suggests that, in our sample, cooperative membership did not systematically alter preferences for key contract attributes as might be expected from recent policy changes.

Estimation results of model 3 with interaction terms show that all location-specific variables (with Qibray as the baseline) have significant parameter estimates compared to education-specific ones. In addition, increased pseudo-R^2 and log-likelihood values of model 3 indicate that these explanatory variables improve the model fit. Farmers from Qibray, who self-reported experiencing more land reallocations on average, are significantly more sensitive to the security of land contracts than their Bulungur counterparts, holding all else constant. This result highlights that experiencing more insecurity cannot diminish the value of land tenure security for farmers. This, however, does not suffice to make an inference that the farmers from Bulungur do not prefer a contract with protected land since they still value the security of the contract the highest. The same logic of interpretation holds for a crop choice attribute: farmers from Qibray are more sensitive to the presence of the free crop choice right in the contract than farmers from Bulungur. A possible explanation for this difference could be that the farmers were cognisant of the fact that certain parts of Qibray, comprising agricultural land, were to be annexed to Tashkent in accordance with the government's decision (resolution of the Legislative Chamber of the Oliy Majlis of the Republic of Uzbekistan, #1051-IV, June 15, 2021).

To account for the differences in sample sizes for Bulungur (n = 117) and Qibray (n = 36), we have normalised the sample sizes by resampling Bulungur data into three equal subsets (n = 39). Comparison of model results for all subsamples corroborates pooled sample results (Table 4), with the main coefficients preserving their sign, order, and significance (Tables S6–S8, ESM).

Willingness to pay for contract attributes. We have estimated marginal utilities from the ML model (model 1) to calculate the mean values of willingness to pay for contract attributes (Table 5).

Interpretation of the WTP estimates is not always straightforward and, in our case, should be considered only for exploratory purposes due to the forced nature

Table 5. Mean willingness to pay (WTP) for land contract attributes

Attribute	*WTP* (USD/ha)	
	Mean	95% confidence interval
Duration	4	[0.6, 6.6]
Secure contract	885	[715.4, 1 147.9]
Free crop choice	738	[571.0, 985.7]
Half-free crop choice	465	[331.6, 649.8]

WTP estimates were calculated in UZS and converted to USD for reporting purposes, using the official exchange rate of 10 427 UZS to 1 USD as of Dec 1, 2020 (https://cbu.uz/)

Source: Authors' own elaboration

https://doi.org/10.17221/62/2025-AGRICECON

Table 6. Farmers' perceptions of the likelihood and concern of losing land (frequency and share (%) of farmers in the total sample)

	Likely	Unlikely	Total
Worry	30 (20%)	30 (20%)	60 (40%)
No worry	18 (12%)	75 (48%)	93 (60%)
Total	48 (32%)	105 (68%)	153 (100%)

Source: Authors' own elaboration

of choice, which could have possibly led to inflated WTP estimates (Hoyos 2010). Nevertheless, the estimation results indicate that farmers are ready to pay more for secure land tenure and free crop choice (Table 5). Thus, farmers reveal dissatisfaction with the status quo, having insecure land contracts with a liability to grow mandatory crops.

Perceptions of farmers on land tenure security

To triangulate our findings from the choice experiment, we have collected additional data on farmers' perceptions of land tenure security (Table 6). Nearly a third (n = 48) of the surveyed farmers expect premature termination of their land contracts within the next five years. That only 12% (n = 18) do not express concern over this perceived risk of losing land could be a sign that these farmers indeed perceive the insecurity of land tenure as a normal phenomenon. But, on average, farmers care about land tenure security, and we cannot assume that farmers have normalised land tenure insecurity.

In addition, to support previous findings, the results (Table S9, ESM) indicate a positive correlation between farmers' increasing concern about losing land and the frequency of land reallocations they have previously experienced (Pearson correlation coefficient, r = 0.16).

We also estimated models (Tables S10–S15, ESM) and the mean WTP across different groups to examine how sample farmers' perceptions of tenure security correlate with their willingness to pay for improved contract terms (Table 7).

While the mean WTP for a secure contract varies slightly across subgroups, these differences are not statistically significant due to wide and overlapping 95% confidence intervals. This suggests that the high value placed on tenure security is a fundamental preference shared by farmers, regardless of their individual perception of risk or level of worry. Similarly, while the small group of farmers who appear to have normalised insecurity show a lower mean WTP, this difference is also not statistically significant from the other subgroups.

DISCUSSION

In line with theoretical reasoning supported by empirical evidence, scholars argue that one of the key (pre-) conditions for sustainable agriculture is the presence of a legal system that guarantees a definite set of tenure rights, which allow land users to plan and realise current and future productive activities (Deininger et al. 2014; Bambio and Agha 2018). The state, in such

Table 7. WTP (willingness to pay) estimates (USD/ha) for subgroups, based on tenure security perceptions

Variable	Likely (n = 48)	Unlikely (n = 105)	Worry (n = 60)	No worry (n = 93)	Likely & no worry (n = 18)	Likely & worry (n = 135)
Duration	0.6	4.9	3.4	3.6	0.9	3.9
95% CI	[–4.1, 5.4]	[1.1, 9.1]	[–1.4, 8.6]	[–0.1, 7.7]	[–7.1, 9.5]	[0.7, 7.3]
Secure contract	911	900.8	1 006.70	847.4	737.6	932.1
95% CI	[640, 1 369]	[675, 1 241]	[706, 1 524]	[631, 1 174]	[384, 1 505]	[729, 1 221]
Free crop choice	813.9	726.8	754.8	763.3	1 086.90	705.2
95% CI	[523, 1 279]	[512, 1 021]	[476, 1 191]	[539, 1 086]	[577, 2 191]	[520, 957]
Half-free crop choice	528.8	451.6	443.4	502	744.5	435.5
95% CI	[300, 862]	[282, 677]	[231, 762]	[321, 752]	[347, 1 553]	[288, 625]

Source: Authors' own elaboration

https://doi.org/10.17221/62/2025-AGRICECON

instances, comes at the forefront that not only defines but ultimately enforces land-related rights. However, in countries where farmers rent land from the state, the government can also act as a primary source of risk to land tenure security (Ma et al. 2015; Ho 2021).

Our findings, using microdata from Uzbekistan, support the results of previous studies indicating that state-driven land reallocation policies in developing countries undermine land tenure security (e.g. Deininger et al. 2014; Zorya et al. 2019). A high share of the surveyed farmers who expect (32%) and worry (40%) that their land contracts will be terminated could be directly attributed to the continuous risk of land expropriation and reallocation. The poor *de facto* enforcement of frequently changing legal tenure security on the part of the state has an adverse effect on farmers' perception of future tenure security, potentially negatively influencing their long-term investment and production decisions (Jacoby et al. 2002). This is in line with the literature that stresses the need for a more holistic understanding of land tenure security that should consider not only the legal provisions and their *de facto* implementation but also farmers' perceptions (Linkow 2016).

Our findings largely refute an assumption of widespread normalisation. While our data does identify a small group of farmers (12%) who fit the 'normalisation' pattern (perceiving a high likelihood of land loss but expressing no worry), this is the least common perception among the four groups in Table 6. We interpret this group's view as the 'normalisation of insecurity', a concept adapted from Ashforth and Anand (2003) to describe acceptance of the institutionalised practice rather than a belief in one's own tenure security. In stark contrast, among all farmers who perceive a high likelihood of losing their land, a clear majority (62.5%) also express worry. This finding supports the conventional understanding that tenure insecurity is a source of stress for farmers, indicating that most have not become insensitive to the risks they face. Further evidence against widespread normalisation is that the frequency of past land reallocations positively correlates with their current level of concern about losing their land.

The findings of the choice experiment indicate that farmers place a very high value on contract security, which has the highest mean *WTP* among all attributes. The hypothesis that, in circumstances of high expropriation and reallocation hazards that allow short-term planning, farmers favour unrestricted crop choice rights (likely improving allocative efficiency) over tenure security has not been validated within the Uzbekistan context. A possible explanation for this strong preference for security is that surveyed households rely heavily on farming income and therefore prioritise maintaining access to land over gaining full autonomy in crop choice, even when subject to state-imposed restrictions on crop allocation. In the context of state land ownership in Uzbekistan, farmers have little choice but to accept these terms to continue farming, and while state-imposed cropping patterns are not necessarily suboptimal, they do not necessarily account for farmers' specific experience and needs.

Therefore, farmers consider the prospect of losing their land and being unable to cultivate it highly undesirable. This observation is not specific only to Uzbekistan. While the specific context differs, this prioritisation of land access over immediate economic returns echoes findings from rural China. For example, Deininger et al. (2014) found that the risk of losing land due to reallocation discouraged farmers from pursuing more profitable off-farm work, despite declining farm productivity. In both cases, farmers demonstrate a preference for maintaining land tenure security, even at the cost of accepting economic constraints – be it forgoing off-farm opportunities in China or accepting state-imposed cropping patterns in Uzbekistan.

We acknowledge that our study is based on two districts, and caution should be exercised when generalising our specific quantitative findings to the entire country. However, we argue that the results are indicative for farmers in Uzbekistan as a whole due to the high degree of centralisation in the country's agricultural policymaking. Decisions made at the national level create a uniform institutional environment for all farmers, which is consistently marked by poor land property rights, including restricted crop choice and land management rights, and systemic tenure insecurity itself. Because farmers across the country operate within this same institutional context, the preference for tenure security found in our sample is likely to be widespread. In fact, our results highlight that localised threats can amplify this preference even further: farmers in the Qibray district, who faced the specific threat of land annexation, showed stronger preference for tenure security than those in Bulungur. The underlying mechanisms of this response may offer valuable insights for other post-socialist economies facing similar challenges, such as China and Vietnam.

In a broader policy context, our results contribute to the debate on the extent of state involvement in agriculture. State landownership by its very nature carries

https://doi.org/10.17221/62/2025-AGRICECON

inherent risks of discretionary expropriation and reallocation of farmers' land. Despite that there is a certain reluctance among policymakers in some developing countries (i.e. China, Vietnam, Uzbekistan) to truly liberalise land markets ensuring effective protection of land property rights. If we can't empirically say much about why state authorities refrain from ultimate liberalisation of the land market ('why' could range from ideological beliefs to perceived socio-economic considerations), we can say something about land users' attitudes towards the existing status quo of tenure insecurity. One line of argumentation reflects noteworthy evidence of 'social support' for land reallocations, a sign of tenure insecurity that is perceived as 'credible' (Ho 2014) by land users and is positively associated with 'village democracy' and 'households' knowledge of policy' (Ren et al. 2022) in China. In other words, according to the aforementioned studies, land users in China do not demand tenure security from the state, and this could be one of the reasons for maintaining state land ownership. The other line of narrative builds on the simple argument that land tenure security is important for farmers, even in the absence of private land tenure rights for decades. For instance, Ho (2021) points out that secure land use rights are similar to private land tenure rights under the conditions of state land ownership and have a positive impact on economic development in rural Vietnam, the magnitude of which is limited only by the inherent risk of land expropriation. In this context, the state in Uzbekistan has a long history of restricting farmers' land use rights, but our results show that farmers still prefer more secure tenure rights and are willing to pay a premium price for them. Thus, conceptually, the dominant role and involvement of the state in agriculture is called into question when farmers have a choice, however hypothetical.

The general interpretation of the findings of our choice experiment is bound to the selection of contract design attributes and their values. Thus, the question of reference points arises. To the best of our knowledge, there is one study (Qin et al. 2011) that included land tenure security as a specific attribute in a choice experiment. Our findings echo those presented by Qin et al. (2011), according to which farmers in China were the most sensitive to the security of land contracts in forestry. Studies, which offered land users the choice between different land use options without considering relevant tenure security, give a different picture of the relative importance of presented land contract attributes (Goibov et al. 2012; Admasu et al. 2021).

Given that this study presents the first evidence on farmers' perceptions of land tenure security in Uzbekistan using a discrete choice experiment, we need to bear in mind some methodological limitations of the study and suggestions for future studies. First, as was mentioned, the farmers had to make a forced choice between the presented contracts. Although for the purposes and context of our study, we found that to be relevant, still, the choice situation does not fully reflect the reality in which farmers could at least theoretically opt out. Second, the interpretation of the choice experiment results should be careful within the context of references to selected attributes. Thus, future studies could explore the relevance of tenure security by modifying the attributes, for example, by adding an attribute on the access to irrigation water and/or on land quality, which is highly topical in the context of irrigated agriculture.

CONCLUSION

Developing countries still experiment with agricultural land policy, aiming to find an optimal farmland size and tenure system. However, state-driven land redistribution accompanied by premature termination of existing land contracts undermines all three aspects of land tenure security: legal, *de facto*, and perceived. In our study, we examine how farmers perceive tenure security under the ongoing risk of land expropriation and reallocation by the state, using Uzbekistan as an example. This risk can lead to the perception of tenure insecurity as a normal phenomenon that, in turn, could have an undesirable effect on the way farmers conduct agricultural production in the absence of reliable expectations.

To answer our research question, we have conducted a survey with a discrete choice experiment to reveal the preference patterns of a sample of farmers regarding land contract attributes, including contract security and crop choice. The results of our study suggest that the farmers are sensitive to and willing to pay a relatively high price for contract security compared to other attributes. Plus, the farmers do not seem to perceive tenure insecurity as a normal phenomenon, even being exposed to frequent land reallocation processes. We could characterise this as an optimistic outcome as the farmers still aspire to have secure land rights, preferring longer planning horizons, which is generally more compatible with sustainable approaches that require long-term land-improving activities and investments. This highlights once again the importance of understanding land tenure security from all three – legal, *de facto*, and perceived – perspectives.

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Although our findings could be extrapolated to explain the preferences of the farmers operating in similar state-dominated environments, nevertheless, they should be interpreted in the context of the relative importance of land tenure security subject to selected reference points. Further and more generally, the ongoing process of the land reforms, such as in Uzbekistan, should take into account the parity between demand and supply of tenure security. We have shown a considerable demand for tenure security on the part of the farmers. The supply side, which is currently the state, should ensure legal and *de facto* security of the land tenure to meet the demand of agricultural producers if the aim is to achieve efficient and sustainable use of scarce land and water resources as stated in the key policy documents.

Acknowledgement: We are grateful to the interviewees for their time and valuable insights. Discussions with the participants of multiple workshops and meetings within the SUSADICA project have helped to improve the research. We are also grateful to the two anonymous referees for their constructive comments and suggestions, which have significantly improved the manuscript.

REFERENCES

Admasu W.F., Van Passel S., Nyssen J., Minale A.S., Tsegaye E.A. (2021): Eliciting farmers' preferences and willingness to pay for land use attributes in Northwest Ethiopia: A discrete choice experiment study. Land Use Policy, 109: 105634.

Akhmadiyeva Z., Herzfeld T. (2021): How does practice matches land laws in Central Asia? Land Use Policy, 109: 105726.

Alberini A. (2012): Repeated questioning in choice experiments: Are we improving statistical efficiency or getting respondents confused? Journal of Environmental Economics and Policy, 1: 216–233.

Arnot C.D., Luckert M.K., Boxall P.C. (2011): What is tenure security? Conceptual implications for empirical analysis. Land Economics, 87: 297–311.

Acemoglu D. (2003): Why not a political Coase theorem? Social conflict, commitment, and politics. Journal of Comparative Economics, 31: 620–652.

Ashforth B.E., Anand V. (2003): The normalization of corruption in organizations. Research in Organizational Behavior, 25: 1–52.

Babadjanov J., Petrick M. (2023): Uzbekistan's cotton clusters in the context of the industrial policy debate. Eurasian Geography and Economics, 66: 354–383.

Bambio Y., Agha S.B. (2018): Land tenure security and investment: Does strength of land right really matter in rural Burkina Faso? World Development, 111: 130–147.

Bellemare M.F. (2013): The productivity impacts of formal and informal land rights: Evidence from Madagascar. Land Economics, 89: 272–290.

Bridges J.F., Hauber A.B., Marshall D., Lloyd A., Prosser L.A., Regier D.A., Johnson F.R., Mauskopf J. (2011): Conjoint analysis applications in health – A checklist: A report of the ISPOR Good Research Practices for Conjoint Analysis Task Force. Value in Health, 14: 403–413.

Broegaard R.B., Vongvisouk T., Mertz O. (2017): Contradictory land use plans and policies in Laos: Tenure security and the threat of exclusion. World Development, 89: 170–183.

Bryman A. (2016): Social Research Methods. 5th Ed. London, Oxford University Press: 747.

Deininger K., Jin S., Xia F., Huang J. (2014): Moving off the farm: Land institutions to facilitate structural transformation and agricultural productivity growth in China. World Development, 59: 505–520.

Djanibekov N., Herzfeld T., Petrick M. (2024): Agriculture and rural development reforms. In: Mirkasimov B., Pomfret R. (eds): New Uzbekistan. London, Routledge: 112–134.

Fenske J. (2011): Land tenure and investment incentives: Evidence from West Africa. Journal of Development Economics, 95: 137–156.

Gao Z., House L.O., Yu X. (2010): Using choice experiments to estimate consumer valuation: The role of experimental design and attribute information loads. Agricultural Economics, 41: 555–565.

Goibov M., Schmitz P.M., Bauer S., Ahmed M.N. (2012): Application of a choice experiment to estimate farmers preferences for different land use options in Northern Tajikistan. Journal of Sustainable Development, 5: 2.

Hensher D.A., Rose J.M., Greene W.H. (2015): Applied Choice Analysis. 2nd Ed. Cambridge, Cambridge University Press: 1216.

Ho H.A. (2021): Land tenure and economic development: Evidence from Vietnam. World Development, 140: 105275.

Ho P. (2014): The 'credibility thesis' and its application to property rights: (In) secure land tenure, conflict and social welfare in China. Land Use Policy, 40: 13–27.

Holden S.T., Ghebru H. (2016): Land tenure reforms, tenure security and food security in poor agrarian economies: Causal linkages and research gaps. Global Food Security, 10: 21–28.

Hoyos D. (2010): The state of the art of environmental valuation with discrete choice experiments. Ecological Economics, 69: 1595–1603.

Hu W., Sun S., Penn J., Qing P. (2022): Dummy and effects coding variables in discrete choice analysis. American Journal of Agricultural Economics, 104: 1770–1788.

Jacoby H.G., Li G., Rozelle S. (2002): Hazards of expropriation: Tenure insecurity and investment in rural China. American Economic Review, 92: 1420–1447.

https://doi.org/10.17221/62/2025-AGRICECON

Johnson F.R., Lancsar E., Marshall D., Kilambi V., Mühlbacher A., Regier D.A., Bresnahan B.W., Kanninen B., Bridges J.F. (2013): Constructing experimental designs for discrete-choice experiments: Report of the ISPOR conjoint analysis experimental design good research practices task force. Value in Health, 16: 3–13.

Krinsky I., Robb A. L. (1986). On Approximating the Statistical Properties of Elasticities. The Review of Economics and Statistics, 68(4), 715–719. https://doi.org/10.2307/1924536

Lawry S., Samii C., Hall R., Leopold A., Hornby D., Mtero F. (2017): The impact of land property rights interventions on investment and agricultural productivity in developing countries: A systematic review. Journal of Development Effectiveness, 9: 61–81.

Linkow B. (2016): Causes and consequences of perceived land tenure insecurity: Survey evidence from Burkina Faso. Land Economics, 92: 308–327.

Ma X., Heerink N., Feng S., Shi X. (2015): Farmland tenure in China: Comparing legal, actual and perceived security. Land Use Policy, 42: 293–306.

Mamine F., Fares M., Minviel J.J. (2020): Contract design for adoption of agrienvironmental practices: A meta-analysis of discrete choice experiments. Ecological Economics, 176: 106721.

Markussen T., Tarp F., Van Den Broeck K. (2011): The forgotten property rights: Evidence on land use rights in Vietnam. World Development, 39: 839–850.

McFadden D. (1974): Conditional logit analysis of qualitative choice behavior. In: Zarembka P. (ed.): Frontiers in Econometrics. New York, Academic Press: 105–142.

Meinzen-Dick R.S., Pradhan R., Di Gregorio M. (2020): Understanding Property Rights. In: Meinzen-Dick R.S., Di Gregorio M. (eds): Collective Action and Property Rights for Sustainable Development. Washington, D.C., IFPRI. Available at https://hdl.handle.net/10568/157457

Niyazmetov D., Soliev I., Theesfeld I. (2021): Ordered to volunteer? Institutional compatibility assessment of establishing agricultural cooperatives in Uzbekistan. Land Use Policy, 108: 105538.

Omura M. (2008): Property rights and natural resource management incentives: Do transferability and formality matter? American Journal of Agricultural Economics, 90: 1143–1155.

Penn J.M., Hu W., Cox L.J. (2019): The effect of forced choice with constant choice experiment complexity. Journal of Agricultural and Resource Economics, 44: 439–455.

Qin P., Carlsson F., Xu J. (2011): Forest tenure reform in China: A choice experiment on farmers' property rights preferences. Land Economics, 87: 473–487.

Ren G., Zhu X., Heerink N., Feng S., Van Ierland E.C. (2022): Persistence of land reallocations in Chinese villages: The role of village democracy and households' knowledge of policy. Journal of Rural Studies, 93: 336–344.

Schlager E., Ostrom E. (1992): Property-rights regimes and natural resources: A conceptual analysis. Land Economics, 68: 249–262.

Sikor T., Müller D. (2009): The limits of state-led land reform: An introduction. World Development, 37: 1307–1316.

National Statistics Committee of the Republic of Uzbekistan (2021): Demography. Available at https://stat.uz/en/official-statistics/demography

Tseng T.W.J., Robinson B.E., Bellemare M.F., BenYishay A., Blackman A., Boucher T., Childress M., Holland M.B., Kroeger T., Linkow B., Diop M., Naughton L., Rudel T., Sanjak J., Shyamsundar P., Veit P., Sunderlin W., Zhang W., Masuda Y.J. (2021): Influence of land tenure interventions on human well-being and environmental outcomes. Nature Sustainability, 4: 242–251.

Train K.E. (2009): Discrete Choice Methods with Simulation. 2nd Ed. New York, Cambridge University Press: 400.

van Gelder J.L. (2010): What tenure security? The case for a tripartite view. Land Use Policy, 27: 449–456.

Uz D., Buck S., Sunding D. (2022): Fixed or mixed? Farmer-level heterogeneity in response to changes in salinity. American Journal of Agricultural Economics, 104: 1343–1363.

Zorya S., Djanibekov N., Petrick M. (2019): Farm Restructuring in Uzbekistan: How Did It Go and What is Next? Washington, D.C., World Bank Group. Available at: https://documents1.worldbank.org/curated/en/686761549308557243/pdf/134322-WP-P162303-PUBLIC-Report-Farm-Restructuring-in-Uzbekistan-eng.pdf

Received: February 12, 2025
Accepted: January 6, 2026