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INTERNATIONAL CLIMATE INITIATIVE (IKI)

Protocol of implementing behavioral experiments for trees on farms options in Uganda: Experiment on risk preferences

International Climate Initiative (IKI)

Harnessing the potential of trees on farms (TonF) for meeting national and global biodiversity targets

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OBJECTIVE OF THE STUDY

The objectives of this study are (1) to elicit both risk and time preferences of smallholder coffee farmers in eastern Uganda using lottery-based experiments, and (2) to investigate key attributes or features of companion trees in coffee agroforestry systems that are preferred by farmers using a discrete choice experiment (DCE). We investigate farmer preferences related to six companion tree attributes: tree products provided, regulating ecosystem services provided, growth rate, seedling price, provision of quality shade for coffee, and maximum tree height. To demonstrate the relation between risk and time preferences and the adoption of companion trees, we couple these experimental data with the results from the DCE about farmers' preferences for companion tree attributes. To analyze potential strata in farmer preferences, our sample includes coffee farmers from different altitude zones. Our gendered research design furthermore allows exploring possible differences in preferences between men and women.

DESCRIPTION OF EXPERIMENTS

a. Experiment on risk preferences

We used a series of lottery-based experiments to elicit behavioral characteristics related to risk and potential losses. The experiment used in this study is based on those introduced in Tanaka et al. (2010) and Liu (2013). This experimental design, which takes the form of a Multiple Price List (MPL) design, had previously been tested among individual respondents in different developing countries (Liebenehm & Waibel, 2014; Nguyen, 2011; Ward & Singh, 2015). According to this method, respondents are confronted with an array of paired lotteries (including options A and B) and one of these two options has to be chosen, which implies that the other has to be rejected. To enforce choices consistent with monotonic preferences, we follow Tanaka et al. (2010) and Liu (2013) and capture information only on the switching point in each series.[1] This method assumes rationality of the respondents and eliminates any inconsistent behavior (Liu & Huang, 2013). The switching points are used to estimate the respondents' risk preference parameters. While our experiment maintained the general design of previous studies, a few adaptations were made to improve contextual suitability. For instance, payoffs were specifically calibrated to the context of Ugandan smallholder farmers. Furthermore, the overall experiment was framed in a way that is familiar to these farmers, rather than keeping it hypothetical. Specifically, risk preference was determined based on the respondents' choice between two types of tree species that promise different levels of income depending on the weather conditions.[2]

The risk experiment consisted of three series of paired lotteries. In each series, the respondent has to choose between two options ('Tree species A' and 'Tree species B'), where each option is a lottery (Figure 1). The probabilities were explained using a fair ten-sided dice, numbered 1 to 10, with different rewards for each option. The numbers 1 to 10 represent 10 years of weather ('good rains' or 'bad/ no rains'). The respondent makes a choice based on single picture cards illustrating each lottery pair. For example, 'Tree species A' gives 4,000 USh as income from production in times of 'good rains' (in 3 out of 10 years) and 1,000 USh in times of 'bad/ no rains' (in 7 out of 10 years). Alternatively, 'Tree species B' gives 15,000 USh as income from production in times of 'good rains' (in 1 out of 10 years) and 500 USh in times of 'bad/ no rains' (in 9 out of 10 years). One would note that 'Tree species B' pays more in times of 'good rains', but less in times of

[1] Each respondent is allowed to switch from lottery A to lottery B only once during each series. The option of choosing either all A or all B is also available.

[2] To increase the external validity of experiments, it has been argued that experimental instructions may be framed in a context familiar to the subjects (Alekseev, Charness, & Gneezy, 2017; Viceisza, 2016).

'bad/no rains'. In total, there were 35 choices to make. These were grouped in three independent series, each of which contained between 7 and 14 choices (Table 1).

At the end of the experiment, one pair of lotteries was randomly selected to be played for real money to encourage participants to reveal their true preferences (Andersen, Harrison, Lau, & Rutström, 2006; Holt & Laury, 2002). The average reward was 7,400 USh (approximately $2). The highest amount that could have been won by the respondent was 170,000 USh (approximately $45). The highest amount that could have been lost was 2,100 USh (approximately $0.6). This is the amount that was paid when the respondent agreed to participate in the experiment.

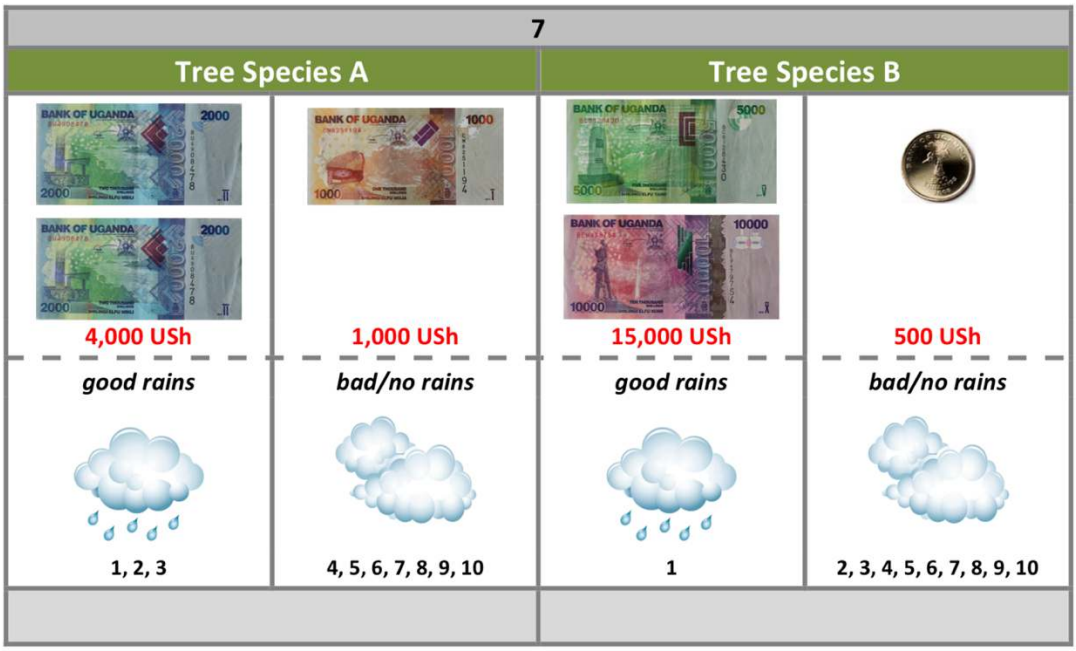

Figure 1. Example of a picture card in the risk experiment. Source: Authors.

Table 1. Design of risk experiment (in Ugandan shillings)

		Option A		Option B	
		Probability		Probability	
Series 1	Choices	30%	70%	10%	90%
	1	4,000	1,000	6,800	500
	2	4,000	1,000	7,500	500
	3	4,000	1,000	8,300	500
	4	4,000	1,000	9,300	500
	5	4,000	1,000	10,600	500
	6	4,000	1,000	12,500	500
	7	4,000	1,000	15,000	500
	8	4,000	1,000	18,500	500
	9	4,000	1,000	22,000	500
	10	4,000	1,000	30,000	500
	11	4,000	1,000	40,000	500

		Option A		Option B	
		Probability		Probability	
	12	4,000	1,000	60,000	500
	13	4,000	1,000	100,000	500
	14	4,000	1,000	170,000	500
Series 2	Choices	90%	10%	70%	30%
	1	4,000	3,000	5,400	500
	2	4,000	3,000	5,600	500
	3	4,000	3,000	5,800	500
	4	4,000	3,000	6,000	500
	5	4,000	3,000	6,200	500
	6	4,000	3,000	6,500	500
	7	4,000	3,000	6,800	500
	8	4,000	3,000	7,200	500
	9	4,000	3,000	7,700	500
	10	4,000	3,000	8,300	500
	11	4,000	3,000	9,000	500
	12	4,000	3,000	10,000	500
	13	4,000	3,000	11,000	500
	14	4,000	3,000	13,000	500
Series 3	Choices	50%	50%	50%	50%
	1	2,500	-400	3,000	-2,100
	2	400	-400	3,000	-2,100
	3	100	-400	3,000	-2,100
	4	100	-400	3,000	-1,600
	5	100	-800	3,000	-1,600
	6	100	-800	3,000	-1,400
	7	100	-800	3,000	-1,100

b. Experiment on time preferences

The time experiment consisted of 15 series of five choices between a smaller reward delivered immediately (Option A) and a larger reward delivered at a later specified time (Option B) (Nguyen, 2011; Tanaka et al., 2010). In total, respondents had to make 75 choices, which are partially presented in (Table 2). The table shows only the first three series in which the same range of five immediate rewards (Option A) is contrasted with the same delayed reward at three different points of time in the future (Option B). In every fourth series, the amount of the five immediate rewards x_t and that of the delayed rewards $(x_{t+\tau})$ change, but the ratio between the two options remains identical, that is, $x_t = x_{t+\tau} * \nu/6$, where $\nu = 1, \dots, 5$ is the choice

number within each series. The future reward varies between 3,000 USh (approximately $0.8) and 30,000 USh (approximately $8), and the delay varies between three days and three months. Within each series, the respondent had to decide, whether he or she preferred Option A or Option B. Respondents made choices based on single picture cards illustrating both options (Figure 2). Again, monotonic switching was enforced.

After all 75 choices were made, the respondent was asked to blindly draw one card out of a bag. The cards in the bag were numbered from 1 to 75. The card drawn determined the decision number, and the respondent gained the reward at the respective time according to the choice he or she made during the experiment. For example, if Option A had been chosen during the choice for which the number was drawn, the respondent received the reward in cash immediately. If Option B had been chosen, the respondent received a credit voucher indicating the amount of money he or she would receive and the date of payment. The credit voucher was issued by the experimenter and approved by the main researcher. The money was sent via a mobile money transfer to the respondent's number by a finance officer of our institution exactly on the date of payment as indicated on the credit voucher. Average payoffs were 12,500 USh (approximately $3.4).

Table 2. Design of time experiment (in Ugandan shillings)

Series	Choices	Option A	Option B
1	1	2,000 USh today	12,000 USh in 1 week
	2	4,000 USh today	12,000 USh in 1 week
	3	6,000 USh today	12,000 USh in 1 week
	4	8,000 USh today	12,000 USh in 1 week
	5	10,000 USh today	12,000 USh in 1 week
2	6	2,000 USh today	12,000 USh in 1 month
	7	4,000 USh today	12,000 USh in 1 month
	8	6,000 USh today	12,000 USh in 1 month
	9	8,000 USh today	12,000 USh in 1 month
	10	10,000 USh today	12,000 USh in 1 month
3	11	2,000 USh today	12,000 USh in 3 months
	12	4,000 USh today	12,000 USh in 3 months
	13	6,000 USh today	12,000 USh in 3 months
	14	8,000 USh today	12,000 USh in 3 months
	15	10,000 USh today	12,000 USh in 3 months
…	…	…	…

Figure 2. Example of a picture card in the time experiment. Source: Authors.

c. Discrete choice experiment

We used a DCE to analyze farmers' preferences for different features of companion trees in coffee-banana farming systems. In a DCE, respondents are presented with alternative descriptions of a good, differentiated by their attribute levels, and are asked to choose one of the alternatives (Holmes & Adamowicz, 2003). In order to identify contextually relevant attributes and their levels, we conducted key informant interviews and focus group discussions with farmers during a preliminary field visit to the study area. Based on their feedback, we selected six attributes that they deemed important in a companion tree with two to six levels (Table 3). The first attribute relates to the products provided by companion trees, namely fruits, timber, fuelwood, and fodder. Regulating ecosystem services provided by companion trees are the second attribute. The four levels are microclimate (i.e. buffering temperature extremes and conserving soil moisture), soil fertility (i.e. producing mulch and controlling erosion) pests and diseases control (i.e. decreasing incidence of white coffee stem borer and coffee leaf rust[3]), and weed control (i.e. suppressing weed growth). As the third attribute we consider the growth rate of companion trees and define three levels: slow-, medium-, and fast-growing. The fourth attribute is the seedling price, categorized in five levels: 0 USh, 200 USh, 500 USh, 1,000 USh, and 1,500 USh. The fifth attribute concerns the provision of quality shade for coffee in two levels: light and mottled shade, as well as dense shade. The last attribute in the choice experiment is the tree height of the companion tree, either short (< 5 m) or tall (> 5 m).

[3] White coffee stem borer and coffee leaf rust are the major pests and diseases in coffee systems in the study area.

Table 3. Overview of attributes and levels used in the choice experiment

Attributes	Definition	Attribute levels
Tree products	Products provided by companion trees	1. Fruits 2. Timber 3. Fuelwood 4. Fodder
Ecosystem services	Regulating services provided by companion trees (i.e. microclimate, soil fertility, pests and diseases control, and weed control)	1. Buffering temperature extremes and conserving soil moisture 2. Producing mulch and controlling erosion 3. Fewer problems of White Coffee Stem Borer and Coffee Leaf Rust 4. Suppressing weed growth
Tree growth rate	Growth rate of companion tree species	1. Slow-growing 2. Medium-growing 3. Fast-growing
Seedling price	Cost of one tree seedling of companion tree species	1. 0 USh 2. 200 USh 3. 500 USh 4. 1,000 USh 5. 1,500 USh
Shade quality	Shade quality of companion tree species	1. Light, mottled shade 2. Dense shade
Tree height	Maximum tree height of companion tree species	1. Short (< 5 m) 2. Tall (> 5 m)

The six attributes and their different levels imply a full factorial design with 960 ($5^1 \times 4^2 \times 3^1 \times 2^2$) combinations. Theoretically, each unique combination of attribute levels represents a specific companion tree species. To produce a more manageable experiment, a d-optimal design was used to generate a subset of companion tree species that covers the range of variability between all possible combinations (Hensher, Rose, & Greene, 2015). In total, 32 choice sets were included in our design. The choice sets were further subdivided into four subsets containing eight choice sets each. To reduce the response burden and to avoid fatigue, respondents were randomly assigned one of these four subsets, with an even number of households allocated to each of the subsets. A choice set consisted of two alternative companion tree species (A and B) and an status quo ('none of the trees') option. The status quo option is provided because a respondent might not have a preference for either of the companion tree species listed. Moreover, illustrations were included in the choice sets to increase respondents' comprehension of the attributes and levels (Figure 3). Before conducting the DCE, we explained to the respondents that the drawings used hypothetical companion tree species rather than real ones. The attributes and levels used were carefully explained. Respondents were also informed that the choices they made in the experiment would not have any immediate consequence. It was clarified that the results would be used more generally to better understand farmers' preferences for particular characteristics of companion trees that may inform project design or future project implementation.

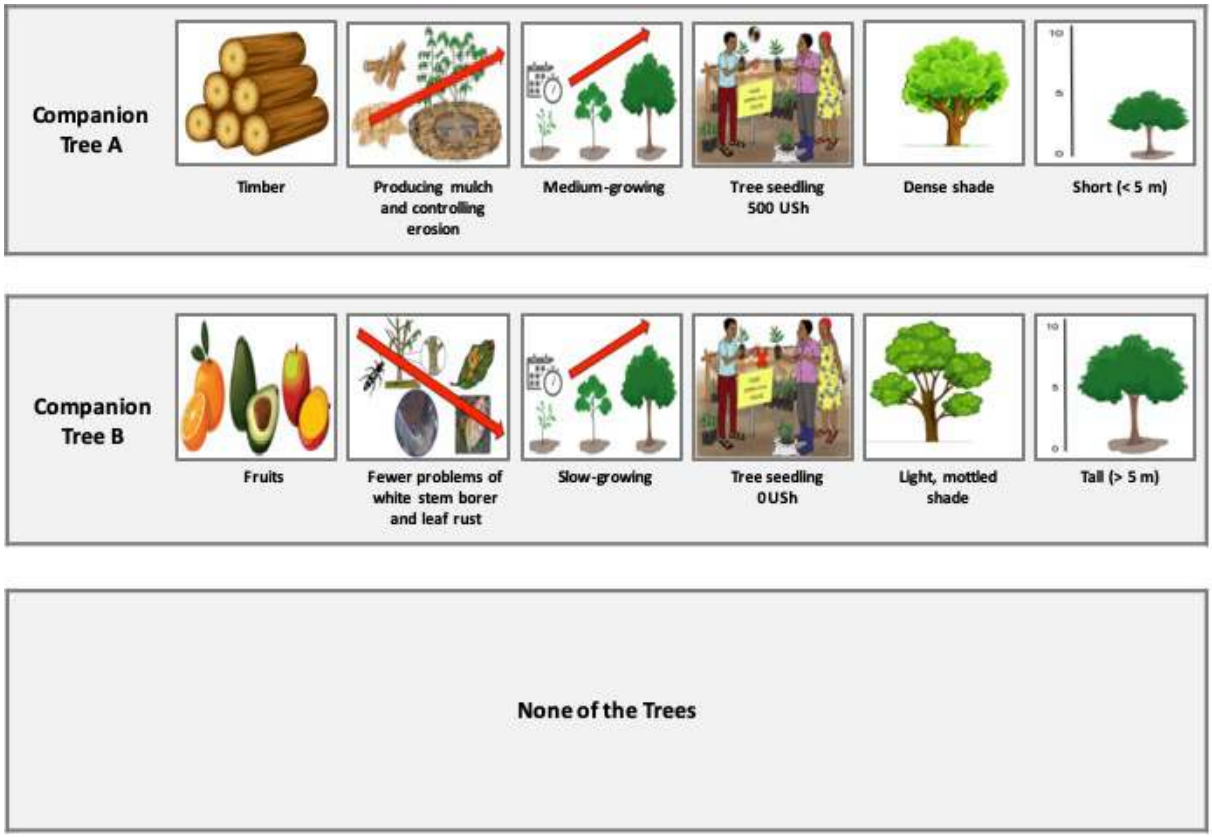

Figure 3. Example of a choice card. Source: Authors.

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Instructions – Experiment on risk preferences 3 (incentivized)

[1] Instructions to experimenter
1. The experimenter hands out choice card 1 of the risk game to the respondent as an example.
2. The experimenter first asks the respondent what he/she thinks the pictures on the choice card represent. i. This serves as an icebreaker. It basically enables the respondent to start thinking about the material and the decisions he/she will be presented with during the game. ii. The respondent should realize that the task has something to do with trees and 'good' or 'bad/no' rains.
[2] Experiment explanation example: Experimenter explains to respondents
1. *The brainstorming has shown that the task today has to do with trees and 'good' or 'bad/no' rains.*
2. *Specifically, we will talk about two types of tree species (we call them 'Tree species A' and 'Tree species B'). We are going to ask you which of these two tree species you prefer.*
3. *But first you have to understand how to make a difference between these two tree species? You will see that the difference has to do with how well the trees grow in different climatic conditions – specifically, you will see that some tree species grow better than others when there are good rains, but also when there bad/no rains. This is what matters. To understand that better, let's focus on the third row of the choice card.*
4. Let's start with 'Tree species A' a. *'Tree species A' gives 4,000 USh as income from production in times of 'good rains' and 1,000 USh in times of 'bad/no rains'.* i. Explain payoff and how it is associated with 'good rains' or 'bad/no rains'. ii. Quiz respondent on how high the payoff is in times of 'good rains' or 'bad/no rains'.
5. Move to explain tree species B' a. *Now, let's look at 'Tree species B'. What is different about it? Well, this tree species gives 6,800 USh as income from production in times of 'good rains' but 500 USh in times of 'bad/no rains'.*
6. *'So, the difference between the two tree species is that 'Tree Species B' pays MORE in times of 'good rains' but LESS in times of 'bad/no rains'.* i. Explain payoff and how it is associated with 'good rains' or 'bad/no rains'. ii. Quiz respondent on how much payoff is in times of 'good rains' or 'bad/no rains'.

7. Recap: *So, we have seen that there are two types of tree species, 'Tree Species A' and 'Tree Species B'. We also know that they are affected by the weather ('good rains' or 'bad/no rains')*.

8. *What do we know about the weather*?
   a. *As in real life, sometimes there are 'good rains' and sometimes there are 'bad/no rains'*.
   b. *These 10 numbers (1, 2, 3, …, 10) of a 10-sided dice represent 10 years of weather ('good rains' or 'bad/no rains')*.
   c. *The numbers in the columns of 'good rains' and 'bad/no rains' of the choice card represent the years of 'good rains' or 'bad/no rains'*.
   d. *In the fourth row of the choice card, in 3 out of 10 years there are 'good rains' and in the 7 other years there are 'bad/no rains'* ***for 'Tree Species A'***.
      i. *The numbers 1, 2, 3 represent the years of 'good rains'*.
      ii. *The numbers 4, 5, 6, 7, 8, 9, 10 represent the years of 'bad/no rains'*.
   e. *Still in the fourth row of the choice card, in 1 out of 10 years there are 'good rains' and 9 out of 10 years there are 'bad/no rains'* ***for 'Tree Species B'***.
      iii. *The number 1 represents the year of 'good rains'*.
      iv. *The numbers 2, 3, 4, 5, 6, 7, 8, 9, 10 represent the years of 'bad/no rains'*.

9. Questions/quiz to test respondent's understanding of the weather factor:
   i. *How many years can be 'good rains' in row 4 of the choice card*? [ADD ANSWER IN BRACKETS]
   ii. *How many years can be 'bad/no rains'*? [ADD ANSWER IN BRACKETS]
   iii. *What is the income from production if there are 'good rains' (depends on whether you buy 'Tree Species A' or 'Tree Species B')*? [ADD ANSWER]
   iv. *Suppose, you buy 'Tree Species A' and there are 'good rains', what is your income from production? How about 'Tree Species B'*? [ADD ANSWER]
   v. *How about if there are 'bad/no rains'*? [ADD ANSWER IN BRACKETS]

[3] Instruction about proceedings during actual experiment: Experimenter explains to respondents

1. *We discussed only one choice card. In total, we will show 35 similar choice cards. How are the other choice cards different from choice card 1*?

i. *Notice that when we go from choice card 1 to choice card 2 and continue up to choice card 14, the only aspect that changes is the income from production. The number of years of 'good rains' and 'bad/no rains' do NOT change up to choice card 14.* ii. *After choice card 14, the numbers in the columns of 'good rains' and 'bad/no rains' as well as the income from production change.* iii. The respondent is informed that during the game he/she will be notified about any changes to avoid too much prior information.
2. *So, we are going to ask you to make a decision for each of the choice cards that will be presented to you: Do you prefer 'Tree Species A' or 'Tree Species B'*?
3. *There is only one restriction in your decisions within each of the three series: you can either start with 'Tree Species A' or 'Tree Species B'. If you start with 'Tree Species A', you can continue to choose 'Tree Species A' for as long as you want, but if you choose 'Tree Species B' at any point, you cannot go back to 'Tree Species A'. Also, if you start with 'Tree Species B', you can only choose 'Tree Species B' for the rest of the series*.
4. *Is this clear*?
[4] Instruction to the experimenter
1. Examples are repeated until the experimenter feels confident about the respondent's understanding.
2. Once the experimenter is satisfied with the respondent's understanding, actual decisions are made.
3. The experimenter presents each series separately and after each other. For each series ONLY 1 switch from 'Tree Species A' to 'Tree Species B' possible. i. First, series 1: choice cards 1 – 14 ii. Second, series 2: choice cards 15 – 28 iii. Third, series 3: choice cards 29 – 35
[5] Instructions for the experiment: Experimenter explains to respondents
1. *In this game, you play for real money. It's a bit complicated, but you will understand*.
2. *After you have made all 35 decisions, you are asked to blindly draw one card out of a bag. The cards in the bag are numbered from 1 to 35. The card drawn will determine the decision number that will be played for real money. So only one of the 35 decisions will be played for real money*.
3. *For example, if you draw a card that shows a 1, then decision number 1 will be played for real money. No pair of choices is any more likely to be used than any other and you will not know in advance which one will be selected, so please think about each decision carefully*.

4. *After the card is drawn to determine which choice pair will be played, we will refer to the questionnaire to see whether you had previously chosen 'Tree species A' or 'Tree species B'. Then, we will roll the 10-sided dice to determine which payout you will receive*.
5. *For example, if you choose 'Tree species A', and the dice roll shows a 1, 2, or 3 then you will receive 4,000 USh and if the dice roll shows a 4, 5, 6, 7, 8, 9, or 10 then you will receive 1,000 USh*.
6. *If you agree to participate in this game, you will receive 2,100 USh to start. What will happen with these 2,1000 USh will depend on the decisions you take and on the number you draw out of the bag. You might lose all the money or you might win some. The maximum win is to 170,000 USh*.
7. *Do you have any questions*?

1			
Tree Species A		**Tree Species B**	
			
4,000 USh	**1,000 USh**	**6,800 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3	**4, 5, 6, 7, 8, 9, 10**	**1**	**2, 3, 4, 5, 6, 7, 8, 9, 10**

2			
Tree Species A		**Tree Species B**	
			
4,000 USh	**1,000 USh**	**7,500 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3	**4, 5, 6, 7, 8, 9, 10**	**1**	**2, 3, 4, 5, 6, 7, 8, 9, 10**

3			
Tree Species A		**Tree Species B**	
 		   	
4,000 USh	**1,000 USh**	**8,300 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3	**4, 5, 6, 7, 8, 9, 10**	**1**	**2, 3, 4, 5, 6, 7, 8, 9, 10**

4			
Tree Species A		**Tree Species B**	
 		   	
4,000 USh	**1,000 USh**	**9,300 USh**	**500 USh**
good rains 	***bad/no rains*** 	***good rains*** 	***bad/no rains*** 
1, 2, 3	**4, 5, 6, 7, 8, 9, 10**	**1**	**2, 3, 4, 5, 6, 7, 8, 9, 10**

5			
Tree Species A		**Tree Species B**	
  **4,000 USh**	 **1,000 USh**	  **10,600 USh**	 **500 USh**
good rains  **1, 2, 3**	***bad/no rains***  **4, 5, 6, 7, 8, 9, 10**	***good rains***  **1**	***bad/no rains***  **2, 3, 4, 5, 6, 7, 8, 9, 10**

6			
Tree Species A		**Tree Species B**	
 		  	
4,000 USh	**1,000 USh**	**12,500 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3	**4, 5, 6, 7, 8, 9, 10**	**1**	**2, 3, 4, 5, 6, 7, 8, 9, 10**

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7			
Tree Species A		**Tree Species B**	
  **4,000 USh**	 **1,000 USh**	  **15,000 USh**	 **500 USh**
good rains  **1, 2, 3**	***bad/no rains***  **4, 5, 6, 7, 8, 9, 10**	***good rains***  **1**	***bad/no rains***  **2, 3, 4, 5, 6, 7, 8, 9, 10**

8			
Tree Species A		**Tree Species B**	
 		    	
4,000 USh	**1,000 USh**	**18,500 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***

			
1, 2, 3	**4, 5, 6, 7, 8, 9, 10**	**1**	**2, 3, 4, 5, 6, 7, 8, 9, 10**

9			
Tree Species A		**Tree Species B**	
  **4,000 USh**	 **1,000 USh**	  **22,000 USh**	 **500 USh**
good rains  **1, 2, 3**	***bad/no rains***  **4, 5, 6, 7, 8, 9, 10**	***good rains***  **1**	***bad/no rains***  **2, 3, 4, 5, 6, 7, 8, 9, 10**

10			
Tree Species A		**Tree Species B**	
			
4,000 USh	**1,000 USh**	**30,000 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3	**4, 5, 6, 7, 8, 9, 10**	**1**	**2, 3, 4, 5, 6, 7, 8, 9, 10**

11			
Tree Species A		**Tree Species B**	
  **4,000 USh**	 **1,000 USh**	  **40,000 USh**	 **500 USh**
good rains  **1, 2, 3**	***bad/no rains***  **4, 5, 6, 7, 8, 9, 10**	***good rains***  **1**	***bad/no rains***  **2, 3, 4, 5, 6, 7, 8, 9, 10**

12			
Tree Species A		**Tree Species B**	
  **4,000 USh**	 **1,000 USh**	  **60,000 USh**	 **500 USh**
good rains  **1, 2, 3**	***bad/no rains***  **4, 5, 6, 7, 8, 9, 10**	***good rains***  **1**	***bad/no rains***  **2, 3, 4, 5, 6, 7, 8, 9, 10**

13			
Tree Species A		**Tree Species B**	
 		 	
4,000 USh	**1,000 USh**	**100,000 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3	**4, 5, 6, 7, 8, 9, 10**	**1**	**2, 3, 4, 5, 6, 7, 8, 9, 10**

14	
Tree Species A	**Tree Species B**
 	
4,000 USh	**1,000 USh**
good rains	***bad/no rains***
	
1, 2, 3	**4, 5, 6, 7, 8, 9, 10**

   	
170,000 USh	**500 USh**
good rains	***bad/no rains***
	
1	**2, 3, 4, 5, 6, 7, 8, 9, 10**

15			
Tree Species A		**Tree Species B**	
  **4,000 USh**	  **3,000 USh**	  **5,400 USh**	 **500 USh**
good rains  **1, 2, 3, 4, 5, 6, 7, 8, 9**	***bad/no rains***  **10**	***good rains***  **1, 2, 3, 4, 5, 6, 7**	***bad/no rains***  **8, 9, 10**

16			
Tree Species A		**Tree Species B**	
  **4,000 USh**	  **3,000 USh**	  **5,600 USh**	 **500 USh**
good rains  **1, 2, 3, 4, 5, 6, 7, 8, 9**	***bad/no rains***  **10**	***good rains***  **1, 2, 3, 4, 5, 6, 7**	***bad/no rains***  **8, 9, 10**

17			
Tree Species A		**Tree Species B**	
  **4,000 USh**	  **3,000 USh**	  **5,800 USh**	 **500 USh**
good rains  **1, 2, 3, 4, 5, 6, 7, 8, 9**	***bad/no rains***  **10**	***good rains***  **1, 2, 3, 4, 5, 6, 7**	***bad/no rains***  **8, 9, 10**

18			
Tree Species A		**Tree Species B**	
  **4,000 USh**	  **3,000 USh**	  **6,000 USh**	 **500 USh**
good rains  **1, 2, 3, 4, 5, 6, 7, 8, 9**	***bad/no rains***  **10**	***good rains***  **1, 2, 3, 4, 5, 6, 7**	***bad/no rains***  **8, 9, 10**

19			
Tree Species A		**Tree Species B**	
 	 	  	
4,000 USh	**3,000 USh**	**6,200 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5, 6, 7, 8, 9	**10**	**1, 2, 3, 4, 5, 6, 7**	**8, 9, 10**

20			
Tree Species A		**Tree Species B**	
 	 	  	
4,000 USh	**3,000 USh**	**6,500 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5, 6, 7, 8, 9	**10**	**1, 2, 3, 4, 5, 6, 7**	**8, 9, 10**

21			
Tree Species A		**Tree Species B**	
			
			
			
4,000 USh	**3,000 USh**	**6,800 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5, 6, 7, 8, 9	**10**	**1, 2, 3, 4, 5, 6, 7**	**8, 9, 10**

22			
Tree Species A		**Tree Species B**	
 	 	  	
4,000 USh	**3,000 USh**	**7,200 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5, 6, 7, 8, 9	**10**	**1, 2, 3, 4, 5, 6, 7**	**8, 9, 10**

23			
Tree Species A		**Tree Species B**	
 	 	  	
4,000 USh	**3,000 USh**	**7,700 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5, 6, 7, 8, 9	**10**	**1, 2, 3, 4, 5, 6, 7**	**8, 9, 10**

24			
Tree Species A		**Tree Species B**	
 	 	   	
4,000 USh	**3,000 USh**	**8,300 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5, 6, 7, 8, 9	**10**	**1, 2, 3, 4, 5, 6, 7**	**8, 9, 10**

25			
Tree Species A		**Tree Species B**	
 	 	  	
4,000 USh	**3,000 USh**	**9,000 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5, 6, 7, 8, 9	**10**	**1, 2, 3, 4, 5, 6, 7**	**8, 9, 10**

26			
Tree Species A		**Tree Species B**	
 	 		
4,000 USh	**3,000 USh**	**10,000 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5, 6, 7, 8, 9	**10**	**1, 2, 3, 4, 5, 6, 7**	**8, 9, 10**

27			
Tree Species A		**Tree Species B**	
 	 	 	
4,000 USh	**3,000 USh**	**11,000 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5, 6, 7, 8, 9	**10**	**1, 2, 3, 4, 5, 6, 7**	**8, 9, 10**

28			
Tree Species A		**Tree Species B**	
 	 	  	
4,000 USh	**3,000 USh**	**13,000 USh**	**500 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5, 6, 7, 8, 9	**10**	**1, 2, 3, 4, 5, 6, 7**	**8, 9, 10**

29			
Tree Species A		**Tree Species B**	
 		 	 
2,500 USh	**– 400 USh**	**3,000 USh**	**– 2,100 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5	**6, 7, 8, 9, 10**	**1, 2, 3, 4, 5**	**6, 7, 8, 9, 10**

30			
Tree Species A		**Tree Species B**	
		 	 
400 USh	**– 400 USh**	**3,000 USh**	**– 2,100 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5	**6, 7, 8, 9, 10**	**1, 2, 3, 4, 5**	**6, 7, 8, 9, 10**

31			
Tree Species A		**Tree Species B**	
		 	 
100 USh	**– 400 USh**	**3,000 USh**	**– 2,100 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5	**6, 7, 8, 9, 10**	**1, 2, 3, 4, 5**	**6, 7, 8, 9, 10**

32			
Tree Species A		**Tree Species B**	
		 	 
100 USh	**– 400 USh**	**3,000 USh**	**– 1,600 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5	**6, 7, 8, 9, 10**	**1, 2, 3, 4, 5**	**6, 7, 8, 9, 10**

33			
Tree Species A		**Tree Species B**	
		 	 
100 USh	**– 800 USh**	**3,000 USh**	**– 1,600 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5	**6, 7, 8, 9, 10**	**1, 2, 3, 4, 5**	**6, 7, 8, 9, 10**

34			
Tree Species A		**Tree Species B**	
		 	 
100 USh	**– 800 USh**	**3,000 USh**	**– 1,400 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5	**6, 7, 8, 9, 10**	**1, 2, 3, 4, 5**	**6, 7, 8, 9, 10**

35			
Tree Species A		**Tree Species B**	
		 	 
100 USh	**– 800 USh**	**3,000 USh**	**– 1,100 USh**
good rains	***bad/no rains***	***good rains***	***bad/no rains***
			
1, 2, 3, 4, 5	**6, 7, 8, 9, 10**	**1, 2, 3, 4, 5**	**6, 7, 8, 9, 10**