

# Unravelling the pastoralist paradox – preferences for land tenure security and flexibility in Kenya

Göran Bostedt<sup>1,2,3,4\*</sup>, Erlend Dancke Sandorf<sup>5</sup>, Stephen M. Mureithi<sup>6</sup> and Deborah N. Muricho<sup>6</sup>

<sup>1</sup>Department of Forest Economics, Swedish University of Agricultural Sciences, Umeå, Sweden, <sup>2</sup>Umeå School of Business and Economics, Umeå University, Umeå, Sweden, <sup>3</sup>Center for Environmental and Resource Economics, CERE, Umeå, Sweden, <sup>4</sup>Luleå University of Technology, Luleå, Sweden, <sup>5</sup>School of Economics and Business, Norwegian University of Life Sciences, Ås, Norway, <sup>6</sup>Department of Land Resource Management & Agricultural Technology (LARMAT), University of Nairobi, Nairobi, Kenya

\*Corresponding author. E-mail: [goran.bostedt@slu.se](mailto:goran.bostedt@slu.se)

## ONLINE APPENDIX

## **Text introduction to the low climate variability treatment**

Now we will ask you to make six choices between two possible tenure contracts and your current situation. The contracts are described by the type of tenure, the availability of livestock insurance and the cost of the contract. We will now describe what the different parts of the contract mean.

1) **TYPE OF TENURE REGIME:** The Kenyan constitution allows for three different types of land tenure: Private land, Community land and Public land. Each contract is defined by one of these tenure regimes.

2) **THE DISTANCE TO EMERGENCY GRAZING AREAS:** In case of extreme drought, it is important to have access to emergency grazing areas. However, land fragmentation can make the migration distance to alternative grazing areas longer. Each contract is defined by the distance to emergency grazing grounds.

3) **AVAILABILITY OF LIVESTOCK INSURANCE:** The Kenya Livestock Insurance Programme, KLIP, is a government backed insurance scheme. The program allows a pastoralist to insure up to 14 animals against drought for about 960 Kenyan Shillings per animal and year. The payouts are pegged to satellite measurements of forage conditions. Plans are to introduce KLIP throughout Kenya, however, there is a risk that the program will be discontinued because of its high cost. Each contract is defined by whether KLIP is available or not.

4) **COST FOR TENURE REGISTRATION AND LAND SURVEYING:** Each contract is defined by the cost for tenure registration and land surveying.

**WHEN MAKING YOUR CHOICE** - think about the next ten years of livestock management, and assume that the drought frequency will **NOT CHANGE** in the future compared with today but stay as today with an average of 1 drought per 5 years. Please treat each choice as if it was real. There are no right or wrong answers and we are only interested in your opinion. If you

choose to enter into a contract, you will have less money to spend on other things. Remember, you can always choose to stay with your current situation at no cost if you believe that is better.

### **Text introduction to the high climate variability treatment**

Now we will ask you to make six choices between two possible tenure contracts and your current situation. The contracts are described by the type of tenure, the availability of livestock insurance and the cost of the contract. We will now describe what the different parts of the contract mean.

1) TYPE OF TENURE REGIME: The Kenyan constitution allows for three different types of land tenure: Private land, Community land and Public land. Each contract is defined by one of these tenure regimes.

2) THE DISTANCE TO EMERGENCY GRAZING AREAS: In case of extreme drought, it is important to have access to emergency grazing areas. However, land fragmentation can make the migration distance to alternative grazing areas longer. Each contract is defined by the distance to emergency grazing grounds.

3) AVAILABILITY OF LIVESTOCK INSURANCE: The Kenya Livestock Insurance Programme, KLIP, is a government backed insurance scheme. The program allows a pastoralist to insure up to 14 animals against drought for about 960 Kenyan Shilling per animal and year. The payouts are pegged to satellite measurements of forage conditions. Plans are to introduce KLIP throughout Kenya, however, there is a risk that the program will be discontinued because of its high cost. Each contract is defined by whether KLIP is available or not.

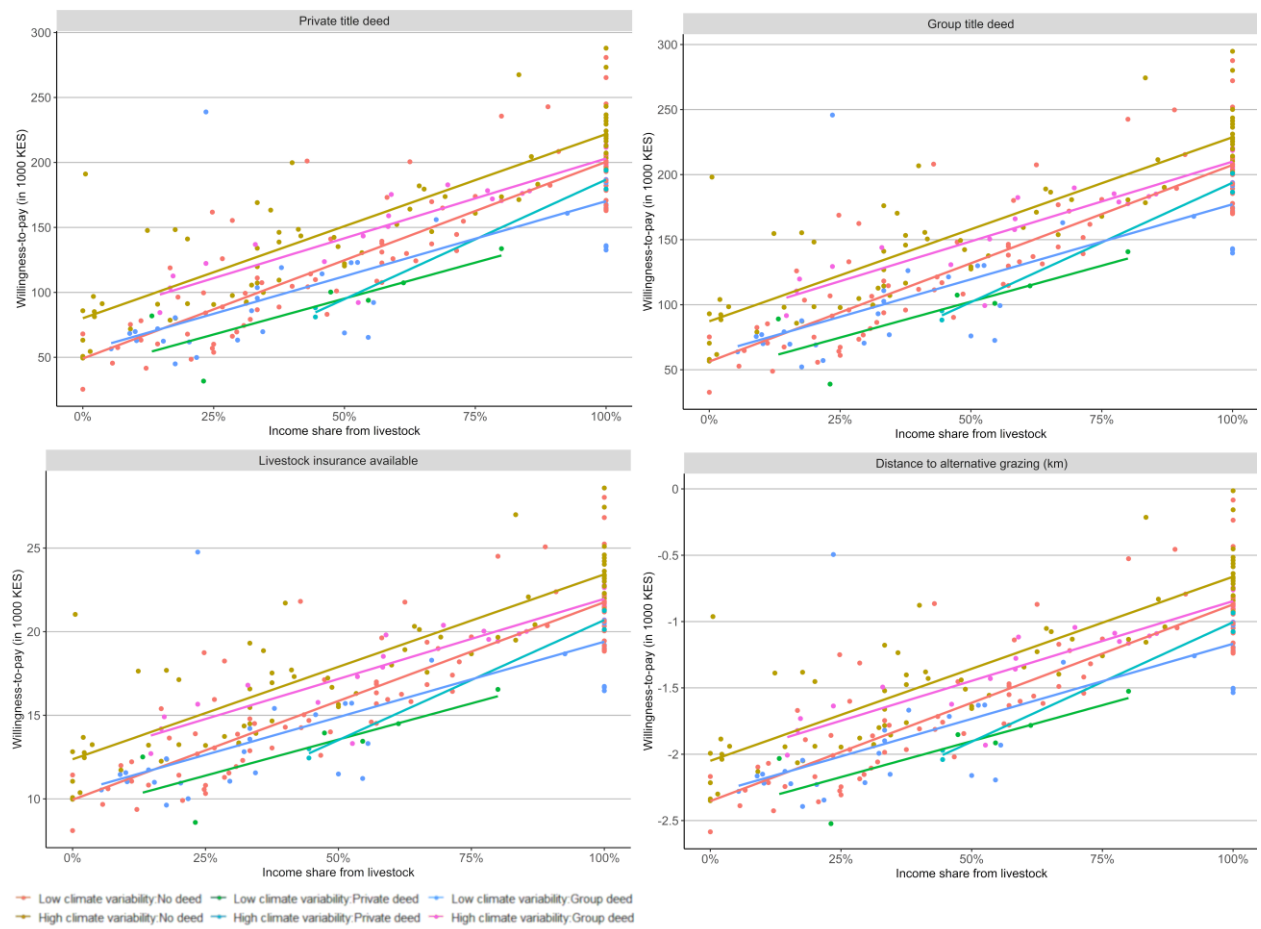
4) COST FOR TENURE REGISTRATION AND LAND SURVEYING: Each contract is defined by the cost for tenure registration and land surveying.

WHEN MAKING YOUR CHOICE - think about the next ten years of livestock management, and assume that the drought frequency will DOUBLE in the future compared with today with an average of 2 droughts per 5 years. Please treat each choice as if it was real. There are no right or wrong answers and we are only interested in your opinion. If you choose to enter into a contract, you will have less money to spend on other things. Remember, you can always choose to stay with your current situation at no cost if you believe that is better.

**An example of a choice set**

	<b>Contract A</b>	<b>Contract B</b>	<b>No change</b>
<b>Property rights</b>	You have a private title deed	You have a group title deed	I prefer my current situation to both A and B
<b>Distance to alternative grazing grounds</b>	180 km	30 km	
<b>Livestock insurance</b>	Not available	Available	
<b>Cost of title deed and surveying</b>	7,500 Kenyan Shillings	15,000 Kenyan Shillings	
	<input type="checkbox"/>	<input type="checkbox"/>	

## Figures and tables



**Figure A1.** Graphical distribution of willingness-to-pay across the distribution of income share from livestock.

**Table A1.** An overview of the attributes and levels they could take in each of the four counties

Attribute	Baringo	Isiolo	Laikipia	West Pokot
Land tenure	Group, Private	Group, Private	Group, Private	Group, Private
Distance (km)	25, 50, 75, 100	30, 60, 90, 120, 150, 180	2.5, 5, 7.5, 10	30, 60, 90, 120, 150, 180
Insurance	0, 1	0, 1	0, 1	0, 1
Cost (Kenyan Shillings, KES)	5000, 7500, 10000, 12500, 15000, 17500	5000, 7500, 10000, 12500, 15000, 17500	5000, 7500, 10000, 12500, 15000, 17500	5000, 7500, 10000, 12500, 15000, 17500

**Table A2.** Tests for significant differences between counties for the variables reported in table 1

Type of title deed			
	West Pokot	Baringo	Laikipia
Baringo	0.000	-	-
Laikipia	0.000	0.000	-
Isiolo	0.000	0.000	0.000
Insurance			
Baringo	0.000	-	-
Laikipia	0.000	0.000	-
Isiolo	0.000	0.000	0.022
Distance to alternative grazing			
Baringo	0.000	-	-
Laikipia	0.194	0.000	-
Isiolo	0.000	0.000	0.018
Houshold head male			
Baringo	0.265	-	-
Laikipia	0.000	0.000	-
Isiolo	0.000	0.000	0.037
Houshold head age			
Baringo	0.000	-	-
Laikipia	0.000	0.000	-
Isiolo	0.000	0.000	0.071
Household head years of education			
Baringo	0.328	-	-
Laikipia	0.017	0.001	-
Isiolo	0.000	0.000	0.006
Income share from livestock			
Baringo	0.000	-	-
Laikipia	0.001	0.134	-
Isiolo	0.000	0.000	0.000



**Table A3.** Percentage of respondents always, never and sometimes choosing the status quo (SQ)

County	Ward	Never SQ %	Sometimes SQ %	Always SQ %
Isiolo	Garbatulla	50.00	2.00	48.00
Isiolo	Kinna	43.59	7.69	48.72
Isiolo	Oldonyiro	46.88	6.25	46.88
Laikipia	Mukogodo East	45.00	0.00	55.00
Laikipia	Mukogodo West	40.00	0.00	60.00
Laikipia	Segeera	55.00	2.50	42.50
Baringo	Saimo/soi	17.86	21.43	60.71
Baringo	Ilchamus	25.00	23.08	51.92
Baringo	Loiyamorok	80.00	5.00	15.00
West Pokot	Suam	96.67	3.33	0.00
West Pokot	Chepareria	93.65	4.76	1.59
West Pokot	Riwo	100.00	0.00	0.00

**Table A4.** Difference between respondents who always, sometimes and never chose the status quo

Choice pattern	No title deed (share)	Group title deed (share)	Private title deed (share)	Insurance (share)	Distance (drought, km)	Male (share)	Age (years)	Years of education	Income share from livestock	N
Always SQ	0.779	0.0233	0.198	0.0291	38.6	0.632	42.4	7.36	0.528	172
Sometimes SQ	0.742	0.0645	0.194	0.0323	29.3	0.767	50.2	6.6	0.518	31
Never SQ	0.539	0.0745	0.387	0.0496	61.5	0.708	44.5	7.41	0.647	282

**Table A5.** P-values for the tests for significant difference between respondents with different choice patterns

Type of title deed		
	Always SQ	Sometimes SQ
Sometimes SQ	0.007	-
Never SQ	0.000	0.000
Insurance		
Sometimes SQ	0.951	-
Never SQ	0.037	0.840
Distance to alternative grazing		
Sometimes SQ	0.038	-
Never SQ	0.000	0.000
Houshold head male		
Sometimes SQ	0.001	-
Never SQ	0.000	0.118
Houshold head age		
Sometimes SQ	0.000	-
Never SQ	0.000	0.000
Household head years of education		
Sometimes SQ	0.180	-
Never SQ	0.800	0.180
Income share from livestock		
Sometimes SQ	0.710	-
Never SQ	0.000	0.000