

Crop Planting Decisions at the Intensive and Extensive Margin: Evidence from Tanzania National Panel Survey

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Research Objective

Our research objective is to consider whether strategies to support particular crops might impact other crops grown or change over time. Our analysis seeks to inform about changes on the extensive and intensive margin in Tanzania, with regards to changes in agricultural land that a farmer has available and area planted in the context of smallholders and farming systems.

Research questions

1. How much does agricultural land available to households change?
2. How much do farmers change the proportion of land dedicated to growing priority crops?
3. How do crop area changes vary with changes in landholding, between smallholder and non-smallholder farmers, and between various farming systems?

Methodology

We used STATA statistical analysis software to collapse plot-level data to the household unit of analysis and create variables of interest. We produced descriptive statistics, split the sample into sub-groups of interest and tested for statistical difference between key sub-groups based on FAO farming systems and smallholder categorization. We were interested in identifying changes at household level in this panel data set in observations from 2008 and 2010.

Data Source

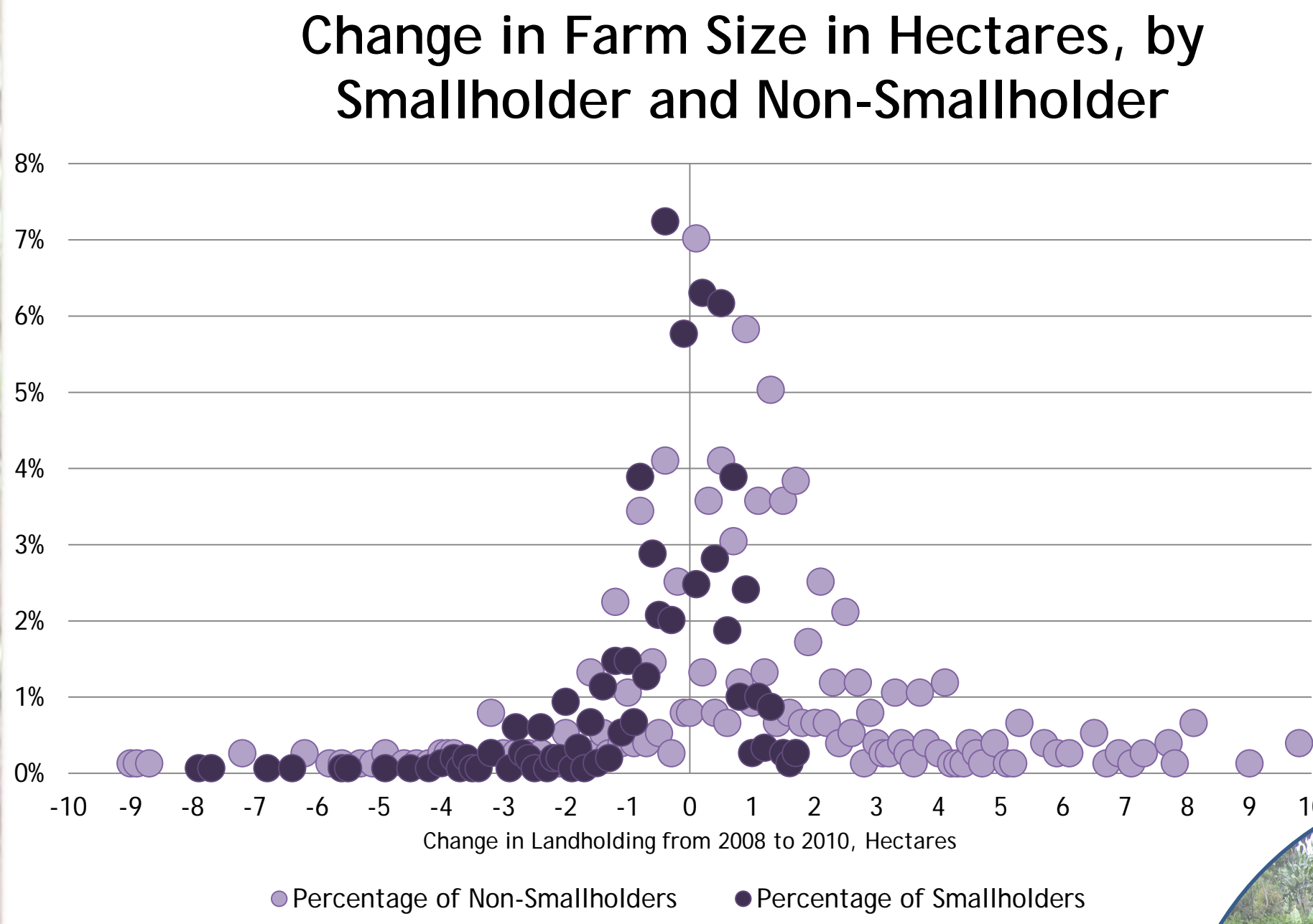
The Tanzania National Panel Survey (TNPS) is part of the World Bank's Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS – ISA) and is implemented by the Tanzania National Bureau of Statistics (NBS). The surveys collect detailed information about agriculture and socio-economic indicators. This analysis is based on two rounds of panel data collected from interviewing the same households during 2008 and 2010. The sample design was constructed to produce nationally representative estimates.

Sample

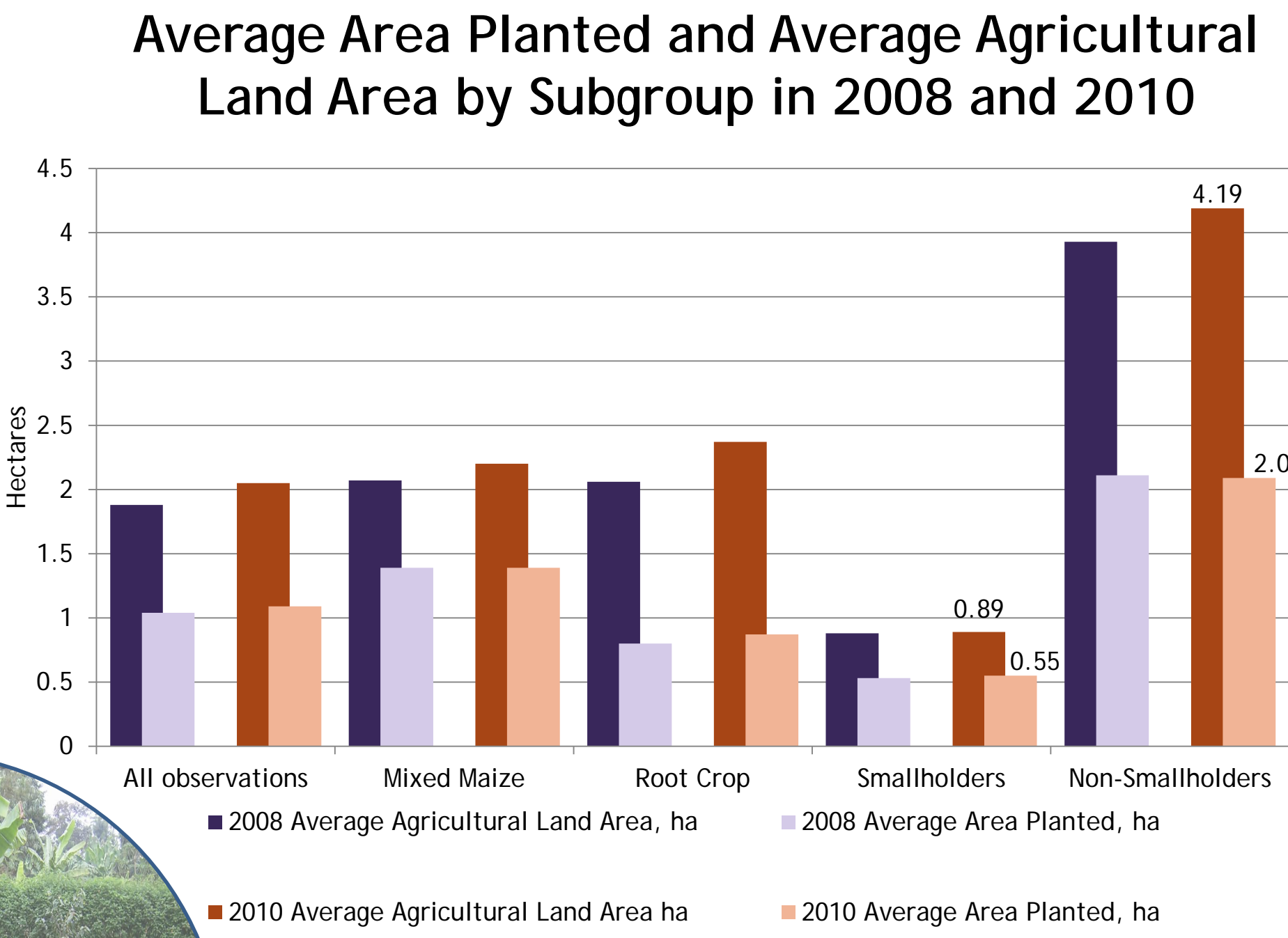
Of all households interviewed in 2008 or 2010, we only included agricultural households that had land in both years and planted in one or both years resulting in a sample size of 2246 households.

	Smallholders	Non-Smallholders
Total Sample (n=2246)	65%	35%
Female Head of Household	30%	12%***
Education (years)	4.5	4.7
Age head of household	48.3	50.9***
Family Size	5.1	6.7***
Extension Services	11.2%	20.1%***
Mixed Maize	49.5%	54%
Root Crop	24%	32%***
*p<0.10, **p<0.05, ***p<0.01		
Note: Values are for year 2010. P-values represent significance between smallholders and non-smallholders.		

Almost half of households had a change of agricultural land area of at least half a hectare from 2008-2010. Smallholder farmers on average decreased the amount of available land between 2008 and 2010, while non-smallholder farmers increased agricultural land area during that time period.

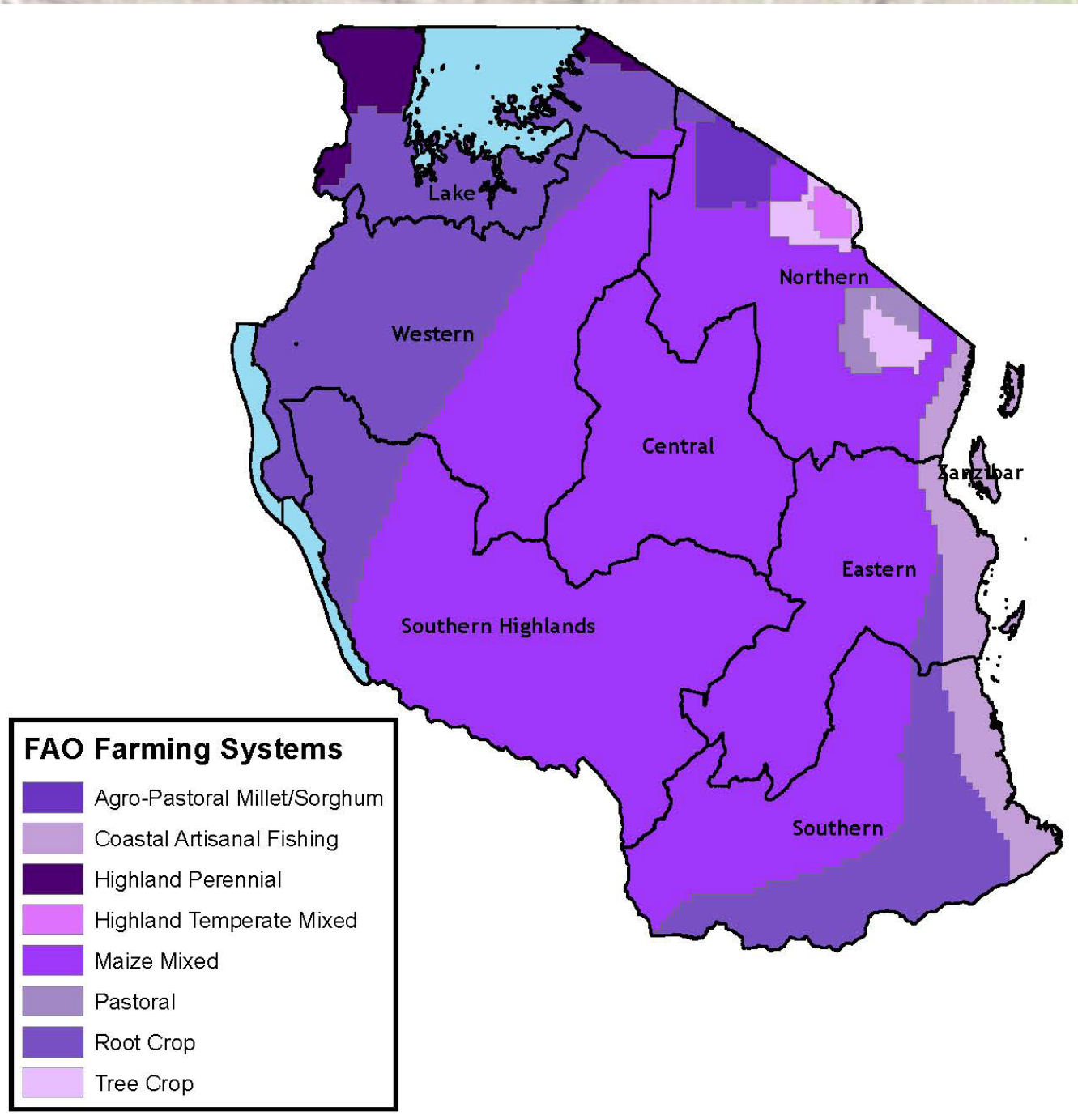


Smallholder households planted a greater proportion of their agricultural land than non-smallholders. Smallholders decreased on the extensive margin while increasing on the intensive margin, but the opposite was true for non-smallholders.



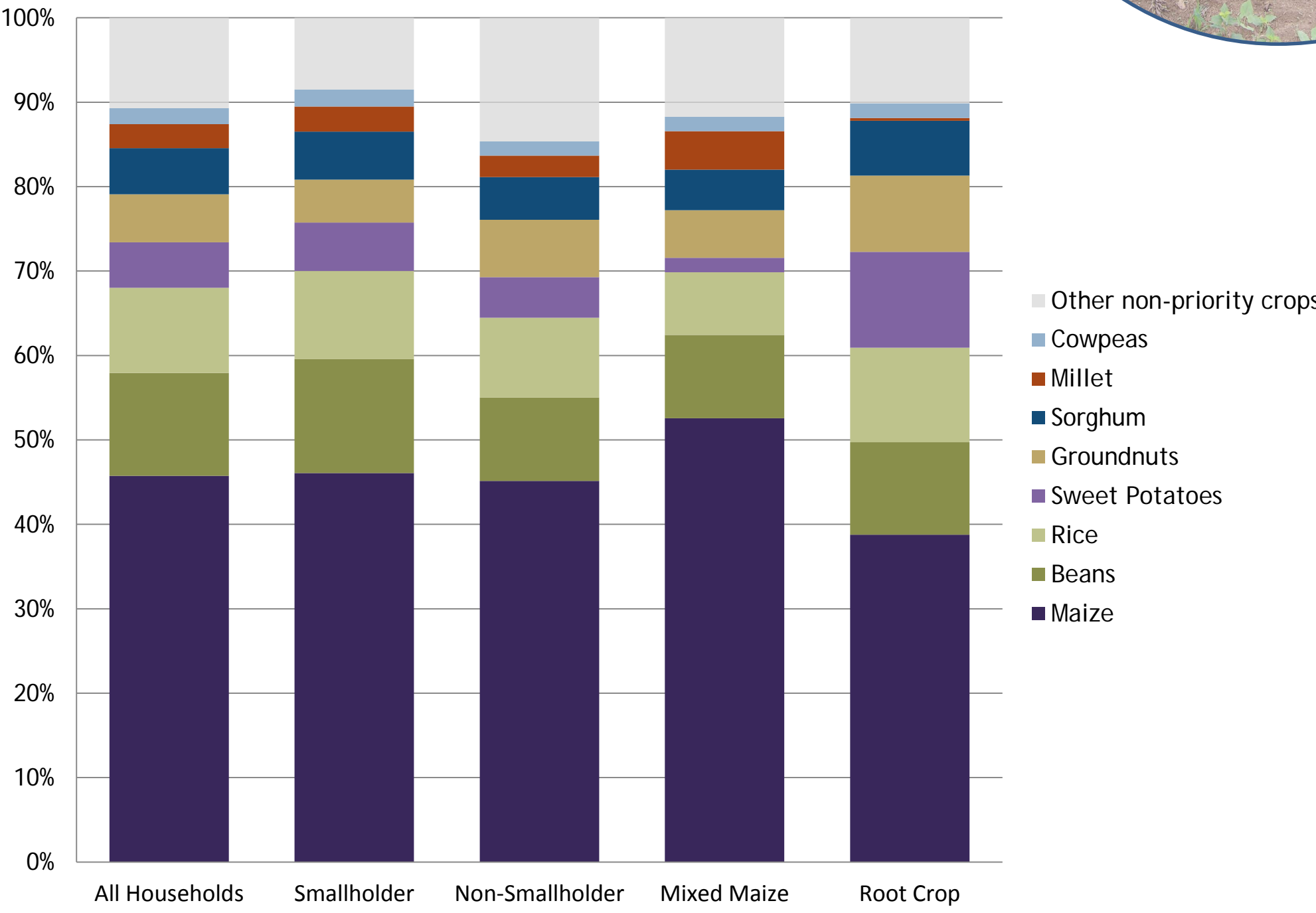
Farming Systems

Our analysis traces cropping patterns according to farming systems as defined by the Food and Agriculture Organization of the United Nations (FAO). FAO defines a farming system as “a population of individual farm systems that have broadly similar resource bases, enterprise patterns, household livelihoods and constraints, and for which similar development strategies and interventions would be appropriate.” We focus on the two dominant cropping systems in Tanzania: Mixed Maize and Root Crop.

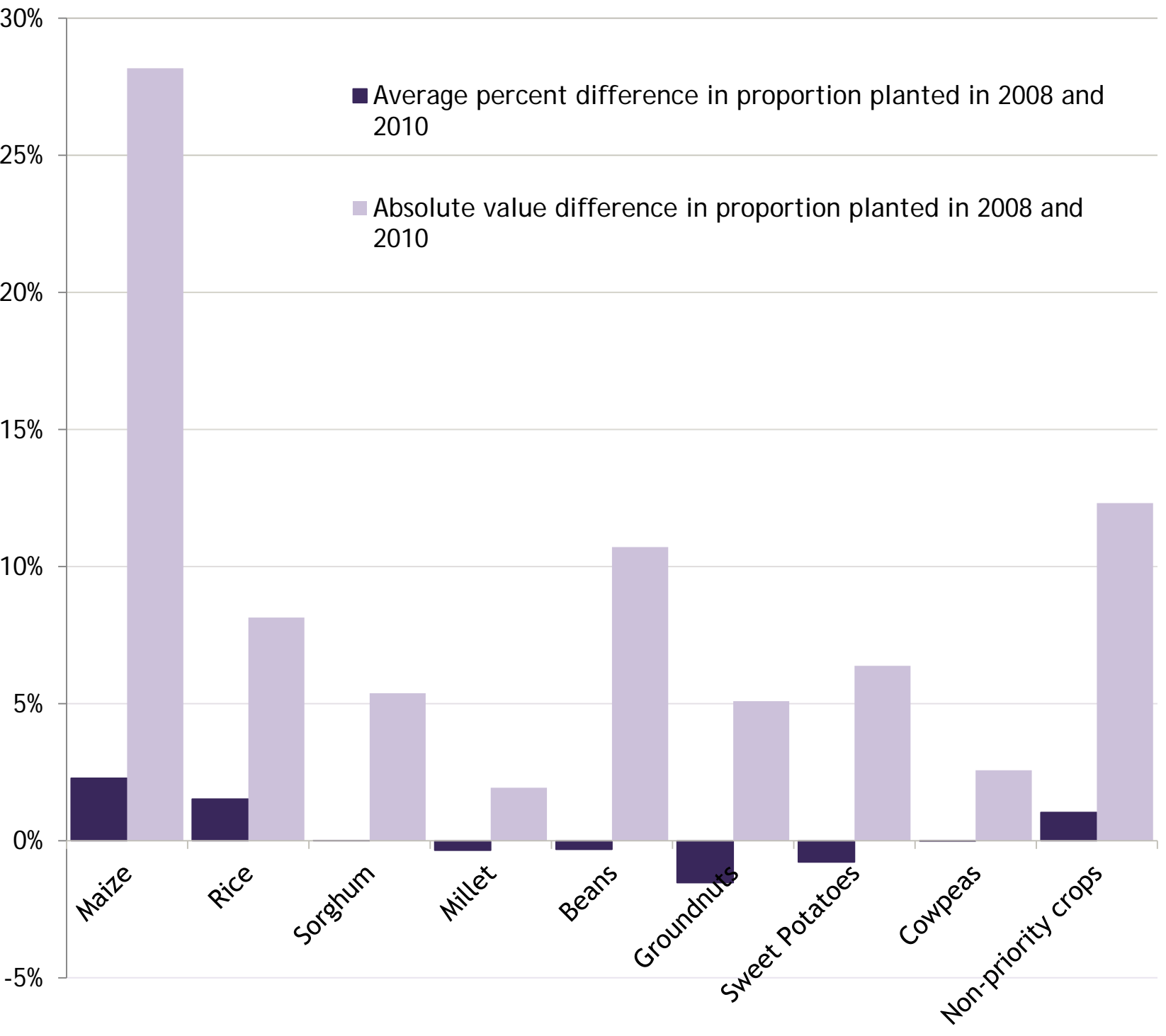


RESULTS

2008 Average Household Crop Portfolio by Subgroup



Household Level Changes in Crop Area Planted: Absolute Value Compared to Average Percent Difference



In 2008 the average household planted 45% of their total plot area with maize, followed by 12% with beans, and 10% with rice. Disaggregating by farming system shows significant differences in crop proportion patterns.

Eighty percent of households changed crop proportions from 2008 to 2010, yet aggregate level indicators mask household level changes.

Key terms:

Agricultural land/Farm Size is the sum of all plot areas, based on farmer estimates.

Area planted: total number of hectares planted with any crop across all household plots.

Smallholder: a household that has less than or equal to two hectares of total landholding, calculated by the sum of all farmer-reported plot sizes.

Extensive margin: total amount of agricultural land a farmer has available in a given year

Intensive margin: area of land planted with certain crops.

Evans School Policy Analysis and Research Group (EPAR)
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