Who is a smallholder farmer?

Features and implications of alternative definitions with an application to household survey data in Nigeria, Tanzania, and Ethiopia

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Motivation (1)

> In low- and middle-income countries (LMICs), agricultural development strategies put a great emphasis on small farms.
  - These farms dominate the rural population.
  - These households are most affected by poverty and food insecurity.

> A subset of these farms, labeled small producers or "smallholders", are at the center of many national and international policy initiatives.

  - **e.g., the SDGs set the target of doubling "the productivity and incomes of small-scale food producers" by 2030 (SDG 2.3).**

Motivation (2)

> Despite its ubiquity, there is no universal definition of the term "smallholder farmer".

> Existing definitions use a variety of criteria to identify smallholder farms (Lowder et al., 2016):
  - e.g., farm size, livestock holdings, farm revenue, source of income

> Consequently, there exist multiple other terms to designate smallholders (Heidhues and Brüntrup, 2003).

Motivation (3)

> Differences in definitions can have significant implications for estimates of the prevalence and the relative importance of smallholders.

> They also confound comparisons of statistics on smallholders across time and space.

> Hence, it is important to understand these implications to inform choices around definitions when analyzing or making decisions about this group of farmers.

Research questions

1. What are the criteria commonly used in definitions of smallholder farmers (SHFs)?

> What characteristics of farm households are captured by these criteria and how are they operationalized?

2. How do conclusions about smallholder farms (number and performance) change with different definitions when applied to data?

Criteria used in "smallholder" definitions

Criteria used in definition of SHF	Dimension of farms captured	Operationalization in definitions of SHF	Alternative names used for smallholders
Farm size	Resource endowment	Farm size / area planted	Small-scale farms Resource-poor farms
Livestock holdings	Livestock assets	Livestock holdings	Small-scale farms
Farm revenue	Economic size	Total farm revenue	Small-scale farms
Share of crop output sold	Access to markets	Proportion of crop output sold	Subsistence farms Pre-commercial farms
Non-farm income	Reliance on agriculture	Share of non-farm income	Non-diversified farms
Family labor	Type of management	Proportion of family labor in total labor	Family farms

Selected definitions to analyze

Single-criterion definitions

L1   Farms with farm size less than 2ha

L2   Farms with farm size less than 4ha

L3   Farms with farm size in bottom 40th pctile

Multi-criterion definitions

M1   Land size less than 4ha and number of cattle less than 50 and number of small ruminants less than 100 and number of poultry less than 1,000 (CGAP - Anderson et al., 2014)

M2   Land size less than 4ha and TLUs less than 5 and revenues less than 5000 $PPP (Khalil et al., 2017)

M3   Land size less than 4ha, number of TLU, and total gross farm revenues in the bottom 40% of farm size (FAO RuLIS - Conforti et al., 2017)

M4   Land size less than 4ha and number of cattle less than 50 and number of small ruminants less than 100 and number of poultry less than 1,000 and % non-farm income less than 50 (CGAP - Anderson et al., 2014)

M5   Land size less than 4ha and proportion of crop sold less than 50% and % non-farm income less than 33% (subsistence or pre-commercial farms – AGRA, 2017)

M6   Land size less than 4ha and % of crop sold less than 33% (non-commercial farms – Mellor, 2016)

M7   Land size less than 4 ha and % of family labour in total farm labor greater than 50% (HLPE, 2013)

Data

World Bank Living Standards Measurement Survey – Integrated Studies on Agriculture (LSMS-ISA) in Ethiopia, Nigeria & Tanzania

Focus on rural agricultural households (HHs)

>Ethiopia Socioeconomic Survey (ESS)
- 2011/12, 2013/14, and **2015/16 (wave 3 = 3,099 HHs)**

>Nigeria General Household Survey-Panel (GHSP)
- 2011/12, 2012/13, and **2015/16 (wave 3 = 2,621 HHs)**

>Tanzania National Panel Survey (NPS)
- 2008/09, 2010/11, 2012/13, and **2014/15 (wave 4 = 1,768 HHs)**

Single criterion SHF measure 1: Absolute farm size

(a) Ethiopia 2015/16
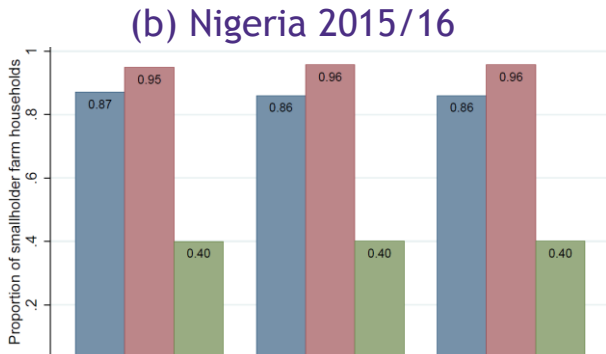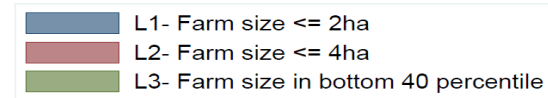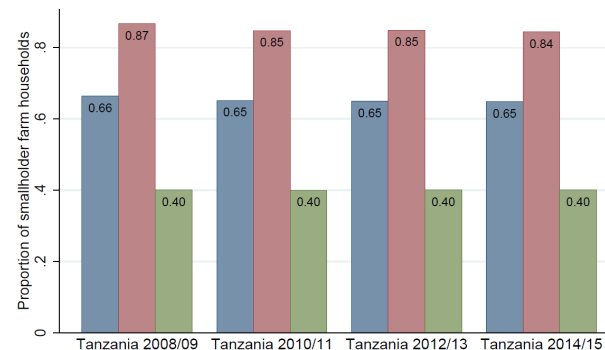
(b) Nigeria 2015/16
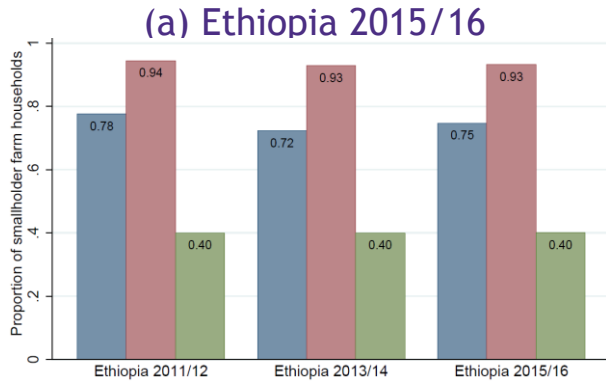
(c) Tanzania 2014/15

Figure 1: Proportion of farm households categorized as smallholder as by various land-based definitions – absolute vs relative threshold
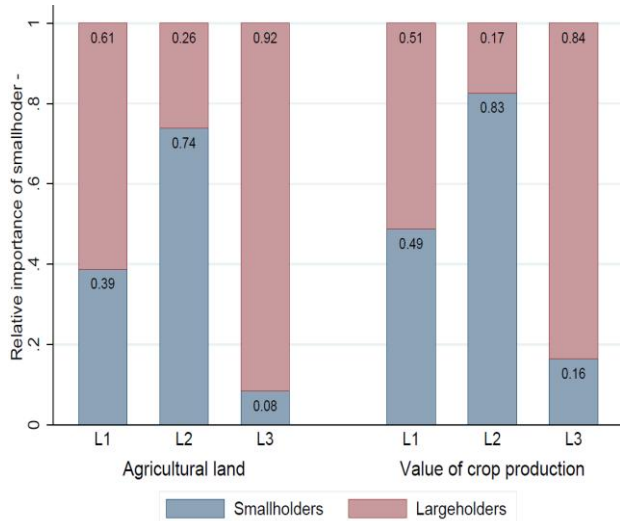
L1- Farm size <= 2ha
L2- Farm size <= 4ha
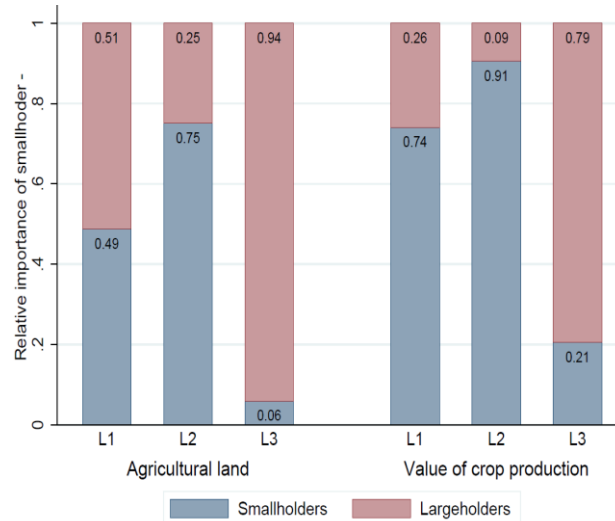L3- Farm size in bottom 40 percentile

Single criterion SHF measure 2: Relative farm size

Figure 2: Share of total agricultural land and value production of smallholder versus largeholder farm households, as implied by various land-based definitions – absolute vs relative threshold
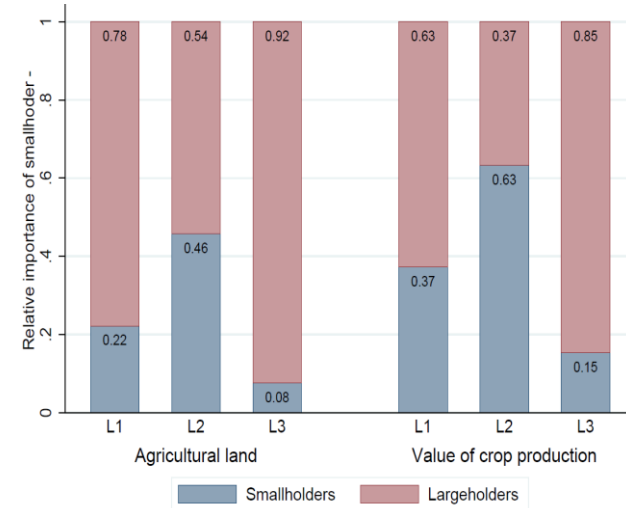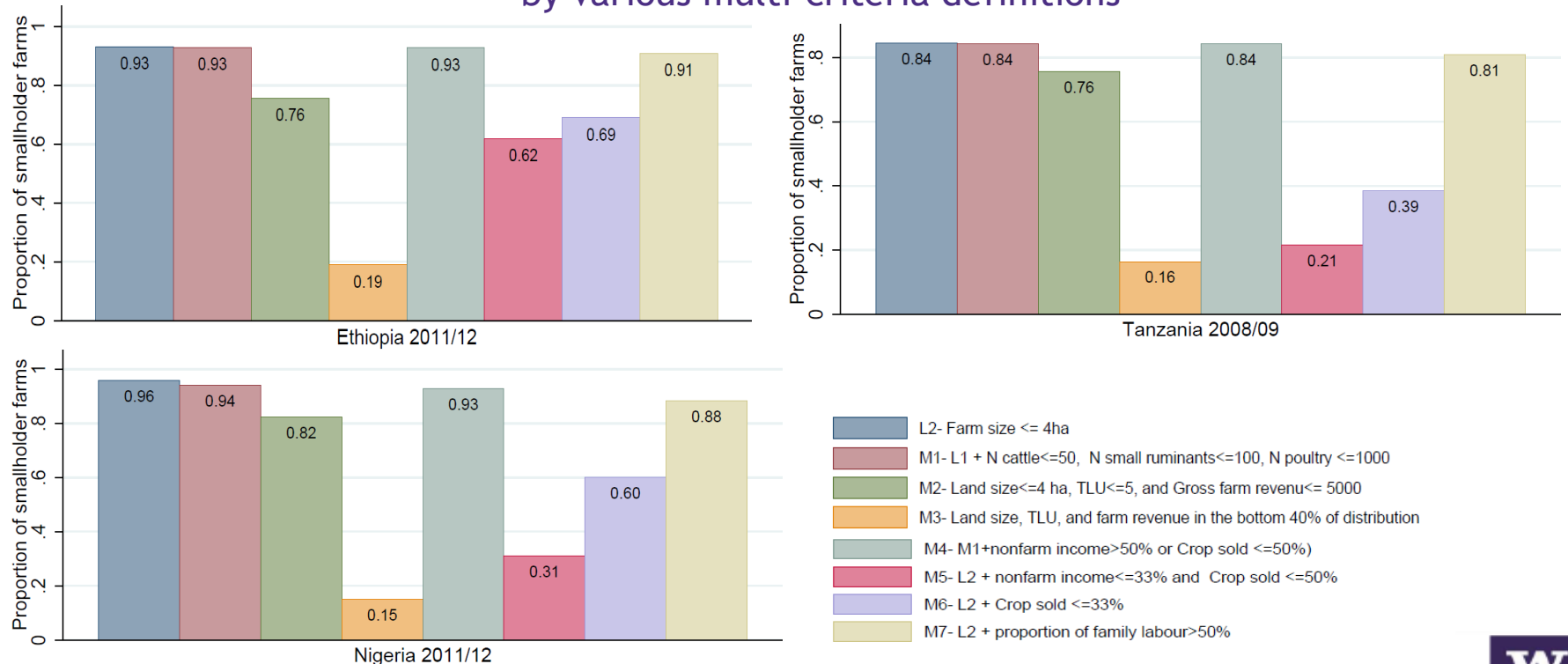

(a) Ethiopia 2015/16
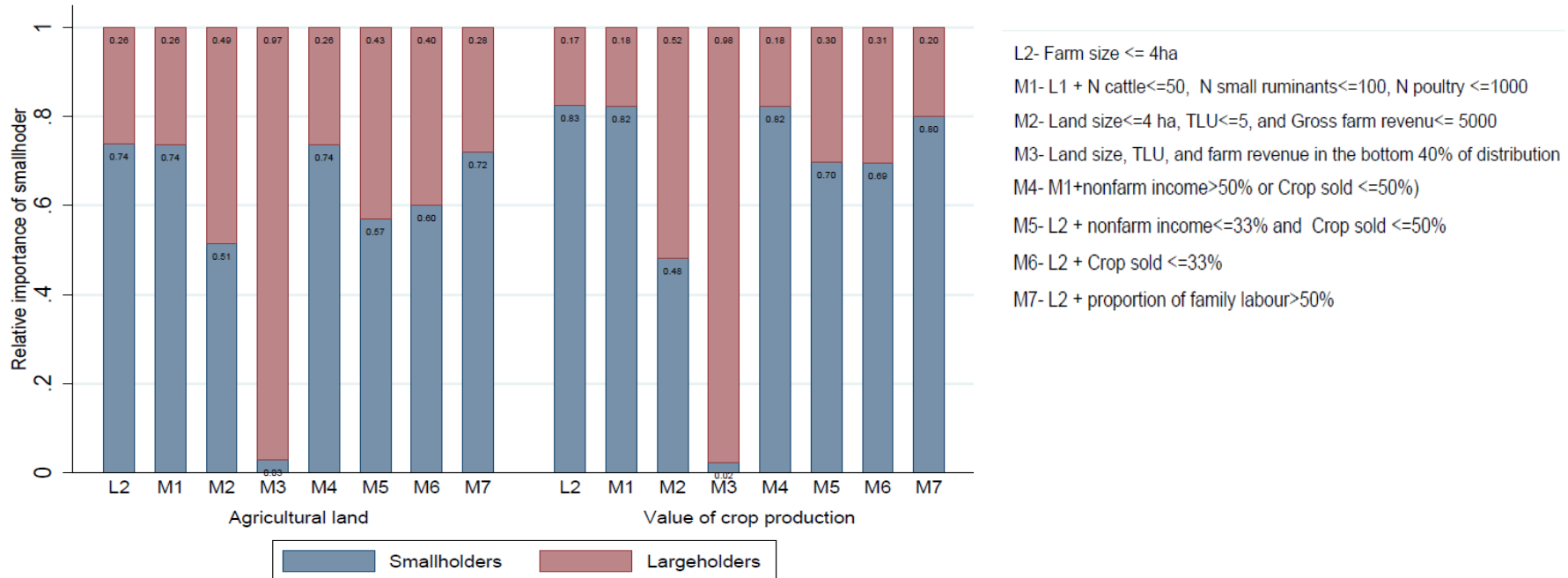
(b) Nigeria 2015/16

(c) Tanzania 2014/15

Multi-criteria SHF definitions

Figure 3: Proportion of farm households categorized as smallholder by various multi-criteria definitions

Multi-criteria SHF definitions, continued

Figure 4: Proportion of farm households categorized as smallholder by various multi-criteria definitions – **Ethiopia**

L2- Farm size <= 4ha

M1- L1 + N cattle<=50, N small ruminants<=100, N poultry <=1000

M2- Land size<=4 ha, TLU<=5, and Gross farm revenu<= 5000

M3- Land size, TLU, and farm revenue in the bottom 40% of distribution

M4- M1+nonfarm income>50% or Crop sold <=50%)

M5- L2 + nonfarm income<=33% and Crop sold <=50%

M6- L2 + Crop sold <=33%

M7- L2 + proportion of family labour>50%

Concluding remarks

> There is a need for a global definition for smallholders, particularly in the context of tracking progress on SGD target 2.3.

> We show that different definitions lead to different conclusions on the prevalence of smallholders and their relative importance.

- A single-criterion definition (using land size) with absolute thresholds tends to categorize most farms as smallholders. Using relative thresholds facilitates cross-country comparisons, but may be challenging to interpret.
- Multi-criteria definitions combining land size with other indicators allows the integration of aspects of farms not related to farm size.

> Additional analyses also show that the profile of the average smallholder varies with definitions.

> What is the best definition? ... It depends!

Evans School Policy Analysis & Research Group (EPAR)

Professor C. Leigh Anderson, Principal Investigator
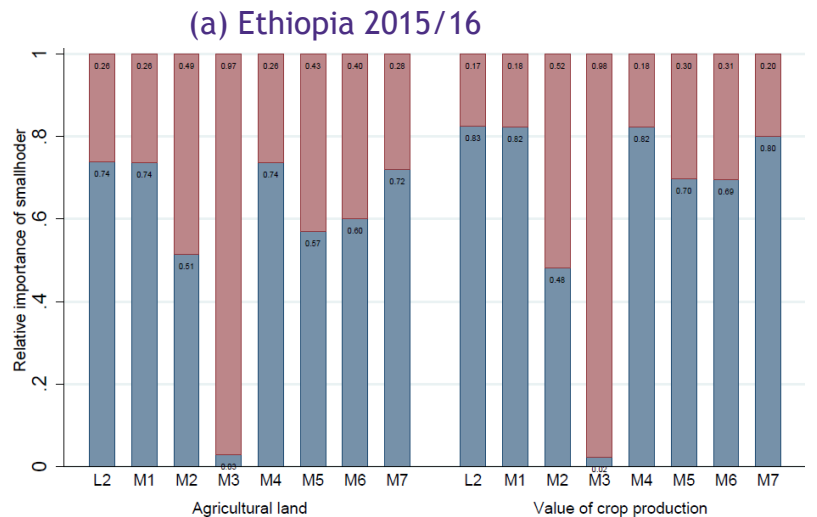
Professor Travis Reynolds, co-Principal Investigator

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Additional slides

Results – Multi-criteria definitions

Figure A1: Proportion of farm households categorized as smallholder as by various multi-criteria definitions

(a) Ethiopia 2015/16   (b) Nigeria 2015/16
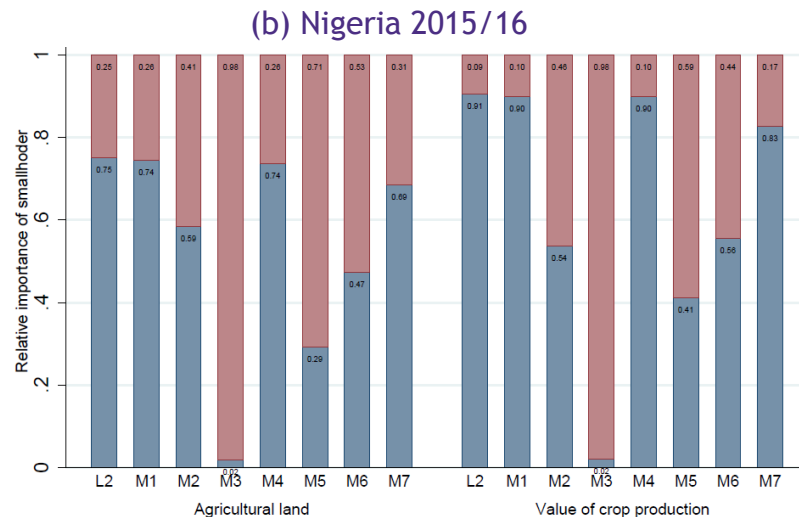
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M7- L2 + proportion of family labour>50%

Results 1 - single criterion definitions

Table A1: Comparing the profile of smallholder to largeholder farms households for selected variables across various land-based definitions Ethiopia

	Land definition 1 vs Land definition 2	Land definition 1 vs Land definition 3	Land definition 2 vs Land definition 3
Panel A: Ethiopia 2015-2016			
Female-headed household	+++	---	---
Proportion of family labor	+++		
Use inorganic fertilizer	---	+++	+++
Use improved seeds	---	+++	+++
Use vaccines	--	++	+++
Maize yield (kg/ha)	+	---	---
Land productivity ($ppp/ha)	+++	---	---
Proportion of crop sold	++		--
Per capita income ($ppp)	--		++
Poverty rate	++		
Share of nonfarm income	+++	---	---
Use financial services	---	++	+++

Notes: +++, ++, and + indicate that the mean of the corresponding variable in rows is higher for smallholder and the difference is statistically significant at 1%; 5%, and 10% respectively. ---, --, and - indicate that the mean of the corresponding variable in rows

Results 1 - single criterion definitions

Table A2 : Comparing the profile of smallholder to largeholder farms households for selected variables across various land-based definitions Nigeria

	Land definition 1 vs Land definition 2	Land definition 1 vs Land definition 3	Land definition 2 vs Land definition 3
Panel B: Nigeria 2015-2016			
Female-headed household	+++	---	---
Proportion of family labor		---	---
Use inorganic fertilizer		+++	+++
Use improved seeds			
Use vaccines	---	+++	+++
Maize yield (kg/ha)	+++	---	---
Land productivity ($ppp/ha)	+++	---	---
Proportion of crop sold		++	+++
Per capita income ($ppp)			
Poverty rate	-	+++	+++
Share of nonfarm income	+	---	---
Use financial services		---	---

Notes: +++, ++, and + indicate that the mean of the corresponding variable in rows is higher for smallholder and the difference is statistically significant at 1%; 5%, and 10% respectively. ---, --, and - indicate that the mean of the corresponding variable in rows is lower for smallholder and the difference is statistically significant at 1%; 5%, and 10% respectively. All summary statistics are

Results 1 - single criterion definitions

Table A3: Comparing the profile of smallholder to largeholder farms households for selected variables across various land-based definitions Tanzania

	Land definition 1 vs Land definition 2	Land definition 1 vs Land definition 3	Land definition 2 vs Land definition 3
Panel C: Tanzania 2014-2015			
Female-headed household	+++	---	---
Proportion of family labor			
Use inorganic fertilizer		-	
Use improved seeds	---	++	+++
Use vaccines			
Maize yield (kg/ha)	++	--	---
Land productivity ($ppp/ha)	+++	---	---
Proportion of crop sold	---	+++	+++
Per capita income ($ppp)			
Poverty rate			
Share of nonfarm income	+++	---	---
Use financial services	+++	---	---

Notes: +++, ++, and + indicate that the mean of the corresponding variable in rows is higher for smallholder and the difference is statistically significant at 1%; 5%, and 10% respectively. ---, --, and - indicate that the mean of the corresponding variable in rows is lower for smallholder and the difference is statistically significant at 1%; 5%, and 10% respectively. All summary statistics are based on the most recent LSMS-ISA in each country and are weighted using the population sampling weights.

Results 2 - Multi-criteria definitions

Table A4: Correlation matrix of different criteria used in definitions of smallholder farm households in Ethiopia, Nigeria, and Tanzania

	Ethiopia 2015-2016	Tanzania 2014-2015	Nigeria 2015-2016
Livestock holding TLU	0.40	0.36	0.13
Number of cattle owned	0.58	0.34	0.12
Total farm revenue	0.45	0.38	0.39
Proportion of crop sold	-0.06	0.18	0.09
Share of nonfarm income	-0.13	-0.17	-0.13
Proportion of family labor	-0.18	-0.09	-0.02

Results 2 - Multi-criteria definitions

Figure A1: Proportion of farm households categorized as smallholder as by various multi-criteria definitions – Nigeria
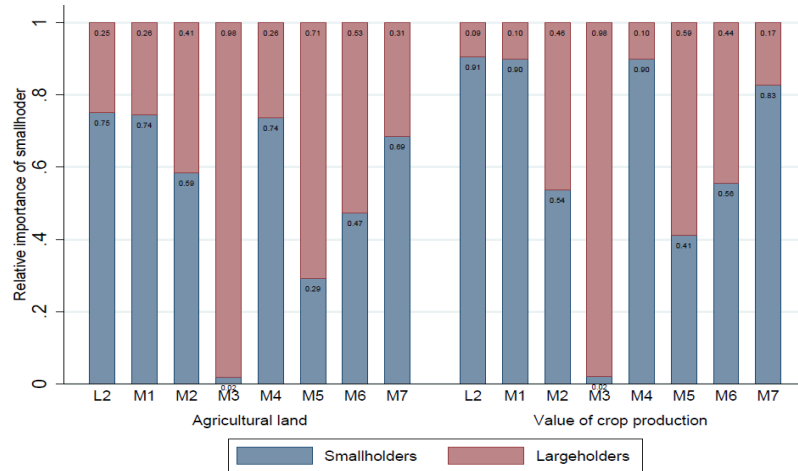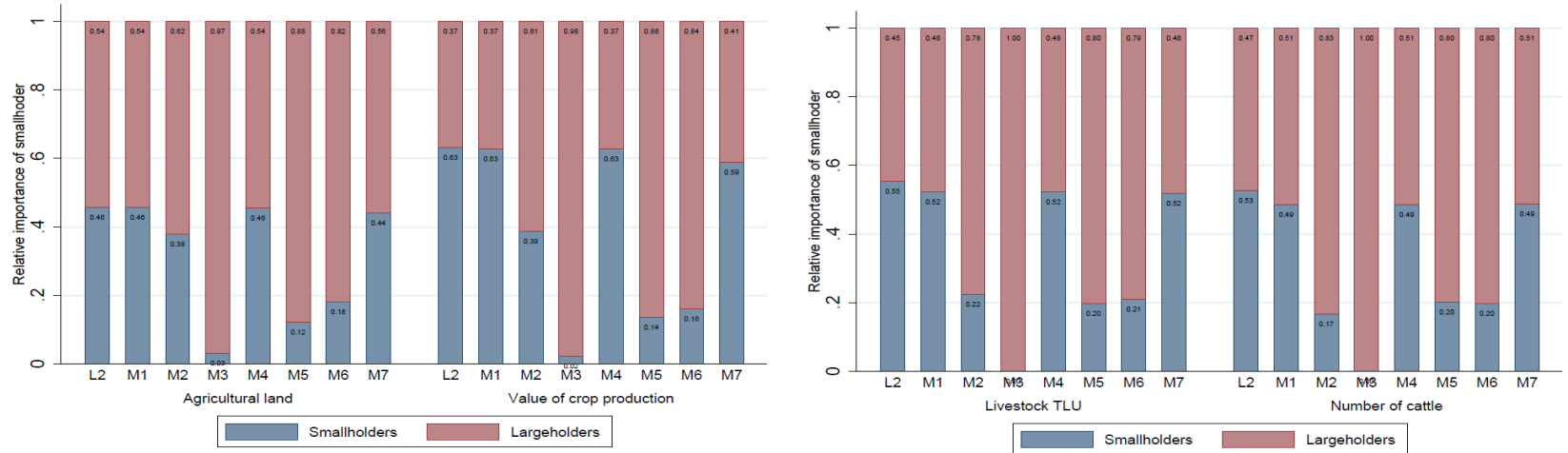

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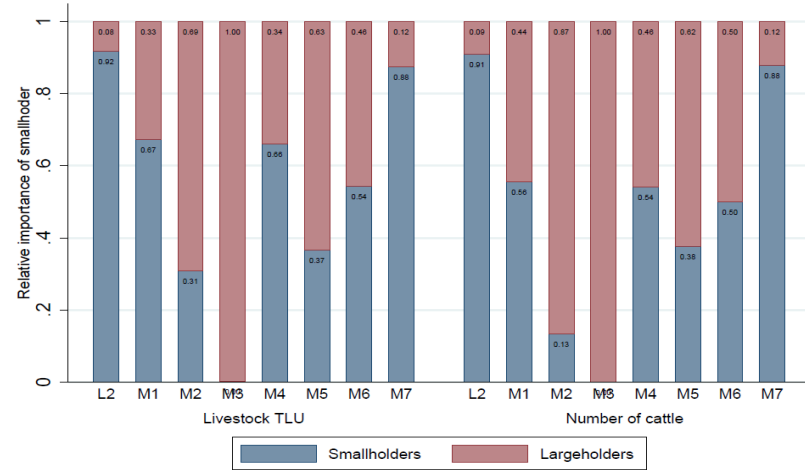
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M6- L2 + Crop sold <=33%

M7- L2 + proportion of family labour>50%

Results 2 - Multi-criteria definitions

Figure A1 : Proportion of farm households categorized as smallholder as by various multi-criteria definitions – Tanzania

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