Business-oriented Typology and Characterization of Agriculture in SSA

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# Background

This study is a prospective chapter in *AGRA Africa Agriculture Status Report (AASR) 2017*.

The overall objective of the AASR report is to (Hazell, [2017](#ref-aasr_cn_2017)):

1. provide an overview of the smallholder farmers and how they have adapted to the challenges they face as economic actors;
2. explore innovative strategies that can substantially raise the productivity and incomes of smallholder farmers;
3. identify policies and programs that can support the movement of Africa’s farming systems from subsistence-oriented to market-oriented thriving businesses;
4. identify the necessary conditions, appropriate technologies, and institutions that can propel and support smallholder agriculture businesses;
5. examine the past and the present role of public and private sector investment in agriculture and the success factors that can be scaled up to accelerate transformation.

# Method

The study should provide a context-setting chapter that attempts to characterize, scale, locate, point to prioritization of high-level smallholder commercialization strategies, opportunities and challenges. A proposed approach is to chracterize SHFs and frame business strategies within a 2-by-2 domain framework (low/high rainfed ag potential across low/high market access areas). This approach assumes that agricultural development and adaptation strategies are largely driven by pre-existing bio-physical and spatial conditions.

We propose then focusing on around half a dozen countries for which we have recent/accessible microdata (e.g. LSMS-ISA and maybe AGRA baseline surveys) to look more closely, in the same 2x2 domain framework, at specific farm household and macro characteristics to do two things:

1. Apply some typology to distinguish between say “predominantly-subsistence” focused and “transitioning-commercial” smallholders
2. Report on hh level variables that can provide insight into the scale of potential business development challenges and opportunities in each country.

(#fig:stan-method) Suggested Approach (05/02/2017)

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Key farm and household-level variables to look at may include:

* Time to Market
* Average yield
* Yield gap
* Average size of land holdings
* Share of land harvested
* Production (amount by crop types)
* Consumption
* Rural households population
* Urban households population
* Rural and urban poverty
* Average household size
* Households by head (Male, Female)
* Average age of the individuals
* Households size
* Education
* Households level income diversification
* Livestock assets
* Ownership of mobile phones
* Households who receive credit
* Households who receive credit from bank or MFI
* Access to extension services
* People in working age (16-64)
* Use of improved technologies and farm management practices
* Average wage rate
* Land rental rate
* Any information on agri-business or agro processing?

# Supporting Datasets

Many (unpublished and mostly country-level) studies have attempted to derive farmer characteristics and farm typologies across geospatial dimensions (see e.g. refs below). IFPRI in particular generated cross-country comparable household variables (derived from World Bank LSMS-ISA panels, Demographic and Health Surveys, and/or other large-scale household surveys and agricultural census).

## Cross-Country Harmonized Variables

Inventory and summarize the latest versions of IFPRI's harmonized variables. Some of these variables are also available (summarized) across districts and/or regions and/or gender.

### Dataset #1 (Poverty, Land, Climate paper)

This dataset contains 395 variables and 220460 observations. The breakdown across countries and survey years is as follows, and variables are further described in the next table. Many of these variables are also documented in Azzarri, Signorelli, & Bacou ([2016](#ref-azzarri2016poverty)).

### Dataset #2 (HarvestChoice Agricultural Snapshots)

My copy of the household-level file is corrupt (would need to contact IFPRI directly) but the variables are similar in the region-level file.

This dataset contains 86 variables. The breakdown across countries and survey years is as follows, and variables are further described in the next table.

### Dataset #3 (Panels for Resilience Study)

This dataset contains 2670 variables and 101333 observations. The breakdown across countries and survey years is as follows, and variables are further described in the next table.

This dataset also includes over 2,000 constructed climatic variables (monthly SPEI, temperature, rainfall, PDSI, etc.). To save space they are not shown in the variable summary below.

### Dataset #4 (SSA Poverty Regressions)

This dataset contains 350 variables and 1650 observations. The breakdown across countries and survey years is as follows, and variables are further described in the next table. This is a district-level dataset (IFPRI holds the hh-level variables).

## Demographic and Health Surveys (harmonized)

IFPRI holds cross-country harmonized variables from the latest DHS. Complete metadata is in a [DHS Google Sheet](https://docs.google.com/spreadsheets/d/1v8DDLgi9lQbS4uKnxYPM83PYC90rijJvjKN4xAntKlE/edit#gid=916658631). We would need to request access to the CHILD and WOMAN recodes, I only have the STRATA summaries.

## Other Country-Level Panel Variables

### Ghana GLSS Rounds

(as needed). IFPRI/DSG holds 3 rounds (2005, 2008, 2012) of harmonized variables focused on wages and productivity trends.

### Nigeria Farm Segmentation Study

(as needed, used in the typology below)

# Typology of Farm Holdings

This section is an exploration of smallholdings and smallholder farmers (definition and characteristics) in Nigeria and Ethiopia.

## Nigeria

Revelant sources of household-level micro records for Nigeria include:

* 2010 and 2012 Nigeria General Household Survey Panels
* DfID's sponsored agricultural survey (1,300 hhlds) (contact Abt Associates)
* Fadama III 2009 Baseline and 2012 Midline Surveys and FADAMA's Agricultural Production Surveys (APS) (still not publicly available, see e.g. Girei, Saingbe, Bitrus, & Bassey ([2017](#ref-girei2017fadama)))

### Definitions

(more vars to be added as needed)

#### Assets

* farm size (incl. parcels rented out and fallows)
* tropical livestock units (combines all animals)

#### Farming

* cultivated area (ha, annual)
* annual value of crops and crop byproducts sold (per RIGA method)
* gross value of crop production (excl. perennials, annual)
* net value of crop production (annual)
* net value of livestock production (annual)
* gross value of livestock products and byproducts sold (annual)
* gross farm sales, i.e. combined value of crop, livestock, and fish products sold
* farm sales per adult equivalent
* commercialization rate for crops, defined as the value of crops and crop products sold over the value of annual crop production (excl. perennial crops)

#### Income

* wage employement in agriculture
* wage employement in non-farm sectors
* non-farm self employement
* net transfers
* other sources of incomes
* total net annual household income (uses )
* gross farm income (includes value of own consumption, ag wages and ag rents)
* total gross income (incl. farm income, non-farm income, and transfers)
* share of farm income in total household income
* share of non-farm income in total household income

Note that all intermediary *value* variables (income and expenses) have been generated by IFPRI using [FAO RIGA](http://www.fao.org/economic/riga/riga-database/en/) guidelines. Using these variables we define a **farm holding** as a household matching any of the following conditions:

* has any or
* has any or or
* owns any livestock
* collects any other revenue from farming

Within the subsample of *farm households* we look at the distribution of households across 3 key ("threshold") variables:

* Cultivated/operated area (using breaks at **2 ha** and/or **4 ha** and **excluding farm households with no** )
* Crop commercialization (using breaks at **5%** and **50%** of crop production)
* Share of off-farm income in total hhld income (using breaks at **1/3** and **2/3** of total gross income)

The resulting classes of farm households are labelled as follows:

(#tab:tabclas) Household Classification

Crop Commercialization

Income Diversification

low

medium

high

low

LoCLoD

MeCLoD

HiCLoD

medium

LoCMeD

MeCMeD

HiCMeD

high

LoCHiD

MeCHiD

HiCHiD

### An Aside on Income Diversification

Initial results from the 2 Nigeria GHS panels tend to show very low income diversification among rural farm households. We propose to check these results against income and expenditure aggregates derived by FAO RIGA. RIGA documentation for Nigeria indicates the following income shares (FAO, [2016](#ref-riga2016nga)) (among rural households only):

(#tab:riga) RIGA Income Aggregates, NGHS 2012/2013 (Rural Households)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variable | Participants | Participation Rate | Returns to Participation - Participant HHs | Returns to Participation - All HHs | Share of Total Income - All HHs (Mean of Shares) | Share ofTotal Income - All HHs (Share of Means) |
| agr\_wge | 40 | 0.01 | 311,337 | 3,515 | 0.01 | 0.01 |
| nonagr\_wge | 446 | 0.14 | 731,050 | 104,061 | 0.12 | 0.24 |
| crop1 | 2,490 | 0.75 | 292,214 | 217,792 | 0.71 | 0.51 |
| livestock | 2,538 | 0.76 | 34,194 | 25,848 | 0.05 | 0.06 |
| selfemp | 1,851 | 0.59 | 121,179 | 71,630 | 0.09 | 0.17 |
| transfer | 138 | 0.05 | 9,069 | 408 | 0.00 | 0.00 |
| other | 462 | 0.15 | 42,125 | 6,240 | 0.02 | 0.01 |
| totincome1 | 3,099 | 0.95 | 450,431 | 429,495 | 1.00 | 1.00 |

All income aggregates are net of expenses, but for this study gross crop and livestock sales and gross farm and non-farm incomes would be preferable. These are derived in the codes below.

### Key Results

The following 3 tables show the count of observations in each class for farm households with cultivated area <= 2ha, between 2 and 4ha, and <= 4ha.

(#tab:countsa) Count of Observations across Classes of Farm Households

2 ha

2-4 ha

4 ha

LoC

MeC

HiC

LoC

MeC

HiC

LoC

MeC

HiC

LoD

1,829

  109

  107

  182

    8

   14

   75

    4

    3

MeD

   39

   32

   65

    0

    1

    2

    0

    1

    2

HiD

  164

   81

   98

    5

    1

    4

    0

    0

    6

(#tab:countsb) Count of Observations across Classes of Farm Households (below/above 2 ha)

2 ha

2 ha

LoC

MeC

HiC

LoC

MeC

HiC

LoD

1,829

  109

  107

  257

   12

   17

MeD

   39

   32

   65

    0

    2

    4

HiD

  164

   81

   98

    5

    1

   10

(#tab:countsc) Count of Observations across Classes of Farm Households (below/above 4 ha)

4 ha

4 ha

LoC

MeC

HiC

LoC

MeC

HiC

LoD

2,011

  117

  121

   75

    4

    3

MeD

   39

   33

   67

    0

    1

    2

HiD

  169

   82

  102

    0

    0

    6

In the next tables we limit categories to farm households **below/above 4ha** (as this approach produces classes with a larger count of observations). Using data from the 2012 Nigeria General Household Survey (GHS) we estimate the proportions of farm households across all categories and the distributions of other key household characteristics (household structure, assets, farm input uses, etc.).

Estimated proportions of farm households across classes and categories are shown in the next graph and table.

Fig. 2 Est. Proportions of Farm Holdings across Categories

Fig. 2 Est. Proportions of Farm Holdings across Categories

(#tab:tab1) Est. Proportions of Farm Holdings across Categories

4 ha

4 ha

LoC

MeC

HiC

LoC

MeC

HiC

LoD

mean

70.7

 4.0

 4.6

 2.0

 0.3

 0.1

SE

 0.0

 0.0

 0.0

 0.0

 0.0

 0.0

MeD

mean

 1.1

 1.2

 2.6

 0.0

 0.0

 0.2

SE

 0.0

 0.0

 0.0

 0.0

 0.0

 0.0

HiD

mean

 5.9

 3.0

 4.1

 0.0

 0.0

 0.2

SE

 0.0

 0.0

 0.0

 0.0

 0.0

 0.0

Using the **<= 4 ha** smallholding definition above, we estimate as of 2012:

* there are **33M** households in Nigeria
* **58.8%** (**19.2M**) generate a revenue from farming (wages, rents, crops, livestock, and/or fish)
* **97%** (**16M**) of farm holdings are *small*
* corresponding to a beneficiary population of **107M**
* crop commercialization is low at **12.2%** for smallholdings (below 4 ha) and **17.7%** for larger holdings (over 4 ha) on average. Median rates are much smaller however with **0.07%** for smallholdings and **0.30%** for larger holdings.
* income diversification in farm households is **17%** on average (**18%** for smallholdings and **13%** for larger holdings) (i.e. off-farm income is 17% on average), but medians off-farm incomes are negligible at **0.83%** (**0.63%** for smallholdings and **0.33%** for larger holdings).

Notes: for LCU conversions **1 int$ = 108.23 Naira** (2015)

Fig. 3 Cultivated Area, Crop Commercialization, and Income Diversification

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Fig. 4 Crop Commercialization and Income Diversification along Cultivated Area

Fig. 4 Crop Commercialization and Income Diversification along Cultivated Area

Fig. 5 Crop Commercialization by Age and Gender

Fig. 5 Crop Commercialization by Age and Gender

Fig. 6 Income Diversification by Age and Gender

Fig. 6 Income Diversification by Age and Gender

(#tab:tab2a) Crop Commercialization for Farms below/above 4 ha (percent, '000 LCU)

4 ha

4 ha

Variable

est.

std. err.

est.

std. err.

(cropsales\_sh \* 100)

Mean

 12.20

  0.99

 17.68

  4.56

Q25

  0.00

  0.00

  0.06

  0.02

Q50

  0.08

  0.02

  0.30

  0.50

Q75

  1.15

  0.38

  7.90

 23.01

(cropsales/1000)

Mean

 63.74

  5.44

195.50

 49.81

Q25

  0.00

  0.00

 21.08

 10.55

Q50

  8.00

  1.71

 62.03

 21.80

Q75

 54.35

  6.49

193.38

113.64

(#tab:tab2b) Off-Farm Income for Farms below/above 4 ha (percent, '000 LCU)

4 ha

4 ha

Variable

est.

std. err.

est.

std. err.

(noaggross\_sh \* 100)

Mean

 17.59

  1.19

 12.54

  3.29

Q25

  0.00

  0.00

  0.00

  0.02

Q50

  0.63

  0.09

  0.33

  0.12

Q75

  8.07

  3.44

  2.14

  9.73

(noaggross/1000)

Mean

293.92

 16.17

309.64

 61.23

Q25

  0.00

  0.00

  0.00

  5.15

Q50

113.48

  9.70

132.73

 53.38

Q75

363.10

 19.87

393.34

 82.47

The 9 categories of small farm holdings are further characterized in the next graphs and summary tables.

Note that all tables below omit standard errors to save space.

(#tab:tab3) Sources of Agricultural Income for Small Farm Households across Categories ('000 LCU)

LoCLoD

LoCMeD

LoCHiD

MeCLoD

MeCMeD

MeCHiD

HiCLoD

HiCMeD

HiCHiD

Variable

est.

est.

est.

est.

est.

est.

est.

est.

est.

(cropvalue/1000)

Mean

 32,136

     73

     33

  2,768

    125

     49

    246

    242

     59

Q25

 12,484

     20

     10

     46

     36

     22

     46

     89

     15

Q50

 26,043

     36

     24

    128

    113

     34

    146

    172

     36

Q75

 45,297

     79

     45

  3,746

    185

     69

    359

    364

     83

(cropsales/1000)

Mean

     49

      0

      0

    263

     40

     12

    216

    220

     49

Q25

      0

      0

      0

      8

      9

      5

     37

     71

     11

Q50

      7

      0

      0

     38

     26

      7

    117

    159

     29

Q75

     50

      0

      0

    404

     51

     14

    295

    287

     60

(lstocksold/1000)

Mean

    225

     81

      8

    335

    132

     13

    595

    106

     15

Q25

      0

      0

      0

      0

      0

      0

      0

      0

      0

Q50

      0

      0

      0

      0

      0

      0

      0

      0

      0

Q75

     48

     27

      5

     30

     43

      7

     64

     10

      7

(agsales/1000)

Mean

    357

     81

      9

    605

    174

     25

    934

    326

     64

Q25

      2

      0

      0

     14

     21

      6

     68

     96

     15

Q50

     36

      0

      0

     84

     50

     11

    249

    211

     44

Q75

    129

     27

      5

    634

     98

     33

    741

    377

     79

agsalespc

Mean

 82,419

 14,910

  1,858

185,677

 35,520

  6,667

270,919

107,205

 18,699

Q25

    388

      0

      0

  4,218

  5,831

  1,190

 21,706

 25,335

  3,370

Q50

  8,008

      0

      0

 19,051

 10,462

  2,586

 58,272

 65,284

  9,448

Q75

 28,274

 11,460

  1,183

178,619

 25,876

  7,386

288,667

121,089

 24,719

(aggross/1000)

Mean

 32,448

    186

     44

  3,131

    264

     64

    970

    400

     78

Q25

 12,609

     46

     13

     60

     72

     25

     84

    153

     18

Q50

 26,207

     75

     32

    239

    135

     44

    295

    307

     47

Q75

 46,155

    129

     53

  4,156

    263

     81

    751

    463

     95

(#tab:tab3a) Sources of Agricultural Income for Small Farm Households across Categories (percent)

LoCLoD

LoCMeD

LoCHiD

MeCLoD

MeCMeD

MeCHiD

HiCLoD

HiCMeD

HiCHiD

Variable

est.

est.

est.

est.

est.

est.

est.

est.

est.

(cropsales\_sh \* 100)

Mean

  0.27

  0.14

  0.25

 21.17

 29.21

 24.02

 86.58

 87.96

 84.49

Q25

  0.00

  0.00

  0.00

  8.98

 16.27

 13.78

 76.08

 78.20

 73.16

Q50

  0.03

  0.00

  0.00

 17.62

 31.43

 21.51

 90.93

 94.03

 93.39

Q75

  0.23

  0.00

  0.00

 30.41

 36.26

 35.96

 99.40

 98.93

100.00

(aggross\_sh \* 100)

Mean

 98.60

 45.77

  9.91

 96.58

 49.82

 14.29

 92.95

 48.29

 15.40

Q25

 98.74

 35.90

  2.96

 95.17

 40.62

  6.49

 88.55

 41.32

  7.49

Q50

 99.72

 44.98

  7.15

100.00

 47.21

 12.49

100.00

 46.79

 15.00

Q75

100.00

 51.17

 14.10

100.00

 59.43

 21.03

100.00

 57.88

 23.51

(#tab:tab3b) Land and Livestock Assets of Small Farm Households across Categories (ha, TLU)

LoCLoD

LoCMeD

LoCHiD

MeCLoD

MeCMeD

MeCHiD

HiCLoD

HiCMeD

HiCHiD

Variable

est.

est.

est.

est.

est.

est.

est.

est.

est.

farmarea

Mean

0.72

0.23

0.23

0.88

0.44

0.24

0.78

0.52

0.48

Q25

0.18

0.00

0.02

0.11

0.07

0.04

0.09

0.09

0.06

Q50

0.46

0.10

0.07

0.55

0.21

0.10

0.43

0.35

0.35

Q75

1.00

0.25

0.28

1.21

0.47

0.24

1.15

0.78

0.69

croparea

Mean

0.71

0.23

0.23

0.88

0.43

0.24

0.78

0.52

0.48

Q25

0.17

0.00

0.02

0.11

0.07

0.04

0.09

0.09

0.06

Q50

0.45

0.10

0.07

0.55

0.17

0.10

0.43

0.35

0.33

Q75

0.99

0.25

0.27

1.21

0.47

0.24

1.15

0.78

0.69

TLU\_total

Mean

1.72

0.36

0.33

0.33

0.79

0.54

0.72

0.34

0.49

Q25

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

Q50

0.42

0.03

0.00

0.03

0.11

0.08

0.00

0.05

0.09

Q75

1.30

0.15

0.30

0.30

0.46

0.30

0.30

0.50

0.39

(#tab:tab4) Demographics of Small Farm Households across Categories

LoCLoD

LoCMeD

LoCHiD

MeCLoD

MeCMeD

MeCHiD

HiCLoD

HiCMeD

HiCHiD

Variable

est.

est.

est.

est.

est.

est.

est.

est.

est.

hhsize

Mean

  6.9

  6.2

  6.3

  5.9

  5.7

  6.2

  5.4

  5.4

  6.0

Q25

  5.0

  4.0

  4.0

  3.1

  3.6

  4.8

  3.0

  4.0

  4.0

Q50

  7.0

  6.0

  6.0

  6.0

  5.5

  6.0

  5.0

  5.0

  6.0

Q75

  9.0

  8.0

  8.0

  8.0

  7.0

  8.0

  7.0

  7.0

  7.2

(femhead \* 100)

Mean

 10.8

 18.9

 21.1

 13.3

 10.3

 14.3

 12.7

 18.5

 11.0

Q25

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q50

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q75

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

agehead

Mean

 51.7

 58.0

 54.4

 57.6

 62.0

 56.4

 54.3

 53.8

 53.6

Q25

 40.0

 42.0

 43.0

 45.0

 51.4

 49.0

 41.2

 40.0

 40.0

Q50

 50.0

 58.0

 55.0

 59.0

 60.7

 55.0

 54.6

 53.2

 51.4

Q75

 61.0

 72.0

 64.5

 70.0

 70.0

 65.0

 66.1

 65.0

 65.0

(lithead \* 100)

Mean

 55.1

 62.2

 69.3

 49.9

 58.9

 73.5

 53.0

 64.0

 69.7

Q25

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q50

100.0

100.0

100.0

  0.0

100.0

100.0

100.0

100.0

100.0

Q75

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

eduyears

Mean

  7.1

  8.2

  7.9

  7.5

  8.1

  8.5

  6.3

  8.4

  7.7

Q25

  3.0

  6.0

  4.0

  5.0

  6.0

  6.0

  4.6

  6.0

  3.0

Q50

  6.0

  6.0

  6.0

  6.0

  6.0

  6.0

  6.0

  6.0

  6.0

Q75

 12.0

 12.0

 12.0

 12.0

 10.9

 12.0

  6.0

 12.0

 12.0

numchildren

Mean

  2.9

  2.5

  2.2

  2.1

  1.7

  2.0

  1.7

  2.0

  2.2

Q25

  1.0

  0.5

  1.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q50

  3.0

  1.0

  2.0

  2.0

  1.0

  2.0

  1.0

  1.0

  2.0

Q75

  4.0

  3.0

  4.0

  4.0

  3.0

  3.0

  3.0

  3.0

  3.0

equiv

Mean

  5.0

  4.6

  4.7

  4.4

  4.5

  4.7

  3.6

  3.8

  4.3

Q25

  3.5

  2.5

  3.0

  2.5

  2.8

  3.5

  2.0

  2.5

  3.0

Q50

  5.0

  4.5

  4.5

  4.0

  4.5

  4.5

  3.1

  3.5

  4.0

Q75

  6.5

  6.0

  6.0

  5.5

  6.0

  6.0

  4.5

  5.5

  5.5

females

Mean

  3.4

  3.2

  3.2

  2.9

  2.9

  3.2

  2.5

  2.8

  3.0

Q25

  2.0

  1.0

  2.0

  2.0

  1.0

  2.0

  1.0

  1.0

  2.0

Q50

  3.0

  3.0

  3.0

  3.0

  3.0

  3.0

  2.0

  3.0

  3.0

Q75

  5.0

  4.8

  4.0

  4.0

  4.0

  4.0

  3.4

  4.0

  4.0

males

Mean

  3.4

  3.1

  3.1

  3.0

  2.9

  3.1

  2.8

  2.6

  3.1

Q25

  2.0

  1.0

  2.0

  1.0

  1.0

  2.0

  1.0

  1.0

  2.0

Q50

  3.0

  2.2

  3.0

  3.0

  3.0

  3.0

  2.1

  2.0

  3.0

Q75

  5.0

  4.0

  4.0

  4.0

  4.0

  4.0

  4.0

  3.8

  4.0

sh\_ed\_none

Mean

  5.6

  3.6

  4.1

  8.4

  3.1

  3.2

  5.6

  4.0

  7.5

Q25

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q50

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q75

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

sh\_ed\_prim

Mean

 62.1

 57.7

 45.9

 58.8

 43.3

 43.9

 63.5

 61.9

 55.2

Q25

 33.9

 33.3

 20.0

 33.3

 20.0

 15.4

 49.3

 43.4

 33.3

Q50

 66.7

 56.0

 50.0

 57.1

 50.0

 50.0

 66.7

 60.0

 55.7

Q75

100.0

 75.0

 66.7

100.0

 60.7

 66.7

100.0

100.0

 80.7

(#tab:tab5) Parcels and Input Uses for Small Farm Households across Categories (percent)

LoCLoD

LoCMeD

LoCHiD

MeCLoD

MeCMeD

MeCHiD

HiCLoD

HiCMeD

HiCHiD

Variable

est.

est.

est.

est.

est.

est.

est.

est.

est.

parcels

Mean

  1.9

  2.1

  1.7

  2.3

  2.3

  2.0

  2.0

  2.0

  1.9

Q25

  1.0

  1.0

  1.0

  2.0

  1.0

  1.0

  1.0

  1.0

  1.0

Q50

  2.0

  2.0

  1.0

  2.0

  2.0

  2.0

  2.0

  2.0

  2.0

Q75

  2.0

  3.0

  2.0

  3.0

  3.0

  2.0

  3.0

  3.0

  2.7

(chempest\_farms \* 100)

Mean

 20.8

 10.5

  2.2

 25.5

 10.3

  2.6

 32.5

 36.0

 22.7

Q25

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q50

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q75

  0.0

  0.0

  0.0

 87.0

  0.0

  0.0

100.0

100.0

  0.0

(chemherb\_farms \* 100)

Mean

 26.8

 12.0

 11.6

 35.3

 20.5

  8.9

 32.9

 29.8

 21.2

Q25

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q50

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q75

100.0

  0.0

  0.0

100.0

  0.0

  0.0

100.0

100.0

  0.0

(fertorg\_farms \* 100)

Mean

  4.6

  3.3

  3.7

  0.0

  0.0

  4.2

  2.0

  3.0

 12.6

Q25

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q50

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q75

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

(fertinorg\_farms \* 100)

Mean

 48.2

 30.0

 24.7

 16.8

 35.5

 21.1

 21.5

 25.0

 33.8

Q25

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q50

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q75

100.0

100.0

  0.0

  0.0

100.0

  0.0

  0.0

  2.2

100.0

(seedp\_farms \* 100)

Mean

 27.8

 27.6

 46.7

 25.5

 37.1

 33.7

 28.3

 19.1

 38.1

Q25

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q50

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q75

100.0

100.0

100.0

 30.6

100.0

100.0

100.0

  0.0

100.0

(tractorown\_farms \* 100)

Mean

  1.2

  2.6

  2.2

  1.0

  1.6

  0.0

  6.7

  2.8

  0.6

Q25

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q50

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q75

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

intens\_idx2

Mean

  1.4

  0.8

  0.9

  0.8

  1.0

  0.7

  1.1

  1.1

  1.3

Q25

  0.3

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

  0.0

Q50

  1.0

  0.5

  1.0

  0.7

  0.8

  0.8

  1.0

  1.0

  1.0

Q75

  2.0

  1.3

  1.0

  1.0

  1.1

  1.0

  2.0

  2.0

  2.0

(#tab:tab6) Poverty Incidence in Small Farm Households across Categories (PPP, percent)

LoCLoD

LoCMeD

LoCHiD

MeCLoD

MeCMeD

MeCHiD

HiCLoD

HiCMeD

HiCHiD

Variable

est.

est.

est.

est.

est.

est.

est.

est.

est.

pcexp\_ppp\_m

Mean

29.7

26.6

39.7

32.7

39.7

33.5

38.2

54.6

46.2

Q25

13.2

12.6

14.6

13.7

23.0

15.6

18.7

28.2

19.3

Q50

21.6

22.2

24.4

26.4

36.7

26.2

27.3

44.9

30.9

Q75

38.6

30.8

44.0

43.0

49.3

40.1

49.8

68.0

50.0

foodexp\_ppp\_m

Mean

23.0

18.8

24.1

24.0

27.3

24.7

29.8

39.5

32.4

Q25

10.3

 8.0

 9.9

10.9

16.2

11.7

14.5

17.7

15.2

Q50

17.0

14.9

16.2

18.5

26.3

19.5

21.9

32.0

24.3

Q75

30.4

24.3

27.3

35.8

35.5

31.3

38.3

50.8

33.6

nfoodexp\_ppp\_m

Mean

 6.6

 7.7

15.6

 8.6

12.4

 8.8

 8.4

15.1

13.8

Q25

 2.2

 3.7

 3.9

 2.3

 4.8

 3.9

 3.6

 6.3

 3.5

Q50

 4.1

 5.0

 6.9

 5.2

 6.9

 7.0

 6.3

 9.1

 7.5

Q75

 7.8

10.0

13.9

11.1

 9.9

10.2

10.1

18.7

13.5

(poor\_ppp1 \* 100)

Mean

74.3

80.8

71.3

68.4

51.8

64.2

66.3

36.9

59.0

Q25

 0.0

100.0

 0.0

 0.0

 0.0

 0.0

 0.0

 0.0

 0.0

Q50

100.0

100.0

100.0

100.0

37.4

100.0

100.0

 0.0

100.0

Q75

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

(poor\_ppp2 \* 100)

Mean

90.6

93.0

82.5

86.1

89.9

91.0

83.9

68.9

83.2

Q25

100.0

100.0

100.0

100.0

100.0

100.0

100.0

 0.0

100.0

Q50

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

Q75

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

(povgap\_ppp1 \* 100)

Mean

38.3

39.5

34.3

33.7

17.5

30.6

27.9

14.6

24.7

Q25

 0.0

17.3

 0.0

 0.0

 0.0

 0.0

 0.0

 0.0

 0.0

Q50

43.1

36.1

35.8

29.6

 0.0

30.5

27.7

 0.0

17.1

Q75

65.2

64.1

61.0

63.2

38.9

58.3

50.2

20.9

48.8

(povgap\_ppp2 \* 100)

Mean

55.3

57.8

50.5

50.4

38.5

50.0

45.4

29.7

42.3

Q25

36.4

48.3

26.4

27.3

18.5

31.7

17.7

 0.0

15.6

Q50

64.5

60.0

59.9

56.0

35.3

56.5

54.8

24.5

48.2

Q75

78.2

77.6

75.6

77.0

61.8

73.9

68.9

50.6

68.0

(sevpov\_ppp1 \* 100)

Mean

23.6

23.2

19.6

20.6

 7.7

17.9

14.6

 7.6

13.0

Q25

 0.0

 3.0

 0.0

 0.0

 0.0

 0.0

 0.0

 0.0

 0.0

Q50

18.6

13.1

12.8

 8.7

 0.0

 9.3

 7.7

 0.0

 2.9

Q75

42.5

41.2

37.2

39.9

15.1

34.0

25.2

 4.4

23.8

(sevpov\_ppp2 \* 100)

Mean

38.6

39.8

34.4

34.5

20.5

32.4

28.9

16.6

26.1

Q25

13.3

23.3

 7.0

 7.4

 3.4

10.0

 3.1

 0.0

 2.4

Q50

41.6

36.1

35.8

31.3

12.5

32.0

30.1

 6.0

23.2

Q75

61.2

60.2

57.2

59.3

38.2

54.7

47.4

25.6

46.2

## Ethiopia

Revelant sources of household-level micro records for Ethiopia include:

* 2011/12 ERSS (income vars)
* 2013/14 and 2015/16 Ethiopia Socioeconomic Surveys
* 2012/13 Ethiopia’s Agricultural Sample Survey (AgSS) -- but it's difficult to cross-tabulate results from the AgSS (crop production and input uses) with the ERSS' income data
* 2012 ATA Baseline Survey (3,000 hhlds), see (Minot & Sawyer, [2013](#ref-minot2013agataeth)).

# Quadrant Classification

## Nigeria

[TBD]

For documentation purposes below are code snippets from the 2016 Farmer Segmentation for Nigeria (definitions and characterization of quadrants and livelihood zones).

## Ethiopia

[TBD]

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Note that some of these references are unpublished materials, do not cite.

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