

Evaluation Survey Design

for

Africa Research in Sustainable Intensification for the Next  
Generation (Africa RISING) Program in Malawi

International Food Policy Research Institute (IFPRI)

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## Table of Content

1. Introduction .....	3
2. Characterization of sites .....	3
3. Selection of action and control communities .....	3
4. Development of household and community survey tools .....	4
5. Malawi Africa RISING evaluation surveys.....	4
5.1. Beneficiary households .....	5
5.2. Control households.....	5
5.3. Non-beneficiary households.....	6
Appendix.....	7
Exhibit 1. MARBES survey tool-household.....	7
Exhibit 2. MARBES survey tool-community .....	9
Exhibit 3. Beneficiary households in action villages (as of June 2013) .....	10
Exhibit 4. Sampled control households .....	11
Exhibit 5. Sampled non-beneficiary households .....	12
Exhibit 6. Power Calculation Results (for Malawi Africa RISING Baseline Evaluation Survey).....	13

## 1. Introduction

This document summarizes the evaluation design employed by IFPRI's Monitoring and Evaluation (M&E) team to evaluate Malawi Africa Research in Sustainable Intensification for the Next Generation (Africa RISING) program. Africa RISING comprises three research-for-development projects to sustainably intensify key African farming systems in West Africa, East and Southern Africa, and the Ethiopian highlands. It is supported by the United States Agency for International Development (USAID) as part of the U.S. government's Feed the Future (FTF) initiative. In 2012, the International Institute of Tropical Agriculture (IITA) launched the Sustainable Intensification of Cereal-based Farming Systems in the Guinea Savannah Zone of West Africa and in East and Southern Africa, while International Livestock Research Institute (ILRI) began the Sustainable Intensification of Crop-livestock Systems to improve food security and farm income diversification in the Ethiopian highlands. The International Food Policy Research Institute (IFPRI) is leading the monitoring and evaluation of all three projects. The quasi-Randomized Controlled Trial design employed by the M&E team is described below.

## 2. Characterization of sites

To properly assess the impact of the Program on various agro-economic and environmental outcomes, geographical areas within which there are large numbers of potential Program beneficiaries and significant improvement in opportunities have been delineated. For each Program focus country, site characterization was made based various agro-economic factors that could affect production and productivity, including length of growing period, elevation, temperature, rainfall, and market access. Detailed site characterization reports can be made available for users upon request.

## 3. Selection of action and control communities

Africa RISING has purposely adopted a highly-structured approach to geographic targeting and the selection of action research sites to facilitate the extrapolation of findings from action research sites, and spillover of knowledge and technologies within and beyond Program mega-sites.<sup>1</sup> Based on site characterization results and local knowledge, IFPRI's M&E team and

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<sup>1</sup> The three Program mega-sites are: The Cereal-based farming systems in the Guinea Savannah Zone of West Africa (covering Ghana and Mali), the crop-livestock systems of the Ethiopian highlands, and the Cereal-based farming systems in East and Southern Africa (covering Malawi, Tanzania, and Zambia).

Program implementing partners selected candidate communities for Africa RISING research activities. From within these candidate communities, and based on additional considerations by the research teams, target action communities have been identified.<sup>2</sup> The M&E team also identified other communities within the same agro-ecological zone and to serve as control communities.

#### 4. Development of household and community survey tools

To assess sustainable intensification trajectories for different household typologies as they occur, and to inform the development of scaling up and scaling out strategies, data need to be collected on the composition of households, crops grown at the plot level, livestock systems, farm and crop management practices, use of inputs, and key livelihood strategies employed. Towards this end, the M&E team developed detailed household and community questionnaires capture baseline characteristics of both beneficiary and control households and communities. These data are crucial to evaluate sustainable intensification trajectories, and evolution of changes in farm practices within the development domains of interest. Exhibits 1 and 2 summarize the modules included in the household and community survey tools for Malawi survey.

#### 5. Malawi Africa RISING evaluation surveys

In each of the Malawi Africa RISING action and control communities, baseline and end line socio-economic (panel) surveys will be conducted involving three types of households and using the structured questionnaires developed by the M&E team.

##### Baseline Survey

For Malawi, the team implemented the baseline survey July – October 2013. The household survey included the following three groups of households.

- A census of all Program *beneficiary* households as of June 2013. This group is referred to as “beneficiary” group hereafter.
- A random sample of *control* households from control communities. This group is referred to as “Control” sample hereafter. See Exhibit 5 for the detail on control sample.

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<sup>2</sup> One such consideration is synergy with pre-existing sustainable intensification projects implemented by Africa RISING research teams.

- A random sample of *non-beneficiary* households in action communities. This group is referred to as “Non-beneficiary” sample hereafter. Data from this group will be used to assess potential spillovers.

While the beneficiary sample is pre-determined, the size of non-beneficiary and control samples was guided by power calculations based on maize yield data from the 2011 Malawi Integrated Household Survey. Please refer Exhibit 6 for the detail.

### 5.1. Beneficiary households

All Program beneficiary households (as of July 2013) are included in Malawi Africa RISING Baseline Evaluation Survey (MARBES). Names and identifying information about beneficiaries were obtained from Malawi Africa RISING research scientists. See Exhibit 3 for the detail on the beneficiary sample.

### 5.2. Control households

From within the geographic area that was identified to serve as control, villages were chosen such that selected villages were physically or in some other way isolated from the action villages. In some areas, which are internally homogeneous, it was possible to find control villages that were both similar to action villages and physically separate from them, whereas in others – with greater variations in topography, climate and access – this proved to be difficult. In the latter case, the M&E team decided to randomly select sites from an adjacent area.

The sampling of control households was done in three stages. In the first stage, and based on results from the site characterization, four control Sections were identified (Mtakatika Center and Thete in Dedza and Sitolo and Mwalaoyera in Ntcheu District). In the second and third stages, control villages and households were selected from the four control Sections using Probability Proportional to Size (PPS). In order to attain the target sample of 560 control households, 28 control villages<sup>3</sup> and 20 households per village were sampled. The 10% reserve

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<sup>3</sup> After sampling of control villages, the list of all the households within control villages was obtained from District Agricultural Offices (DAO). According to DAO sources, this household list was constructed in 2012 as part of Malawi’s Farm Input Subsidy Program (FIPS). The M&E, working with a local survey firm, conducted household verification exercise and constructed an updated sampling frame as of July 2013

households sampled for Ntcheu was found to be inadequate and the reserve sample was raised to 25% for Dedza district.<sup>4</sup> See Exhibit 4 for the detail on control sample.

### 5.3. Non-beneficiary households

In order to sample the target 200 non-beneficiary households, and given that action villages were predetermined, (only) a systematic random sample of household was employed. A list of households in the 24 action villages was obtained from District Agricultural Offices and verifications were done to construct an updated sampling frame for action villages. The target sample was divided into the four action Sections (Mposa and Golomoti Center Sections in Dedza and Kampanje and Mpamadzi Sections in Ntcheu) proportional to the share of the Section (of the total population of the four Sections). Then a fixed number of household were randomly sampled from each of the action villages in the Section using PPS.

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<sup>4</sup> The main reasons for non-interview in Ntcheu District were inability of the survey team to locate sampled households and main respondent being away for an extended period of time.

## Appendix

### Exhibit 1. MARBES survey tool-household

Module	Objective: gather data on...
Household members	educational attainment, marital status, and primary/secondary occupation of household member
Labor	employment, earnings, unemployment, and seasonality in employment
Health	visited health facilities, on how much was spent on any illnesses/injuries,
Agricultural land	land ownership, land and soil characteristics, and water sources (at parcel-level)
Crop inputs (conservation)	farming and soil conservation practices. Data will be collected at a parcel-plot level.
Crop inputs (cost)	seeds, pesticides, fertilizer, and non-labour expenses the household used. Data will be collected at a parcel-plot level.
Crop inputs (labor)	labour input on crops grown on each plot during the rainy and dry seasons. Data will be collected on how many person-days were used for different activities for each crop grown on a plot. Person days are calculated as the number of workers times the number of days they worked
Crop inputs (seed)	seeds were used by cropping season.
Crop production	crops grown on each plot and the different varieties of the crops.
Crop sale	crop sale
Crop storage	storage methods used by households and how effective the methods are/have been. Questions will be asked about all the crops the household grew in the previous cropping season.
Livestock ownership	the number of the different livestock types (disaggregated by local and improved) owned by the household at the time of data collection and during the preceding 12 months.

Livestock feed/water	sources of food and drinking water for different livestock categories
Challenges	agriculture-related problems faced by the household and coping strategies
Extension	interaction with agricultural extension agents and participation in Africa RISING
Other income	non-agricultural income activities that the household has used to acquire/increase the household income in the past 12 months
Credit	access to and use of credit
Housing	facilities the household has inside the home
Welfare & Food security	food security and seasonality in terms of access food (at household level and selected demographic groups)
Food consumption	food expenditure on food, including cereals, starches from roots, sugar, pulse, nuts and seeds, vegetables, fruits, meat, meat products, and fish, milk and milk products, oil and fats, spices and other foods, beverages, and wild fruits, vegetables and meat products
Non-food expenditure	non-food expenditures. Data on food and non-food expenditure will be used to construct a measure of poverty
Shocks	various types of shocks the household might have experienced over the past five years and coping strategies
Women anthropometry	nutritional outcomes of women 15-49 years
Child anthropometry	nutritional outcomes of children 0-59 months old



Exhibit 2. MARBES survey tool-community

Module	Objective: Gather community-level data on...
Basic services	access to basic services
Extension	agricultural labor, extension services, and agricultural problems
Land	land use
Demographics	organizations, labor movement, major crops provides, and amount and fluctuation of rain water
Water, shocks, and food	access to water, shocks, and food consumption
Local units and prices	metric conversion of local measurement units and crop price data

Exhibit 3. Beneficiary households in action villages (as of June 2013)

Distri ct	EPA	Interventio n Section	Number of Household s in the Section	Number of Villages in the Section	Number of Beneficia ry Villages in the Section	Beneficiary Villages	Number of Beneficiary households
Dedza	Linthipe	Mposa	3723	17	5	Phwere, Mkuwazi, Mbidzii, Chibwana, Ng'anjo	77
	Golomo ti	Golomoti Center	1013	9	4	Msamla, Pitala, Kalumo, and Wilson	104
Ntche u	Kandeu	Kampanje	2206	14	9	Katsese, Kampanje Center (Kampanje 1, 2, 3), Kaziputa, Dauka, Gonthi, Khomba, Mitchi	177
	Nsipe	Mpamadzi	1554	17	7	Amosi, Champiti, Gwauye, Hiwa, Malinda, Njomole, Nzililongwe	94
<b>Total</b>					<b>25</b>		<b>452</b>

Exhibit 4. Sampled control households

EPA	Section	Total number of household in the Section	Sampled village	Total number of household in the village	Sampled households (without reserve)
Mtakataka	Mtakataka Center	1676	Fwalikire	193	20
Mtakataka	Mtakataka Center	1676	Chidzondo	140	20
Mtakataka	Mtakataka Center	1676	Kakhome I	171	20
Mtakataka	Mtakataka Center	1676	Kautsile	111	20
Mtakataka	Mtakataka Center	1676	Kudoole	196	20
Mtakataka	Mtakataka Center	1676	Chikawola	90	20
Mtakataka	Mtakataka Center	1676	Manyika	101	20
Mtakataka	Mtakataka Center	1676	Tseka	84	20
Kandeu	Sitolo	990	Kambadya	104	20
Kandeu	Sitolo	990	Majawa	114	20
Kandeu	Sitolo	990	Sitolo	176	20
Kandeu	Sitolo	990	Zaunda	151	20
Nsipe	Mwalaoyera	1646	Chilumo	118	20
Nsipe	Mwalaoyera	1646	Chimwala	324	20
Nsipe	Mwalaoyera	1646	Sanjani	282	20
Nsipe	Mwalaoyera	1646	Jingo	193	20
Nsipe	Mwalaoyera	1646	Hauya	140	20
Nsipe	Mwalaoyera	1646	Kahowela	67	20
Nsipe	Mwalaoyera	1646	Mnkhwani	199	20
Nsipe	Mwalaoyera	1646	Mnkhwani II	113	20
Nsipe	Mwalaoyera	1646	Pendanyama	210	20
Lobi	Thete	1599	Chizuzu I	77	20
Lobi	Thete	1599	Kabinda II	37	20
Lobi	Thete	1599	Gogo	188	20
Lobi	Thete	1599	Maphiri	98	20
Lobi	Thete	1599	Mafuko	54	20
Lobi	Thete	1599	Chimbwala	71	20
Lobi	Thete	1599	Mambewe	75	20
<b>Total</b>		<b>5911</b>	<b>28</b>	<b>3877</b>	<b>560</b>

Exhibit 5. Sampled non-beneficiary households

EPA	Section	Non-beneficiary households	Village	Household per village	Household sampled (with 25% reserve)
Linthipe	Mposa	1051	Chibwana	125	22
Linthipe	Mposa	1051	Mbidzi	334	22
Linthipe	Mposa	1051	Mkuwazi	198	22
Linthipe	Mposa	1051	Phwere	150	22
Linthipe	Mposa	1051	Ng'anjo	244	22
Golomoti	Golomoti	541	Msamala	252	7
Golomoti	Golomoti	541	Pitala	136	7
Golomoti	Golomoti	541	Kalumo	68	7
Golomoti	Golomoti	541	Wilison	85	7
Kandeu	Kampanje	1429	Katsese	185	8
Kandeu	Kampanje	1429	Kampanje I	284	8
Kandeu	Kampanje	1429	Kampanje II	209	8
Kandeu	Kampanje	1429	Kaziputa	171	8
Kandeu	Kampanje	1429	Dauka	232	8
Kandeu	Kampanje	1429	Gonthi	92	8
Kandeu	Kampanje	1429	Khomba	126	8
Kandeu	Kampanje	1429	Mitchi	130	8
Nsipe	Mpamadzi	759	Amosi	95	7
Nsipe	Mpamadzi	759	Champiti	210	7
Nsipe	Mpamadzi	759	Gwauya	96	7
Nsipe	Mpamadzi	759	Hiwa	75	7
Nsipe	Mpamadzi	759	Malinda	106	7
Nsipe	Mpamadzi	759	Njolomole	45	7
Nsipe	Mpamadzi	759	Nzililongwe	132	7
<b>Total</b>		<b>3780</b>	<b>24</b>	<b>3780</b>	<b>250</b>

Exhibit 6. Power Calculation Results (for Malawi Africa RISING Baseline Evaluation Survey)

	New maize yield	Correlation between measurements	Power	$\rho$	Sample required (N)	# of households/village	# of villages
<b>Baseline values:</b> Avg maize yield: 1049kg/ha  Std. dev.: 1955 Deff: 2.36 ( $\rho=0.72$ )	1259	0.7	90%	-	893	-	-
				0.072	1,469	10	147
				0.1	1,697	10	170
				0.05	1,295	10	130
				0.03	1,135	10	114
			80%	-	645	-	-
				0.072	1,061	10	106
				0.1	1,226	10	123
				0.05	936	10	94
				0.03	820	10	82
				0.072	1,523	20	76
				0.1	1,871	20	94
				0.05	1,258	20	63
				0.03	1,013	20	51

Note: Data source is Malawi Integrated Household Survey (2011) for Dedza and Ntcheu Districts.

Power calculation assuming a 20% increase in average maize yield between baseline and end line.

$\rho$  is intra-cluster correlation in maize yield (for mono-croppers only).