MALAWI
Strategy Support Program

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
IFPRI
A member of the CGIAR Consortium

TECHINICAL REPORT | February 2017

The State of Agricultural Extension and Advisory Services Provision in Malawi

Insights from Household and Community Surveys

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TABLE OF CONTENTS

LIST OF TABLES

EXECUTIVE SUMMARY

This is part of a series of descriptive reports and later in-depth analysis of the survey data. These series are aimed to provide an assessment of the state of agricultural extension and advisory services provision in Malawi in order to inform policy and reform processes and programming by the government and donors. These studies are in response to the request by the Ministry of Agriculture, Irrigation and Water Development (MoAIWD) to look closely at the state of extension services provision with the intent to further strengthen the contribution such services make to food security, economic growth, and achieving sustainable development goals.

This report summarizes key findings on the state of agriculture and nutrition extension and advisory services in Malawi based on responses from household and community surveys conducted in Malawi between August and October 2016 that focused on the demand side of agricultural extension service provision and access to those services. Nationally-representative samples of 3001 households and 299 communities in all districts of Malawi, except Likoma, were interviewed for the study. Key messages are as follows:

Access to advice: Three-quarters of households reported having received some advice on agriculture in the past two years. This is relatively high compared to other African countries. Half of households received advice in the last 12 months, indicating that households generally are not receiving advice every year or more frequently. On health and nutrition advice, 57 percent of households received advice in the last two years, and 36 percent in the last 12 months.

Topic of advice: Most of the advice received is on crop production practices, mainly on weather forecasts, early or timely planting, improved varieties, soil fertility management practices, and water harvesting practices. Most common advice on health and nutrition are on dietary diversity (six food groups) in food consumption, washing hands before and after consuming food, and general hygiene and cleanliness. A third of respondents received advice on agroforestry, mainly on planting trees in field crops or around the homestead, or advice on not cutting trees. A quarter of respondents obtained advice on postharvest practices, mainly on applying storage chemicals, proper drying of the crop, and bagging. Another quarter received advice on livestock, mainly on livestock housing and disease control or vaccination. Fifteen percent received advice on marketing, mainly on group marketing or selling produce to ADMARC. Only 5 percent received advice on aquaculture practices.

Equity of advice: Males are more likely to receive agriculture-related advice than females, although both are equally likely to receive advice on other livelihoods and health/nutrition advice. Among females, female members in male-headed households have a lower likelihood of receiving agriculture advice than females who are household head. This may be due to the persistent focus on household heads as recipients or beneficiaries in many extension, training, or capacity building programs. In terms of specific technologies, females are less likely to receive advice on weather or climate forecasts, external inputs (improved varieties and chemical fertilizer), crop disease control, and irrigation and water harvesting techniques. Females are also less likely to participate on Village Agricultural or Development Committees than males. As a result, females are less likely to be aware of improved technologies and less likely to try out any improved technologies. But once aware, females are equally likely to adopt improved technologies as males.

Formal education, measured as the number of years of formal education and a dummy (yes/no) for completing at least primary education, is also a strong predictor of access to advice on all topic. Those with higher educational attainment are more likely to access advice. The wealthier households are more likely to access advice on both agriculture and nutrition. Those residing farthest from the main roads or in the most remote areas have significant lower access to advice on crop production, livestock, postharvest management, health, nutrition, and environment. Youth (less than 35 years of age) are less likely to access advice on most of these topics. In general, youth are less likely to participate in Village Agricultural or Development Committees and less likely to demand or request advisory or extension services. As a result, youth are less likely to be aware, to try out and to adopt improved technologies than their older counterparts. This is a topic that needs further investigation since these results are in contrasts to claims and hopes that the youth the drivers of agricultural innovation and rural transformation.

Quality of advice: Farmers gave very high ratings and are satisfied with the advice that they receive overall: 76 percent of farmers are very satisfied, 77 percent said they found the advice very useful; 86 percent said they followed the advice; 92 percent said the advice was something they wanted or needed. Ratings from this survey are somewhat higher than the ratings reported in the third Integrated Household Survey (IHS-3) of 2010 and its follow-up panel, the Integrated Household Panel Survey (IHPS) in 2013, but all these surveys indicated generally high ratings for the agricultural advisory services provided. These observations indicate either that extension and advisory services for those that received them are of good quality and respond to farmers' needs or, rather, are a reflection of a cultural norm on judgment, in which people do not want to disappoint or cannot complain. We also checked the consistency of responses on whether farmers follow or act upon the advice received with actual adoption, and evidence shows that only a small proportion of those receiving advice on a particular technology are actually adopting it. This is contrary to the earlier reported ratings on the quality of the advice received. Self-reported ratings should be interpreted with caution; and alternative measures of quality of advice should be considered.

Technology awareness: In general, it seems that there is still low awareness of technologies being promoted, signaling low or weak coverage of extension services provision to date. At the same time, this finding indicates that more extension services can help to disseminate these practices. In terms of specific types of technology, awareness rates range from 14 to 49 percent for soil fertility and land management technologies. Awareness on pit planting and composting toilets are particularly low, at 14 and 26 percent, respectively. In terms of specific dimensions of conservation agriculture that is heavily promoted in the country, 42 percent of respondents are aware of minimum tillage, 28 percent are aware of soil cover, 38 percent are aware of intercropping, and 46 percent are aware of crop rotation.

Technology adoption: In general, there is low adoption of many of the promoted technologies. Those trying out different improved technologies range from 4 to 35 percent of all respondents, or from 31 to 81 percent of those aware of these technologies. The actual adoption rates in 2016 cropping season range from 4 to 42 percent of all plots or from 8 to 63 percent of those who are aware. Use of crop rotation and intercropping are relatively well-adopted, but other improved technologies have low adoption rates. More than half of farmers still are not aware of many of these practices, so there is room for extension services to teach farmers on the benefits and processes of adopting these technologies.

When we asked farmers to list new practices tried out in the last three years (using open-ended questions), not many farmers were reporting new practices tried. The most commonly reported new practices tried are composting pits or piles, Sasakawa-promoted technologies (proper and timely planting, proper spacing, and proper planting densities), minimum tillage, bunds or ridges, crop residue incorporation, and crop rotation, in which only 6 to 9 percent of farmers reported trying them out in the last three years. This indicates that the large majority of farmers have not tried any new technology in the last several years.

The food and health related technologies have relatively high adoption rates, because they are relatively simpler and monetary costs and efforts needed in adopting them are low compared to the production-related technologies. However, more efforts are needed in promoting these practices, especially those where adoption is still relatively low, including on eating multiple food groups, consuming more iron-rich food, and using iodized salt.

Demand-driven system: Most of the farming households do not participate in meetings or processes where they can articulate their demands for agriculture- or nutrition-related advice. Only 14 percent of those receiving advice actually demanded or requested this advice, indicating that not many farmers are requesting or articulating their demand for extension and advisory services. This indicates that agricultural and nutrition extension services provision is still heavily supply-driven, rather than demand-driven as envisioned in the National Extension Policy.

The majority of respondents are either those who received advice, even though they did not request (41 percent of respondents) or those respondents who did not seek advice and did not receive agriculture-related advice (half of respondents). Within the latter, one-third of them reported that they have particular needs or demands for advice, which means there is still scope for the extension service providers to improve on reaching out to farmers. In general, the majority of respondents do not adopt and do not demand advice on particular technologies being promoted.

What technologies or agricultural advice are being demanded? We asked this question of those who said they need extension and advisory services. Two-thirds of sample farmers responded to the survey questions on specific demands for technologies and on their willingness to trade their hypothetical voucher or coupon for such advice. It was surprising that most of the advice requested is for advice on older agricultural practices—on minimum tillage, pit planting, manure or fertilizer making, composting, soil cover or mulching, intercropping, bunds or ridges, water management practices, crop residue incorporation, crop rotation, Sasakawa-promoted practices (proper and timely planting, proper spacing, and proper planting densities), and agroforestry. A third of farmers requested food, health and nutrition related advice. One implication is that the extension and advisory services requested are available and provision of these can be intensified through the existing extension system. Another implication is the opportunity to create or facilitate demand for specific extension and advisory services by intensifying general awareness of improved technologies through cost-effective, mass media.

Pluralistic system: While there are several dimensions of pluralism in agricultural extension service provision, we specifically look at diversity of sources of advice among households using both surveys. Agricultural extension development officers (AEDOs) (government extension workers) continue to play a big role in the provision of such advice, and they remain the dominant players (66 percent of farmers receiving advice source it from AEDOs, and this figure is higher if we assume that some of the NGO agents reported as having offered advice to respondents actually are AEDOs that were contracted to work on an NGO project). However, we can also say that there are more players or service providers than just government extension workers: 25 percent of those receiving advice sourced it from non-governmental organizations (NGOs, including those other community-based or farmer-based organizations) (and this figure is higher if we assume that some of those reported reporting government agents are actually being hired by NGOs). At community level, 99 percent of group villages have been visited by government agents, and only 15 percent of group villages indicated having had non-government agents or workers come to their village to give advice. Therefore, it seems that there is still limited coverage spatially in the provision of agricultural advice by non-government actors. Moreover, the non-state service providers are dominated by international NGOs, who can be considered more as donors than as local service providers. They function on external funding, usually operating within short-term project cycles. The sustainability of their efforts is a

major issue. In reality, there are only a few local organizations that are extension service providers and only a few households received advice from them. A major challenge remains in strengthening and supporting local organizations to become effective extension service providers – this despite the National Agricultural Extension Policy having a strong emphasis on capacity strengthening of local organizations.

Interestingly, other farmers are reported to be a major source of awareness of technologies: 33 to 56 percent of respondents indicated getting information of many technologies being promoted from fellow farmers. This is an important finding, indicating a major role for social networks and information spillover in communities in the spread of improved agricultural technologies.

In terms of methods for disseminating information on agricultural technologies, community or group meetings is the most common; radio is second; face-to-face visits are third; and fourth are through short-term trainings usually done with a group of farmers. The fifth main method of receiving advice is through farm demonstrations, facilitated by government or NGO workers, often with the help of lead farmers. Very few farmers (1 to 2 percent) reported accessing information from other sources or through other approaches, including farmer field schools, farmer field days, farmer phone or SMS messaging, mobile vans, listening clubs, television, or internet. In terms of health and nutrition advice, health workers and hospitals or clinics are the major sources, and only a few households reported getting such advice from extension workers.

Farmers' connectivity: A large majority of survey households are well connected to other farmers and potential sources of information: 81 percent go to market at least once a week; 64 percent use a phone at least once every week; 45 percent listen to radio every day and 60 percent listen to radio at least once per week; 59 percent go to town at least once per month; 42 percent participates in village agricultural or development committees; and 33 percent are members of producer associations, cooperatives or other community-based organizations. We looked at the correlation of these measures of connectivity with the likelihood of an individual receiving agricultural advice. Those using the radio or cellphone everyday are more likely to receive advice on various topics. Participation in associations or cooperatives is also linked to greater access to extension and advisory services on many topics. Those who go to the market at least once a week are more likely to get advice only on marketing and agroprocessing. These figures indicate that these processes are potentially important channels that can be explored in disseminating information.

Lead farmer approach: Lead farmers' coverage seems lower than expected. Of those farmers receiving advice, only 9 percent reported that they received advice from a lead farmer—the main sources are still government workers (under either government or donor projects), radio, and NGO workers (either own NGO staff or AEDOs hired by NGOs for projects). By specific technology, 7 to 16 percent of respondents reported sourcing advice on the use of these technologies from lead farmers. These figures may be underestimates, as some respondents may be responding "other farmers" instead of lead farmers due to unfamiliarity with the concept of 'lead farmers', although this is not very likely. Another potential source of under-reporting of lead farmer coverage is the fact that lead farmers mainly conduct follow-ups to what AEDOs or field workers from NGOs have initiated in the communities. Consequently, respondents in such instances may still report AEDO as the main source of advice and not the lead farmer. However, if the advice from the lead farmer is substantial and useful, it is likely the respondents would have reported the lead farmer as the source of the advice, especially since the survey interviewers/ enumerators emphasized that multiple responses are encouraged. It is, therefore, likely that the under-reporting of lead farmers' coverage is not substantial. These results conform to findings obtained when the research team revisited four communities after the survey to validate the survey results.

The performance of lead farmers seems to depend on how active and motivated the AEDO or NGO extension worker is. In general, if the AEDO is active in the community—mainly because there is project or is otherwise personally motivated to do so—lead farmers are also more active. Otherwise, lead farmers are not active in training neighboring farmers on the use of technologies that they were trained to promote. Our perspective on this is that, rather than focusing on promoting this lead farmer approach, the focus should be first on strengthening the supply-side overall, particularly the capacity of and incentives for the AEDOs and NGO agents to bring new, effective innovations that farmers can try out.

ACKNOWLEDGEMENTS

There are numerous people we would like to thank for making this project and study possible:

- The Department of Agricultural Extension Services (DAES) of the Ministry of Agriculture, Irrigation, and Water Development of the government of Malawi, especially to Frieda Kayuni and Jerom Nkhoma, for their support and the invaluable inputs and guidance starting with the questionnaire and research design. We are also thankful to the Department of Agricultural Planning Services (DAPS) for their support in the development of the project proposal.
- For the funding support for the overall project from the Government of Flanders and from the Gesellschaft für Internationale Zusammenarbeit (GIZ), the development agency of the German government, we are thankful. Specifically, we thank Nikolas Bosscher of the Government of Flanders and Florian Bernhardt and Elena Zanardi of GIZ for their guidance.
- Significant complementary funding for the survey was received from the Strengthening Agricultural and Nutrition Extension (SANE) project, funded by the United States Agency for International Development (USAID) mission in Malawi as an activity of Feed the Future. This funding enabled us to increase our sample size. We especially acknowledge SANE staff members Marie Cadrin, Clodina Chowa, Paul McNamara, Austen Moore, Stacia Nordin, Lonester Sibande, and Cristina Alvarez-Mingote for their support in various forms, including inputs to and review of the questionnaires, pretesting the questionnaires, providing contacts and links, and help in completing the list of sections used in the sampling.
- We acknowledge the support provided by the Malawi Country Strategy Support Program (MaSSP) of the International Food Policy Research Institute (IFPRI). MaSSP receives support from USAID/Malawi and is undertaken as part of the CGIAR Research Program on Policies, Institutions, and Markets (PIM) led by IFPRI. In addition, PIM graciously provided funds to write a precedent paper and a policy note that paved the way to securing funds for the larger project under which this paper was written. PIM is funded by the CGIAR Fund Donors.
- Wadonda Consult, headed by Ephraim Chirwa and Peter Mvula, managed and implemented the household and community surveys. We are thankful Dr. Chirwa and Dr. Mvula and to all the supervisors, translators, and enumerators for their hard work and efforts to collect quality data despite numerous challenges. We acknowledge with thanks the work of Tyler Moorhead and Amrik Cooper in programming the survey questionnaires onto computer tablets so that the surveys could be completed using computer-assisted personal interviewing techniques. This programming involved sleepless nights trying out the program and setting up the computer tablets.
- Within IFPRI, we are grateful for the support of Todd Benson, who has been instrumental since day one of writing the project proposal and who continues to guide us in the project. We also acknowledge the support of Karl Pauw and John Mazunda for initiating the concept and linking us to possible funders. We thank Suresh Babu and Kristin Davis, and Guy Faure (CIRAD) for provided feedback on the initial version of the project concept note. We are thankful to Bob Baulch, Chance Mwabutwa, and Noora-Lisa Aberman for their support in terms of management, logistics, and technical matters as well as linking as to policymakers and key stakeholders in Malawi. We are very grateful for the excellent research assistance by Cynthia Kazembe.
- Our thanks and acknowledgments are owed to Flora Nankhuni, Athur Mabiso, and the New Alliance Policy Acceleration Support-Malawi (NAPAS:Malawi) project team for linking us to the key stakeholders within the agricultural extension system, providing inputs to the questionnaires, helping in completing the list of sections used in the sampling, and reviewing the draft reports.
- We acknowledge the time shared by numerous people in advising us on the design of the project and the household and community surveys, including Grace Malindi, Rex Chapota, Jean-Pierre Busogoro, David Kamangira, Peter Kabambe, Timothy Gondwe, Gray Matita, Kachere Khumalo, and Andy Khumbanyiwa
- Finally, and most importantly, we are indebted to farmers and key informants we interviewed who shared their valuable time to talk to us and enabled us to have a glimpse into the complexities of their work and life. This project and study would not be possible without their willingness to engage with us. It is our hope that through our reports and engagement with policymakers and implementers that we may really represent and capture their voices and may recommend actions that will benefit them in the long term.

This publication has not been independently peer reviewed. Any opinions expressed here belong to the authors and do not necessarily reflect those of IFPRI, PIM, CGIAR, or any other person or organization listed here.

LIST OF ACRONYMS

ADMARC	Agricultural Development and Marketing Cooperation
AEDO	Agricultural Extension Development Officer
ARET	Agricultural Research, Extension, and Training Institute
ASP	Area Stakeholder Panels
ASWAp	Agriculture Sector Wide Approach
CAADP	Comprehensive Africa Agricultural Development Program
CBO	community-based organizations
DADO	District Agricultural Development Office
DAECC	District Agricultural Extension Coordination Committee
DHS	Demographic and Health Survey
DSP	District Stakeholder Panels
FBO	farmer-based organization
FCS	food consumption score
FISP	Farm Input Subsidy Programme
GAC	Group Villages Agricultural Committees
GVH	Group Village Head
HDDS	household dietary diversity score
HFIAS	household food insecurity access score
IHS	Integrated Household Survey
LF	lead farmer
MoAIWD	Ministry of Agriculture, Irrigation, and Water Development (Malawi)
NGO	non-government organization
NRC	Natural Resources College
NSP	National Stakeholder Panels
SANE	Strengthening Agriculture and Nutrition Extension project
VAC	Village Agricultural Committees
VDC	Village Development Committees
VSLA	Village Savings and Loan Associations

1. INTRODUCTION

Malawi has made some progress in increasing agricultural production and economic growth and in reducing food insecurity in recent years, but much still needs to be done. Malawi has underachieved based on the 6 percent agricultural growth target despite exceeding the agricultural investment target of 10 percent under the Comprehensive Africa Agricultural Development Program (CAADP) (MoAIWD 2016). Undernutrition and food insecurity is still widespread with 37 percent of children under five being stunted according to the 2015/16 Demographic and Health Survey (DHS) and 6.7 million people estimated to be in need of food assistance in the 2016/17 crop year (MoAIWD 2016). Despite early successes of the government's flagship agricultural program, the Farm Input Subsidy Programme (FISP), agricultural productivity has been stagnating and food insecurity conditions in many areas of the country remain. For instance, in the case of maize, since 2010/11 season, maize productivity has been around 2 metric tons per hectare (mt/ha) remaining below the Agriculture Sector Wide Approach (ASWAp) target of 3 mt/ha (MoAIWD 2016). This necessitates bold actions to revisit the design and implementation of FISP and, at the same time, rethink the other complementary services and systems, both within agriculture and other sectors, that need to be strengthened.

Agricultural extension is one of those complementary services and systems. In early 2015, extension services were highlighted as the most important priority area for increasing agricultural productivity during the extensive consultation process on the content of the National Agriculture Policy (NAP), which involved representatives from a broad range of agricultural stakeholder groups coming from 28 districts. Snapp et al. (2014) also suggested that lack of information among farmers on proper use of hybrid maize seed and fertilizer due to ineffective extension services may have been a factor in the observed low nutrient use efficiency observed among beneficiaries of the FISP, limiting the productivity and development impact of this flagship agricultural development program of the government of Malawi. A recent analysis of the Malawi Integrated Household Panel Survey (2010, 2013) by Ragasa et al. (2016) also suggests that access to agricultural advice does not necessarily lead to greater crop productivity and food security. However, it is those quality extension services, measured in terms of the farmer' perceived usefulness and relevance of the advice, that is a significant predictor of agricultural productivity at plot level and household food security. These findings and observations suggest a need to look more closely at the agricultural extension system in Malawi to identify the real issues and the constraints in the system that currently prevent it from making a substantial contribution to the development objectives of the country.

This report summarizes key findings from recently-concluded household and community surveys in Malawi that focused on the demand side of agricultural extension service provision and access to those services. Through this review of the survey results and later in-depth analysis of the survey data, we aim to provide an assessment of the state of agricultural extension and advisory services provision in Malawi in order to inform policy and reform processes and programming by the government and donors. This is in response to the request of the Ministry of Agriculture, Irrigation and Water Development (MoAIWD) to look closely at the state of extension services provision with the intent to further strengthen it to contribute to food security, economic growth, and other development goals. This particular study identifies the issues and constraints facing the extension system in the country—whether the main challenges are in terms of low uptake or access, unequitable access, or low quality services that are not responding to demand or famers' constraints. It also aims to identify methods and approaches used in agricultural advisory service provision and discusses their use and effectiveness using various indicators. Additionally, it examines national and district systems to coordinate and implement agricultural extension services in order to inform policy and institutional reform processes and investments at these levels. However, this report is diagnostic in nature and focuses on a system-wide assessment; it is not meant to be a formal evaluation of any particular agricultural extension approach, intervention, or project.

This report is a component of an ongoing series of studies under the 3-year project entitled "Assessing and enhancing the capacity, performance and impact of the pluralistic agricultural extension system in Malawi". Additional research reports and papers will be written to look at both the demand for and supply of agricultural extension services in Malawi. The project is being led by the International Food Policy Research Institute (IFPRI) with the financial support of the government of Flanders and the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), the German agency for international development.

This report is structured as follows. First, the methods and data sources are described. Second, results based on specific indicators are presented. Third, conclusions, policy recommendations, and suggestions for further research are highlighted in the last section.

2. METHODS AND DATA SOURCES

This report is primarily based on household- and community-level surveys conducted by the International Food Policy Research Institute (IFPRI) between August and October 2016, with the assistance of Wadonda Consult. The surveys

cover 3,001 households and 299 sections in all 29 districts in Malawi (excluding Likoma).[1] These surveys were complemented by follow-up visits and in-depth interviews to farmers in four communities and interviews with more than 30 key informants at national, district, EPA, and section levels.

To compute the minimum sample size needed for the household and community surveys, we used per capita expenditure (as a proxy for household income) as an outcome variable using the third Malawi Integrated Household Survey (2010-2011) (IHS-3) dataset[2]. Average per capita expenditure in 2010-11 in rural areas nationwide was 51,941 MWK (with a standard deviation of 5,194 MWK). Using these estimates, simple random sampling would require a sample of 434 households to generate estimates of per capita expenditure with an allowable margin of error of 10 percent of the mean and at 95 percent statistical power. However, given that the sampling is clustered at the village level, we adjusted this sample size to account for intraclass correlation (=0.31) and design effect (=3.82). The minimum sample size based on the multi-stage clustered sampling is 1,660 households.

Given the available funding from the Government of Flanders and GIZ, and complementary funding provided by the USAID-funded project titled "Strengthening Agriculture and Nutrition Extension" (SANE), which will use the data for their project M&E purposes, a total sample of 3,000 households was designed. This sample size enables analysis and statistical inference concerning Malawi's farming population with less than a 3 percent margin of error at a 95 percent confidence level.

A total of 2,000 households in the 11 SANE-targeted districts was targeted to be surveyed and 1,000 households in the 18 non-SANE-targeted districts. We oversampled the SANE-targeted districts to enable district-level analysis for these districts, a condition of the extra funding from SANE. The statistics in the summary tables presented in this document are generated using population weights to adjust for oversampling in some districts. The actual sample of 3,001 households and their distribution by region, district, gender, age, and presence of lead farmers is shown in Table 1.

The full list of districts, extension planning areas (EPA), and sections were obtained from the MoAIWD. The number of communities and households per district were determined using Probability Proportional to Size (PPS) sampling. We randomly-selected 300 sections based on the required sample per district from the PPS method. For each randomly-selected section, one group village was randomly-selected as the enumeration area (EA). The EAs are randomly selected for each district based on equal probability sampling so that each EA (big or small) has equal chance to be included. For each sample EA, a full listing of households was generated by the survey team with the help of village leaders. Very large group villages were divided into between two and four subparts depending on population size. A subpart then was randomly selected in which to do the full listing of households. The list was stratified into households with lead farmers and households without lead farmers, since a component of the study is to assess the activities and performance of lead farmers in Malawi. A total of 10 households were randomly selected – 8 to 10 households without lead farmers and 0 to 2 households with lead farmers, depending on the presence of lead farmers in the community. If the village had more than two households with lead farmers, the survey team randomly selected two households with lead farmers.

After the sample households were selected, a single member or two members of the selected households who were most knowledgeable about agricultural production, agricultural marketing, food preparation and feeding were selected for the face-to-face interviews. For the modules on technology adoption and extension services, we interviewed separately the female and male primary adult members in the household to enable gender analysis beyond the male-head and female-head dichotomy. We collected plot-level data to enable measurement of production and productivity, as well as gendered management and decision making at plot level. Some characteristics of the sample respondents and households are presented in a separate report (Ragasa and Qi 2016).

Both survey instruments were drafted and reviewed several times by IFPRI and SANE teams. Most modules of the household survey (production, household and plot characteristics, socioeconomic indicators, etc.) are heavily based on the IHS-3 questionnaire, but new modules on technology adoption, extension services and lead farmers were added. These new modules, along with the community-level questionnaire, were pre-tested in a few communities between 25 and 29 July 2016, and the questionnaires were adjusted accordingly. The questionnaires were shared with the Department of Agricultural Extension Services (DAES) and the Department of Agricultural Research Services (DARS) of MoAIWD and with staff of the NAPAS:Malawi project that works with MoAIWD. These agencies provided detailed comments and suggestions that were incorporated to the questionnaires accordingly.

[1] For purposes of the surveys, Mzimba district was divided into North and South, and Lilongwe district into East and West

[2] We also used a different outcome indicator – received advice from any source in the last 12 months also from the IHS2 dataset – also to compute the sample size for this survey. The minimum sample size is quite similar to that obtained using the per capita expenditure variable from the IHS-3.

Table 1—Survey sample size by region and district, both at individual respondent and household levels

District	Number of sample households	% female-headed households	% youth-headed (age <35 yrs.)	Number of respondents	% female respondents	Number of Lead Farmers
Northern region	240	23	43	417	54	47
Chitipa	30	23	60	54	57	6
Karonga	30	27	47	53	58	6
Mzimba North	50	22	42	83	51	10
Mzimba South	80	23	40	141	55	16
Nkhata Bay	30	20	37	50	50	5
Rumphi	20	25	35	36	56	4
Central region	1,361	25	45	2,305	55	231
Dedza	241	25	46	414	56	45
Dowa	110	25	50	190	54	22
Kasungu	110	25	50	189	54	19
Lilongwe East	180	27	39	273	55	33
Lilongwe West	270	27	44	461	56	36
Mchinji	170	25	42	299	54	33
Nkhotakota	40	20	45	65	52	6
Ntcheu	160	24	49	277	53	24
Ntchisi	30	20	53	52	54	5
Salima	50	24	44	84	50	8
Southern region	1,399	25	46	2,347	54	253
Balaka	130	27	47	220	55	25
Blantyre	191	26	45	317	52	36
Chikwawa	121	25	40	216	55	22
Chiradzulu	38	22	49	63	52	6
Machinga	270	26	48	463	54	42
Mangochi	210	26	46	341	55	41
Mulanje	90	23	47	151	53	17
Mwanza	20	25	45	34	56	4
Neno	20	25	55	32	53	4
Nsanje	70	23	43	107	51	12
Phalombe	50	22	54	88	55	10
Thyolo	80	24	40	124	55	13
Zomba	110	25	53	191	57	21
National	**3,001**	**25**	**46**	**5,069**	**54**	**531**

Source: IFPRI household survey (2016).

To produce a credible and acceptable assessment that key stakeholders can use, we paid close attention to quality control processes. First, the questionnaires for the household and community surveys underwent various reviews, inputs, and iterations among IFPRI researchers, the SANE team, DAES, DARS, the Natural Resources College (NRC), the Agricultural Research and Extension Trust (ARET), NAPAS: Malawi, and several other key stakeholders. The questionnaires were pre-tested in three rural communities. The questionnaires and assessment design were reviewed and approved by the Institutional Review Board (IRB) and ethics committees both at IFPRI and in Malawi.

Second, we use various methods and sources to complement and triangulate data and evidence. These household and community surveys were complemented by key informant interviews and revisits to four communities for more in-depth interviews. Other data collection methods will be conducted to complement these completed surveys and interviews including focus group discussions and interviews with government and non-government extension organizations and their frontline workers. We employed both qualitative and quantitative methods to validate results and storylines. This diversity of data sources contributes to the richness and rigor of the analysis.

Third, implementation of the surveys involved extensive enumerators' training and the use of computer-assistant personal interviewing (CAPI) on tablet computers. The latter reduce many of the errors in coding and data entry associated with the use of paper questionnaires, as well as allowing for daily checks on data entry that permit enumerators to quickly revisits households and communities to clear up any inconsistencies or errors observed in the initially recorded data. The survey teams were trained extensively for seven days, including hands on pilot-testing of the questionnaire on tablet computers. Wadonda Consult was the survey firm that implemented the surveys after being chosen as the most competent firm out of four survey firms shortlisted for survey implementation based on feedback from other researchers familiar with firms that provide household survey administration services in Malawi.

Lastly, a series of discussions and presentations of preliminary results are planned so that key stakeholders, through the project advisory committee meetings, can discuss and debate on these assessments obtained from our initial analysis of the household and community surveys. Two of these meetings were held on 7 and 9 November 2016. Feedback from these meetings were incorporated in this version of the report on the results from these surveys. Also, four communities were revisited to validate some of the survey results. These feedback processes have substantially improved the presentation of the survey results.

In terms of analytical methods, we used tabular analysis, simple mean comparisons and t-tests to illustrate the status of access to extension services by type and source, demand for extension services, connectivity and technology awareness and adoption. In addition, we used probit model, which is commonly used in analyzing factors or correlates of a binary variable, such as access to extension services. Logit model can be used as alternative to probit models; and our estimations show that the results are very similar. These analyses are used to understand equalities and sources of biases in access to extension services by type and source, demand for extension services, connectivity and technology awareness and adoption. These are aimed to contribute to understanding ways to improve targeting of beneficiaries of extension services provision.

3. DESCRIPTIVE EVIDENCE

This section describes the status of access to and quality of extension services. Additional supporting tables are in the Appendix and in an accompanying piece entitled "Household and Community Surveys on Agricultural Extension Services and Technology Adoption in Malawi: Statistical Abstract Report" (Ragasa and Qi 2016). Characteristics of the sample respondents and those of sample households can be found in the same accompanying document.

Access to advice

Access to agricultural advice[3] is quite high. Three-quarters of the farming population reported having received some agriculture-related advice in the last two years (Table 2). Sixty-three percent of individual respondents (female or male primary adults within a household) reported receiving advice on agriculture-related topics in the last two years.

When we narrowed down the time period to the past 12 months (2015/2016 cropping season), 51 percent of households and 39 percent of individual respondents reported receiving some agriculture advice. Compared to Ethiopia, which has made substantial investments in agricultural extension, the figures in Malawi are much higher. In Ethiopia, 27 percent of households are visited by development agents, 42 percent reported receiving advice on fertilizer or seed, and 28 percent reported accessing information through radio in the past 12 months (Ragasa et al. 2014). The figures for Malawi seems to be much better than for Ethiopia.

Those receiving advice in the 2015/16 season are much fewer than those that received advice over the longer two-year recall period, but this may not necessarily be undesirable, especially if the same information and messages are given. An in-depth interview with an Agricultural Extension Development Officer (AEDO), a frontline extension worker working under the government, indicates that AEDOs repeat messages to the farmers she or he works with—on proper planting and spacing, intercropping, crop residue incorporation, and the like—every cropping season, and that there has been no new technology package taught in recent years. Four communities were also revisited after the surveys and farmers reported the same thing—that there is no new knowledge being promoted by the local AEDO or lead farmers. Currently the messages from AEDOs and lead farmers emphasize minimum tillage, soil cover, and manure-making, with some additional advice on pit planting, intercropping, and crop rotation. If this is indeed the general case, receiving the same advice every year may not necessarily be better than receiving that advice once in a longer time period. And, these survey results further imply that extension agents are not being trained with new technologies or management practices, at least in recent years.

In terms of health or nutrition related advice, 57 percent of households and 47 percent of individual respondents received health advice in the last two years. Similarly, the figures are much lower than in the last 12 months (36 percent of households and 29 percent of respondents), but again, this may not necessarily bad if the same information or technologies are being promoted year after year.

[3] Advice topics include any on crop production, market access, livestock, aquaculture, sustainable land management, other livelihoods, processing/postharvest, environmental protection, forestry, or climate change adaptation.

Table 2—Households and respondents receiving advice on agriculture, health, and nutrition, percent

	All households	All respondents	All male*	All female	Female heads	Female members
In past two years						
Received agriculture advice	75	63	71	56	58	55
Received nutrition or health advice	57	47	47	46	48	45
In last 12 months						
Received agriculture advice	51	39	47	31	33	30
Received nutrition or health advice	36	29	29	29	31	28
Observations	*3,001*	*5,065*	*2,314*	*2,751*	*847*	*1904*

Source: IFPRI surveys (2016). Note: *Almost all are male heads.

Male respondents are more likely than females to receive agriculture advice (71 percent versus 56 percent), but both sexes are equally likely to receive health advice. Among females, female members in households with female and male primary adults have a lower likelihood of receiving agriculture advice than are female heads. This may be due to a persistent focus on household heads as recipients or beneficiaries in many agricultural extension, training, or capacity building programs.

Topics on which advice was given

In terms of topics on which advice was given, health (and nutrition) was the most common topic, followed by crop production and environmental management advice. Forty-two percent of respondents reported receiving advice on crop production in the last two years, just under 47 percent received advice on health and nutrition, and 35.5 percent received advice on environmental management (Table 3).

In terms of specific topics under crop production, the most common advice received was on weather or climate forecasts, improved varieties, soil quality, composting, early or timely planting, irrigation or water harvesting, and pit planting (Appendix Table 1). The majority of respondents reported receiving agriculture advice on multiple topics. Male respondents are more likely to receive advice on weather/climate forecasts, external inputs use (improved varieties and chemical fertilizer), crop disease control, and irrigation and water harvesting practices. For health and nutrition, the most common advice provided was on dietary diversity in food consumption, washing hands before preparing and consuming food, general cleanliness, constructing toilets, and using mosquito nets.

Just under one-quarter of respondents reported accessing advice on postharvest crop management (Table 3), most commonly on the application of storage chemicals; while a few mentioned receiving advice on agroprocessing, such as fruit juice extraction, or on proper storage methods and on proper crop drying and bagging. Twenty-three percent of farmers also reported receiving advice on livestock husbandry, constructing improved housing for livestock, or livestock disease control or vaccination. The research team's revisits to the communities highlighted that government extension services are playing an important role in livestock disease control and vaccination. The farmers usually report to the village headman if issues related to livestock diseases arise locally. The village head then calls the AEDO or AEDC for support.

Only 15 percent of respondents received advice on marketing, with the common advice offered being on group marketing and selling to ADMARC. Advice on other non-farm livelihoods are not common. Few respondents reported receiving advice on obtaining loans to start a small business, starting up Village Savings and Loan Associations (VSLA), starting up small businesses (did not specify for what), and advice on the wise use of income after crop sales.

Just over a third of farmers received advice on environmental protection. The main advice received was on the need to plant trees or to not cut trees. Almost half of respondents received advice on health or nutrition-related topic. The most common topics were on eating multiple food groups (six food groups daily), washing hands before and after preparing food, and general hygiene and cleanliness. Only 5 percent of farmers received advice on aquaculture, such as tilapia raising.

Table 3—Receipt of advice by source and by method or approach, percent of respondents

	Production	Livestock	Aquaculture	Marketing	Processing	Environment	Health
Received advice from any source last two years	42.5	22.8	5.5	15.0	23.7	35.5	46.9
Received advice from any source last 12 months	23.0	9.5	1.2	7.1	11.1	17.6	28.7
By source [/a /b]							
Government extension	67.9	67.8	34.6	40.3	55.0	51.0	9.1
Non-government extension [/c]	23.8	21.5	17.8	29.7	14.3	13.7	8.1
Lead farmer	8.5	2.3	0.0	1.6	3.2	3.2	0.6
Other farmers	9.8	4.1	8.4	5.3	8.1	8.9	5.2
Radio	26.5	21.9	49.4	40.0	38.7	59.6	29.7
Health workers/clinic	0.0	0.3	0.0	0.0	0.0	0.0	45.4
By method or approach							
Community/group meetings	60.1	55.3	28.9	47.2	44.2	44.0	53.5
with government agent	47.0	39.1	18.9	26.6	31.9	31.3	5.6
with non- government agent	18.1	17.9	5.6	22.6	12.7	9.7	6.0
with lead farmer	6.2	1.5	12.2	1.4	0.7	2.3	0.2
with other farmer	6.1	3.6	0.9	1.3	2.8	5.8	2.5
with health worker/clinic	0.0	0.0	0.0	0.0	0.0	0.0	37.8
Face-to-face visits	28.1	24.2	23.7	17.1	15.0	14.0	42.0
with government agent	18.3	17.9	8.5	8.6	7.3	8.5	3.3
with non- government agent	8.2	6.3	9.7	6.2	2.3	3.8	2.2
with lead farmer	5.8	0.4	3.5	0.9	0.7	1.5	0.5
with other farmer	7.9	2.3	3.8	3.5	6.6	5.0	2.9
with health worker/clinic	0.0	0.2	1.6	0.3	0.2	3.5	23.2
Short-term training	14.6	15.8	6.5	11.1	14.6	12.2	9.8
with government agent	12.1	12.0	4.9	5.3	11.8	9.4	2.1
with non- government agent	6.3	4.1	1.5	7.1	2.4	3.2	1.0
with lead farmer	1.4	1.2	9.8	0.3	1.3	0.5	0.2
with other farmer	1.0	0.0	0.0	0.2	0.3	0.5	1.0
with health worker/clinic	0.0	0.0	0.0	0.0	0.0	0.0	7.0
Radio	21.1	19.3	49.4	37.0	37.1	51.9	21.6
Farmer demonstration	7.6	0.3	0.0	0.9	0.1	0.9	0.1
Phone/SMS	2.8	1.4	0.0	4.4	0.7	2.2	0.7
Farmer field day	2.4	1.1	0.0	0.2	1.2	1.2	0.1
Farmer Field School	2.2	0.5	0.0	0.2	0.4	0.5	0.1
Farmer cluster	1.3	0.0	0.0	1.4	0.7	0.6	0.2
TV	0.3	0.2	0.0	0.6	0.3	0.7	0.5

Source: IFPRI household survey (2016).

Note: [/a] All the sources were read out loud to respondents. Responses can be multiple.
[/b] Percent of those receiving advice. Total can be more than 100 percent, since responses on sources of advice can be multiple.
[/c] Includes all NGOs, FBOs, and private companies, but respondents have been classifying them interchangeably. There are also possibilities that those reported working for NGOs are contracted AEDOs from government.

Sources of advice

Government extension visits (mainly by AEDOs, but sometimes by the Agricultural Extension Development Coordinators (AEDC)) are still the most common source of information received by farmers, especially on crop production, livestock, forestry, and postharvest management (mainly storage chemical application) (Table 3). Sixty-eight percent of those with access to advice on crop production reported obtaining that advice from government extension workers, while 24 percent said they received production advice from extension agents employed by non-governmental organizations (NGO). NGO and government agents are the major sources of advice on aquaculture production, on markets, and on other livelihoods.

However, it is possible that some government agents are working with NGO projects, and those reporting getting advice from NGO agents might actually be government agents hired by NGOs. While we cannot say about whether it is government program or NGO project that farmers are getting advice on agriculture or nutrition from, what we can say is that use of government agents is the dominant one (more than 66 percent if we assume that some of those reported NGO agents are hired AEDOs to work on project), and the reach of NGO projects is substantial (more than 25 percent if we assume that some of those reported government agents).

Health workers who go to communities, as well as hospitals and clinics, are the main sources of health and nutrition advice. Extension workers either from government or NGOs help in the dissemination of food, nutrition and health related practices, in addition to agricultural practices.

In terms of method or approach, community or group meetings are the most common forms or approaches of receiving advice, followed by face-to-face contacts (one-on-one visit). The latter is often done after community meetings and are generally upon request by interested farmers who wants to learn and adopt those technologies being promoted. The third most common method or approach of receiving advice is through radio. The fourth is through short-term trainings usually done with a group of farmers. The fifth main method of receiving advice is through farm demonstrations, facilitated by government or NGO workers, often with the help of lead farmers.

Very few farmers (1-2 percent) reported accessing information from other sources or through other approach, including farmer field school, farmer field days, farmer phone/SMS, mobile vans, listening clubs, and television, and internet.

On another module of the questionnaire, where the first-time source of awareness on the agricultural technologies and nutrition-related practices, the dominance of government extension workers in the provision of extension services is similar (Table 5). However, in Table 5, there are substantially more respondents reporting “other famers” as the source of knowledge on these technologies being promoted. This is very different from Table 4, where the sources of advice received in the last two years were asked. Here, 36 to 63 percent of respondents reported being aware of many of the promoted technologies through other farmers (Table 5). This is an important finding, indicating the role of peer effect and social networks in the spread of information on improved technologies.

Table 4—Sources of information on specific technologies, proportion of respondents, percent

Technology	Government	NGO/FBO/ Private [/c]	Lead farmer	Other farmer	Radio	Phone/ SMS	Farmer field school
By access to advice in the last 12 months on . . . [/a]							
Pit planting	75.3	30.3	13.6	11.2	26.0	4.5	3.5
Composting pits	72.1	24.5	15.3	11.0	21.3	4.0	2.4
Agroforestry	47.7	14.4	3.3	7.9	38.6	2.7	0.4
Manure making	43.7	8.9	6.0	3.5	20.7	1.3	0.3
Soil cover	56.3	25.8	2.2	0.9	16.5	0.0	0.0
Crop residue incorporation	36.0	12.0	2.9	5.7	22.5	0.9	0.0
Planting Vetiver grass	34.3	18.0	8.6	6.9	26.9	3.0	1.2
Bunds or ridges	39.0	14.7	10.6	17.4	28.3	4.8	2.4
Crop rotation	29.8	15.9	7.4	11.8	45.5	0.0	3.8
Minimum tillage	40.2	6.7	0.0	9.5	22.9	2.7	0.0
Intercropping	35.8	6.9	0.0	1.3	19.6	0.0	0.0
Multiple food groups	9.6	7.4	0.9	5.7	31.5	1.2	0.1
Washing hands	9.2	6.2	0.8	5.2	30.7	0.6	0.3
By source of awareness on . . . [/b]							
Pit planting	56.5	25.9	15.7	37.4	16.6	0.3	2.8
Composting pits	56.4	17.5	10.3	38.2	13.7	0.3	3.5
Agroforestry	53.6	22.1	9.7	35.5	22.9	0.4	3.9
Manure making	54.3	18.5	12.0	38.1	17.2	0.6	2.5
Soil cover	51.5	24.2	15.0	38.3	21.2	0.9	2.8
Crop residue incorporation	40.9	11.8	6.1	56.3	12.0	0.3	2.3
Planting Vetiver grass	52.6	19.3	8.8	43.3	16.4	0.3	2.2
Bunds or ridges	41.9	14.8	7.9	54.4	12.8	0.1	3.4
Crop rotation	48.0	15.9	9.4	48.0	22.6	0.7	5.4
Minimum tillage	46.9	20.3	9.6	33.3	21.8	0.4	1.5
Intercropping	33.1	12.7	6.9	62.5	13.4	0.3	3.4
Multiple food groups	11.5	11.2	2.0	18.9	31.1	0.4	4.6
Washing hands	8.3	8.2	1.6	29.8	29.0	0.3	5.4

Source: IFPRI surveys (2016).

Note: All the sources of information were read out loud to respondents. The total across columns per row of technologies can be more than 100 percent since responses on sources of advice can be multiple.

[/a] Source of data is from Module H, in which the respondents were asked of the advice they received in the last two years, and the source of that advice;

[/b] Source of data is from Module G, in which respondents were asked about the technologies that they are aware of and that they ever adopted or are currently adopting, and the source of the information about these technologies.

[/c] Includes all NGOs, FBOs, and private companies, but respondents may have classified them interchangeably. It is also possible that those reported as government agents are working for an NGO, and those reported as NGO workers are AEDOs from government.

Access to advice from lead farmers

Surprisingly, those reporting that they received advice from lead farmers—those trained by extension workers from government or NGOs to train other farmers on particular technologies—constitute only 9 percent of the farmer surveyed (Table 3). Lead farmers as the source of advice on specific topics ranged from 7 to 16 percent depending on the specific technologies being promoted (Table 4). The results of the survey imply that the coverage and reach of lead farmers among smallholder farmers in Malawi is more limited than expected.

Given these surprising results, we revisited four communities to validate these results. Overall, the farmers that were revisited and new farmers who were randomly interviewed were not surprised with this result on the limited role of lead farmers in providing agricultural advice in their communities. The revisits conform to the survey results—lead farmers are present in most communities and are known by most farmers as "Mlimi wachitsanzo" (Appendix Table 2), but their extension activities are limited. The large majority of respondents say that the selection of lead farmers within a community was generally fair and that they generally respect and find the lead farmer to be effective (Appendix Table 3). But when asked about specific advice or technologies on which lead farmers instructed them, not many reported receiving such guidance from lead farmers. Our survey results and community revisits are similar to the observations by Brown and Nuberg (2016)[4] on the limited coverage of lead farmers and limited impact of the lead farmer approach from their field work in various African countries. Our results are in contrast to a more favorable assessment of lead farmers by Khaila and colleagues (2015).

The farmers and communities revisited after the survey said that lead farmers are only active when there are projects, since they are given financial allowances and materials and inputs for the on-farm demonstrations that they organize. During these times with project support, the lead farmers form groups or clusters of local farmers and teach them on new technologies, usually centered on the on-farm demonstration. Respondents mentioned that in these projects, extension workers are more active in following-up and monitoring in the targeted communities.

However, without projects, AEDOs are not often seen and only coming to the community during the FISP fertilizer coupon distribution period and during livestock vaccination campaigns. As a result, the lead farmers are not monitored by extension workers. If no new technologies are being promoted and supported through projects, the lead farmers do not have sufficient mobility and incentives to continue the technology promotion they started with an extension worker. This strong association between having a project or support from the local AEDO and the performance and motivation of lead farmers are clearly illustrated in the results presented in Table 6.

Table 5—Comparison of training and support given and monitoring of lead farmers by an NGO project and by Agricultural Extension Development Officer, Dowa district

	Project's field officer	Government AEDO
Nature of training	One week on agriculture (focus on conservation agriculture); one week on gender; one week on nutrition; one week on market access	Two days on lead farmer concept; then join other farmers in a community meeting where AEDO disseminate on technologies
Nature of monitoring	Field officer and lead farmer draw a calendar, work plan, and targets/indicators; then field officer meets with lead farmer to discuss progress	No monitoring; no follow-up
Nature of support	Inputs (fertilizer, seed, herbicide) for farm demonstrations only; allowance; gears/supplies; pushbike	Inputs for their plots (fertilizer, seed)
Nature of technologies being promoted	It depends on the project; for the particular lead farmer interviewed, focus on conservation agriculture (CA)	Depends on whether lead farmer is to promote general agriculture or specific technologies; for the particular lead farmer interviewed, s/he was supposed to be trained and expected to promote general agriculture: conservation agriculture, pit planting, manure-making, irrigation, early maturing varieties, soybean and groundnut production.
Method of reaching farmers	Visits with producer groups (those members of VSLA who formed PGs, with 10-25 members); visits will depend on the calendar that each group prepared, but generally two visits per group per week (mostly)	Lead farmer usually combines visits and dissemination with the NGO project work. For example, when visiting the groups and the villages, he is also disseminating the other practices he learned from extension agents.
Activities/ Performance	Lead farmer follows the activities set and performs on the targets.	No activities; but since lead farmer is working under the project, if ever s/he will be evaluated by AEDO, he can report his/her activities under the project as his accomplishments.

Source: In-depth interview of a lead farmer, who is both a lead farmer under an NGO project and also trained as lead farmer by the government. This interview took place on 9 November 2016 in Dowa district.

This table may not be representative of all projects or all government AEDOs, as district by district experiences may differ. However, the table illustrates that lead farmers may not have the incentive to work hard and train other farmers without support from extension agents. In general, if an AEDO is active in the community (mainly because there is a

[4] http://theconversation.com/africas-agriculture-projects-are-growing-inequality-not-food-69427

project or is otherwise motivated to do so), lead farmers are also more active. If an AEDO is not active in the community, lead farmers may be appointed and selected, but they generally are also not active in training their neighbors.

Who are these few who get advice from lead farmers? Youth are more likely to receive advice from lead farmers than from other sources. The wealthy are more likely to get information from lead farmers than from other sources (Appendix Table 4). Revisits to communities also reveal that only very few participate in groups trained by lead farmers, mostly those that are in close kinship or have other social connections and form the social circle of the lead farmers. The majority of farmers in the community do not participate in the lead farmer-led training sessions.

Of those few who reported obtaining advice from lead farmers, generally a good rating on the advice received from lead farmers was made (Appendix Table 3). Of 138 farmers who reported obtaining advice from lead farmers, 76 percent were 'very satisfied'. Of 4,500 respondents, 35 percent 'strongly agree' that the selection process of lead farmers is fair and transparent; while 55 percent 'agree'. Similarly, 36 percent 'strongly agree' that the lead farmer is well respected, competent, doing well, and effective with his/her job, and 55 percent 'agree' with this statement. These ratings show very favorable ratings of lead farmers reported by farmers in their communities. But, for the whole survey, all satisfaction-related questions are high, and, given that Malawi was not long ago an authoritarian regime, respondents might just be reluctant to say not so desirable things. So these ratings should be interpreted with some caution as to their accuracy.

Who are those selected as lead farmers, what are their characteristics, and how do they differ or mirror other farmers in their community? Lead farmers are generally older than ordinary farmers, more literate and more educated, and more likely to join associations (Table 6).

Table 6—Comparison of characteristics of lead farmer with those of other farmers who are household heads

	MALAWI		Northern region		Central region		Southern region	
	Other farmer	Lead farmer	Other farmer	Lead farmer	Other farmer	Lead farmer	Other farmer	Lead farmer
Male, 0/1	0.74	0.82 ***	0.75	0.87	0.73	0.85 ***	0.74	0.78
Age, years	40.43	45.79 **	38.94	46.28 **	41.86	44.98	39.27	46.45 ***
Farming years	19.64	22.42 ***	18.25	21.75	20.55	23.30 *	18.87	21.63 *
Can read Chichewa, 0/1	0.70	0.93 ***	0.81	0.96 *	0.69	0.92 ***	0.68	0.93 ***
Can read English, 01/	0.29	0.55 ***	0.49	0.79 ***	0.27	0.55 ***	0.29	0.51 ***
At least some elementary school, 01/	0.19	0.35 ***	0.34	0.53 *	0.17	0.37 ***	0.18	0.31 ***
Membership in associations, number	0.24	0.90 ***	0.22	0.77 ***	0.25	1.05 ***	0.22	0.79 ***
Observations	*2,475*	*531*	*194*	*47*	*1,130*	*231*	*1,147*	*253*

Source: IFPRI household survey (2016).

Note: Figures are means (averages) of indicators; Lead farmers and other farmers are significantly different at *p<0.10, ** p<0.05, *** p<0.01.

Other characteristics of lead farmers are that they are more politically connected, more connected through social networks, and make greater use of radios (Table 7). They are also wealthier, own more livestock, have larger landholdings, and are more food secure and generally better-off in various fronts than other farmers. Some studies show that lead farmers who were seen as most similar to other farm families in their input use and landholding size were most effective (Musopole et al. 2013). Being different from other farmers, lead farmers may not truly represent the conditions and constraints of the community. Moreover, being generally better-off in various fronts than other farmers, the lead farmers may face jealousy and uncooperative behavior among other farmers. This attitude may be linked to previous extension approaches and programs, from the Master Farmer Scheme in the 1950s to the *Achikumbi,* or "Progressive Farmer," approach in the 1960s, which are said to have created negative perceptions of these lead farmers and to have largely failed to show productivity and development impacts (Knorr, Benyata, and Hoffmann 2007).

Table 7—Comparison of lead farmers and other farmers, by household characteristics

	MALAWI		Northern region		Central region		Southern region	
	Other farmer	Lead farmer	Other farmer	Lead farmer	Other farmer	Lead farmer	Other farmer	Lead farmer
Ever held a political office, 0/1	0.05	0.13 ***	0.03	0.09	0.07	0.16 ***	0.04	0.11 ***
Ever held a traditional office, 0/1	0.11	0.21 ***	0.13	0.23	0.16	0.26 ***	0.05	0.15 ***
Have relatives holding a political office, 0/1	0.08	0.13 ***	0.11	0.11	0.09	0.16 ***	0.07	0.11 *
Have relatives holding a traditional office, 0/1	0.42	0.50 ***	0.57	0.57	0.52	0.61 *	0.30	0.39 **
Household size, members	4.80	6.30 ***	5.35	7.36 ***	4.76	6.29 ***	4.75	6.11 ***
Agricultural social network size [/a]	0.85	1.55 ***	0.95	1.72 ***	0.97	1.74 ***	0.71	1.34
Per hectare value of agricultural production, MWK 000/hectare	78.14	98.82 ***	68.84	92.03 *	97.19	123.9 ***	59.14	76.12 ***
Maize productivity, mt/hectare	1.77	2.02	1.18	2.77 **	2.59	2.73	1.13	1.20
Commercialization index, % of harvest sold	16.84	21.31 ***	17.94	23.29	23.20	29.19 ***	10.16	13.39 ***
Has radio, 0/1	0.41	0.59 **	0.38	0.51	0.39	0.60 ***	0.43	0.59 ***
Has tape or CD player, 0/1	0.13	0.22 ***	0.20	0.23	0.13	0.22 ***	0.13	0.23 ***
Has television, 0/1	0.05	0.11 ***	0.11	0.13	0.05	0.11 ***	0.05	0.10 ***
Has bicycle, 0/1	0.46	0.78 ***	0.40	0.68 ***	0.45	0.78 ***	0.49	0.80 ***
Has motorcycle/scooter, 0/1	0.03	0.05 ***	0.01	0.00	0.03	0.06	0.03	0.06 *
Total landholding, acre	2.50	4.12 ***	3.18	6.19 ***	2.79	4.61 ***	2.09	3.28 ***
Livestock units, Tropical Livestock Units	5.70	15.32 ***	8.16	14.51 ***	5.88	16.47 ***	5.10	14.42 ***
Dietary diversity score	4.66	5.55 ***	5.18	6.57 ***	4.81	5.75 ***	4.42	5.18 ***
Food consumption score	33.11	41.46 ***	38.01	51.50 ***	33.03	42.56 ***	32.36	38.62 ***
Food Insecurity score	10.45	7.46 ***	7.53	5.80	8.91	5.59 ***	12.46	9.47 ***
Observations	*2,475*	*531*	*194*	*47*	*1,130*	*231*	*1,147*	*253*

Source: IFPRI household survey (2016).

Note: Figures are means (averages) of indicators; Lead farmers and other farmers are significantly different at *p<0.10, ** p<0.05, *** p<0.01.

As expected, they are more likely to adopt almost all technologies being promoted, more likely to try out new practices, and more likely to produce a more diversified mix of crops (Table 8). It follows that they also have higher value of production per hectare. However, in terms of maize productivity, only the lead farmers in the North have statistically higher maize yields than non-lead farmers (Table 7). While maize yields of lead farmers are higher than those of non-lead farmers in the South and Central regions, these higher average yields are not statistically different.

We need to further analyze how lead farmers can support agricultural extension service provision. Some descriptive tables further show some of the characteristics and activities of lead farmers. Most of the lead farmers are only working with extension agents from the government (63 percent); 12 percent of lead farmers are only working with NGO extension agents; and 17 percent cooperate with both types of agents. There is also a small group (3 percent) of lead farmers who are not supported by any agents currently, but were selected as lead farmer many years ago (Appendix Table 5). Again, extension agents from government can also be those working for NGO projects.

The majority of lead farmers are just regular farmers (43 percent), 33 percent are club/group leaders, 13 percent are club/group members, and 11 percent are village leaders (Appendix Table 6). For the lead farmers that are neither supported by government or non-government agents, 44 percent of them are club/group chairman. This observation might indicate that these lead farmers have their own access to new information or technologies as the leaders of the clubs or groups.

Most of the lead farmers cover several villages (43 percent), while the others cover a single village (30 percent) or one group village (15 percent). A majority of lead farmers are selected from open selection within the community, such as during community meetings. In the Central region, the method of choosing a lead farmer through a selection committee is much more popular than in the Northern and Southern regions. 91 percent are selected openly by the community through a meeting, the rest were selected by extension agent or chief.

The majority of lead farmers express that access to information is their biggest motivation—this observation is the same regardless of the types of agents that support them (Appendix Table 7). For lead farmers who have no support from any agents, the fact that access to information motivates them potentially shows that lead farmers have special information channels other than through extension agents. Lead farmers supported by government agents are the largest percentage of those who report being motivated by the training provided. Probably the government training that they received has proven effective. Lead farmers supported by non-government agents are the largest percentage of those being motivated by the inputs and materials provided.

Table 8—Comparison of lead farmers and other farmers, by technology adoption

	MALAWI		Northern region		Central region		Southern region	
	Other farmer	Lead farmer	Other farmer	Lead farmer	Other farmer	Lead farmer	Other farmer	Lead farmer
Tried new agricultural practices	0.05	0.16 ***	0.08	0.15	0.06	0.17 ***	0.04	0.14 ***
Tried new livestock practices	0.04	0.14 ***	0.03	0.15 **	0.06	0.16 ***	0.03	0.13 ***
Engaged in aquaculture	0.00	0.02 ***	0.01	0.06 **	0.00	0.02 ***	0.00	0.02 ***
Tried new aquaculture practice	0.00	0.01 ***	0.01	0.02	0.00	0.01	0.00	0.01 ***
Crop diversification index [/a]	0.44	0.56 ***	0.42	0.58 ***	0.44	0.58 ***	0.45	0.54 ***
Contour bunds	0.19	0.32 ***	0.17	0.30 *	0.19	0.28 **	0.19	0.35 ***
Box ridges	0.23	0.38 ***	0.15	0.38 ***	0.28	0.45 ***	0.19	0.31 ***
Field levelling	0.10	0.16 ***	0.15	0.21	0.10	0.17 **	0.08	0.15 **
Soil cover	0.04	0.14 ***	0.04	0.23 ***	0.04	0.17 ***	0.03	0.09 ***
Mulching	0.09	0.19 ***	0.01	0.15 ***	0.06	0.15 ***	0.13	0.23 ***
No or little tillage	0.04	0.19 ***	0.04	0.19 ***	0.03	0.16 ***	0.05	0.21 ***
Herbicide	0.02	0.07 ***	0.02	0.09 *	0.02	0.09 ***	0.01	0.06 ***
Water retention	0.01	0.03 **	0.01	0.00	0.02	0.04 *	0.01	0.03 *
Proper plant spacing	0.15	0.34 ***	0.08	0.34 ***	0.20	0.39 ***	0.11	0.29 ***
Pesticide	0.02	0.08 ***	0.02	0.04	0.03	0.11 ***	0.02	0.06 ***
Residue incorporation	0.28	0.35 ***	0.37	0.53 *	0.40	0.47 *	0.14	0.21 **
Testing soil	0.00	0.02 ***	0.01	0.04 *	0.00	0.03 ***	0.00	0.00
Asking advice from plant experts	0.00	0.02 ***	0.00	0.00	0.01	0.03 *	0.00	0.03 ***
Pit planting	0.06	0.20 ***	0.03	0.23 ***	0.05	0.24 ***	0.07	0.17 ***
Row planting	0.60	0.62	0.78	0.77	0.77	0.79	0.41	0.44
Observations	*2,475*	*531*	*194*	*47*	*1,130*	*231*	*1,147*	*253*

Source: IFPRI household survey (2016).

Note: Figures are means (averages) of indicators; Lead farmers and other farmers are significantly different at *p<0.10, ** p<0.05, *** p<0.01.

[/a] All the indicators used are dummy variables, 0/1, except for the crop diversification index, the Simpson Index of Diversification (SID). This is defined at household level as one minus the summation of the square of share of land allocated to each crop. SID is zero if all land is allocated to one crop. Some households have a SID close to 1 which is possible, being determined by both the number of crops grown and how equally land is allocated across crops.

The technologies being promoted by lead farmers are minimum tillage, pit planting, composting pits, soil cover, manure making or fertilizer mixing, bunds/ridges, crop rotation, agroforestry, intercropping, crop incorporation, planting Vetiver grass, Sasakawa-promoted technologies (proper and timely planting, proper spacing, and proper planting densities), and water harvesting in pits (Appendix Table 8).

The training provided to lead farmers often is not done in an intensive manner, especially when there is no NGO project support. In general, the percentages of lead farmer being trained are lower than expected (Appendix Table 9). This means that many lead farmers are still not trained on the specific technologies that they are to promote. This is consistent with the case presented in Table 5 above. The largest share of lead farmers who have been trained on a specific technology are those trained on “Zero or minimum tillage”. These lead farmers are supported by both government and non-government agents.

It is surprising that there are still more than 30 percent of lead farmers have not been trained on the lead farmer concept, on effective communication methods, and on specific technologies. Lead farmers in the Southern region are relatively better trained on the lead farmer concept, but lead farmers in the North are better trained on specific technologies. The majority of lead farmers state that extension agents should make more supervisory visits and follow up (Appendix Table 10), which indirectly reflects potentially insufficient extension provision in the lead farmer extension system.

The main activities for lead farmers are to train fellow farmers, to adopt the technologies themselves for other farmers to follow, to organize and to help farmers conduct on-farm demonstrations, to follow-up on the progress of farmers interested in new technologies or making use of advice provided, and to work with extension workers (Appendix Table 11). The most common methods of providing advice are through community meetings, face-to-face interactions, field/farm visits, mobile phones, farm demonstrations, or through their local leaders (Appendix Table 12). The main challenges they face are uncooperative farmers (60 percent); transportation or mobility constraints (51 percent); and lack of support from extension agents (Appendix Table 13). This last challenge was primarily reported by lead farmers from the South and those trained by government AEDOs. In terms of potential solutions, lead farmers report the need for more support from extension agents, especially with training and in follow-ups; greater support from the community; and more support from local leaders, such as local chiefs (Appendix Table 14).

Follow-up with and monitoring of lead farmers is seemingly very weak in many communities, although there are some differences across districts and across projects. Only 56 percent of lead farmers reported having indicators used by extension workers or projects to evaluate their performance—this implies that about half do not have performance indicators and are not being monitored at all (Appendix Table 15). This is consistent to the scenario described in Table 5 above. Of those who have performance monitoring indictors, the most commonly used are local productivity and yield levels, how many local farmers have adopted new technologies, or how many local farmers have been trained. There seems to be more group village heads that indicated targets or other indicators for their lead farmers in the Northern region, for lead farmer trained by either government or nongovernment workers, than in the Southern and Central regions. One good thing is that majority of lead farmers said that they interacted with other lead farmers—lead farmers in the Northern and Central regions are more likely to interact with each other than in the Southern region (Appendix Table 16).

The above descriptions indicate that the activities and performance of lead farmers are varied and may depend on whether there are any projects in place, the support that they are given, and the districts within which they work. However, it is also not unlikely that in many communities, where there are no active projects, that activities of AEDOs and, therefore, of lead farmers are limited.

Equity in access to advice

Who is receiving agricultural advice? There is a significant gender gap in those who receive such advice on all topics, except for advice related to health or nutrition-related. Males are more likely to receive agriculture-related advice than females, although both are equally likely to receive health and nutrition advice (Table 9).

Formal education is a strong predictor of access to advice on all topic. Those with higher educational attainment are more likely to access advice. There is evidence that the top 40 percent wealthiest farm households are more likely to access advice, except topics on other, non-agricultural livelihoods. There is also evidence that those who are farthest from the main roads or reside in the most remote areas have significant lower access to advice on most topics, such as on livestock, postharvest crop management, health, and environment/climate change. Youth (aged 35 years and under) are less likely to access advice on most topics. Moreover, in the regression analyses presented in Table 9, we control for lead farmers, as they are expected to have greater access to information since they are ones trained by extension officers on certain technologies with the expectation that they would teach other farmers.

Table 9—"Who is more likely to get agricultural or related advice?": Regression analyses of predictors of access to advice received in the last two years, by topic

Dependent variable: Dummy variable (0/1) on whether individual received advice on topic	Production	Livestock	Marketing	Post-harvest	Environment	Health
Male individual	0.070***	0.057***	0.056***	0.060***	0.145***	-0.018
	(0.015)	(0.012)	(0.009)	(0.012)	(0.014)	(0.015)
Young (< 35 years of age)	-0.033**	-0.053***	-0.006	-0.006	-0.031**	-0.002
	(0.015)	(0.012)	(0.009)	(0.012)	(0.015)	(0.015)
Lead farmer	0.414***	0.256***	0.218***	0.164***	0.302***	0.133***
	(0.021)	(0.024)	(0.022)	(0.023)	(0.025)	(0.025)
Primary education	0.108***	0.073***	0.055***	0.090***	0.147***	0.145***
	(0.019)	(0.016)	(0.013)	(0.016)	(0.019)	(0.019)
South, compared to North	0.162*	-0.123*	-0.007	0.224***	-0.004	-0.213**
	(0.095)	(0.066)	(0.053)	(0.081)	(0.079)	(0.092)
Central, compared to North	0.094	-0.06	0.055	0.192**	-0.121	-0.022
	(0.109)	(0.080)	(0.063)	(0.093)	(0.095)	(0.113)
2nd richest quintile, compared to poorest	0.126***	0.045**	0.039**	0.067***	0.103***	0.083***
	(0.022)	(0.019)	(0.016)	(0.019)	(0.022)	(0.022)
Richest quintile, compared to poorest	0.132***	0.096***	0.068***	0.072***	0.125***	0.116***
	(0.022)	(0.019)	(0.016)	(0.019)	(0.022)	(0.022)
Farthest to road quintile, compared to nearest quintile	-0.033	-0.057***	-0.013	-0.083***	-0.085***	-0.058**
	(0.024)	(0.017)	(0.014)	(0.016)	(0.022)	(0.024)
Observations	*4,948*	*4,980*	*4,985*	*4,989*	*4,989*	*4,988*
Pseudo R-squared	0.12	0.12	0.13	0.14	0.14	0.11

Source: IFPRI household survey (2016).

Note: Figures are the marginal effects, that is, if the explanatory variable is a dummy, it is the percentage difference in the likelihood of obtaining advice on that topic; Standard errors in parentheses; Significant at *p<0.10, ** p<0.05, *** p<0.01. Probit model is used here; but the results are very similar when a logit model was used. Many other explanatory variables are used, such as district dummies and the other wealth and distance quintiles, but we picked only a few for presentation purposes.

Quality of extension services

Overall, most respondents gave a high rating on the advice that they received: 76 percent of farmers are 'very satisfied', 77 percent said they found the advice 'very useful'; 86 percent said they followed the advice; 92 percent said the advice was something they wanted or needed (Table 10). All these observations seem to indicate that extension and advisory services for those that received them are of good quality and respond to farmers' needs. As discussed earlier, we must interpret these high rankings with some degree of skepticism.

Ratings from this survey are just a bit higher than the ratings reported in the IHS-3 of 2010 (and its follow-up panel survey in 2013), but both surveys indicate generally high ratings for services provided (Appendix Table 17).

Table 10—Farmers feedback on the latest advice received from agricultural extension service providers

Topic	Were you satisfied with the advice on topic [. . .]?				Was the advice on topic [. . .] useful?				Did you follow advice on the topic?	Was it something that you needed?	Was it something you requested?
	Not satisfied	Somewhat satisfied	Satisfied	Very satisfied	Not useful	Somewhat useful	Useful	Very useful			
Agricultural production	0.8	1.3	19.2	78.7	0.6	1.7	18.9	78.8	84.7	89.4	11.7
Livestock	0.8	1.6	19.0	78.6	0.7	2.0	20.8	76.4	79.2	91.6	13.7
Aquaculture	3.0	13.9	43.0	40.0	8.5	19.0	36.5	36.0	24.4	67.3	11.6
Marketing	0.5	2.0	17.1	80.4	1.1	4.3	14.4	80.2	66.2	89.9	5.3
Post-harvest	0.8	0.4	18.8	80.0	0.3	1.0	16.9	81.8	88.0	95.2	12.8
Sustainable land management	0.7	0.6	28.9	69.8	0.6	0.9	25.7	72.8	86.0	93.0	19.7
Environment	0.8	0.9	26.9	71.4	0.2	1.7	25.0	73.2	83.8	89.3	12.6
Health or nutrition	0.1	0.5	22.7	76.7	0.1	0.3	21.8	77.8	94.4	93.1	14.7
Total	**0.6**	**1.0**	**22.0**	**76.3**	**0.5**	**1.5**	**20.9**	**77.1**	**85.8**	**91.7**	**14.1**

Source: IFPRI household survey (2016).

We also checked the consistency of responses on whether farmers follow or act upon the advice received with actual adoption. Table 11 shows that only a limited proportion of those receiving advice on a particular technology are actually adopting it. The adoption rate for those who receive advice are much higher than those who do not, but apparently not all farmers would follow the advice and adopt. In fact, many farmers who report that they followed the advice end up not actually adopting the technology. This is contrary to the earlier reported ratings on quality advice. Self-reported ratings should therefore be interpreted with caution; and alternative measures of quality of advice should be considered such as technology awareness, and some qualitative and quantitative measure of the level of awareness, and technology adoption rates.

Table 11—Respondents receiving advice and those actually adopting technology on which received advice, number and percent

Technology	Number of farmers received advice	Farmer reporting that they followed the advice received		Farmers who received advice and actually adopted	
	N	N	%	N	%
Soil cover	86	62	72	33	38
Zero or minimum tillage	43	22	51	15	35
Crop rotation	11	5	45	6	55
Intercropping	42	19	45	11	26
Crop residue incorporation	114	75	66	87	76
Composting pits	359	301	84	182	51
Agroforestry	702	510	73	222	32
Bunds or ridges	61	40	66	28	46
Pit planting	246	195	79	105	43
Planting Vetiver grass	86	53	62	34	40
Manure or fertilizer	157	92	59	63	40
Including multiple food groups	586	511	87	413	70
Washing hands	439	383	87	362	82

Source: IFPRI household survey (2016).

Only 14 percent of respondents reported having expressed their demand or requested information from extension services, while most of the advice was just provided to them (Table 10). But, it seems that this advice, even though not sought for, was welcome—farmers are not complaining about and are generally satisfied with the advice received.

Of those expressing demand, they expressed such demand mainly to government extension agents (55 percent reporting), agricultural extension radio show producers (21 percent) or external people, like enumerators or researchers (12 percent), village or group leaders (7 percent) or Village Agricultural Committees or Stakeholder Panels (3 percent). The main methods of requesting advice were face-to-face visits with agents (49 percent), village meetings (24 percent), and contacting radio programs (22 percent) (Appendix Table 18).

Who rates the advice received to be high or low in terms of usefulness? Based on a multivariate regression analysis, female, lead farmers, and those from the Northern region are more likely to rate advice more favorably. These patterns are consistent across all models estimated. In contrast, the youth, the poorest, and those in most remote areas are less likely to rate the advice received favorably. However, this patterns in not consistent across indicators and across all models (Table 12). Female respondents, those with formal education, those in the Northern region, and those in the richest and 3rd richest quintile are more likely to request or demand advice; while lead farmers and youth are less likely to request or demand information.

Table 12—"Who are giving high and low ratings?": Regression analysis of predictors of respondents' ratings based on the quality of latest advice received

	(1) Respondent followed advice	(2) Respondent said advice was needed	(3) Respondent requested or demanded advice
Male individual	-0.029***	-0.019***	-0.048***
	(0.009)	(0.007)	(0.009)
Youth (<35 yrs.)	-0.022**	-0.012	-0.039***
	(0.010)	(0.007)	(0.009)
Lead farmer	0.044***	0.019**	-0.033***
	(0.011)	(0.008)	(0.010)
Primary education	0.010	0.011	0.051***
	(0.010)	(0.008)	(0.010)
Southern region, compared to Northern	-0.078***	-0.043***	-0.118***
	(0.020)	(0.014)	(0.012)
Central region, compared to Northern	-0.081***	-0.001	-0.121***
	(0.018)	(0.012)	(0.014)
Asset 2nd quintile, compared to poorest	0.034**	-0.005	0.018
	(0.015)	(0.013)	(0.018)
Asset 3rd quintile, compared to poorest	0.050***	-0.008	0.053***
	(0.013)	(0.012)	(0.017)
Asset 4th quintile, compared to poorest	0.042***	-0.008	-0.006
	(0.012)	(0.011)	(0.014)
Richest quintile, compared to poorest	0.064***	-0.003	0.030**
	(0.012)	(0.011)	(0.014)
Farthest to road quintile, compared to nearest quintile	0.007	-0.046***	-0.02
	(0.014)	(0.013)	(0.013)
Observations	*6,157*	*6,157*	*6,157*
Pseudo R-squared	0.03	0.04	0.06

Source: IFPRI household survey (2016); Figures are the marginal effects, that is, if the explanatory variable is a dummy, it is the percentage difference in the likelihood of getting advice on that topic; Standard errors in parentheses; Significant at *p<0.10, ** p<0.05, *** p<0.01, that is, more asterisks means greater statistical significance. Probit model is used here; but the results are very similar logit model was used. Many other explanatory variables are used, such as district dummies and the other wealth and distance quintiles, but we picked a few for presentation purposes.

Demand-driven services

How many individuals actually demand or request extension and advisory services and what are the processes or methods available for demand articulation? We showed in Table 10 that only 14 percent of those receiving advice actually demanded or requested this advice, so it seems that not many farmers are requesting or articulating their demand for extension services. This indicates that the provision of agricultural advisory services is still heavily supply-driven.

The majority of respondents are either those who received advice, even though they did not request the advice, but considered the advice received useful and something they wanted (41 percent of respondents), or those respondents who did not seek advice and did not receive advice (half of respondents) (Table 13). Within the latter group, one third of them were actually in need of advice, which means there is still scope for the extension service providers to improve on reaching out farmers. A few (1.5 percent of respondents) actually sought for help but failed to obtain any. This is a small proportion, but still, this implies that the groups are active in seeking and demanding advice, but that extension service suppliers are not fully responsive to their needs.

Table 13—Type of access to and demand for advice, percent of respondents

Access Indicator			Total	Gender		Gender of head of household		Age	
				Male	Female	Male	Female	Youth (<35 yrs)	Older (≥35 yrs)
Got advice	Actively sought	Useful	4.2	3.7	4.6	3.7	6.7	3.4	4.8
Got advice	Actively sought	Not useful	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Got advice	Did not seek	Useful	40.6	41.5	39.8	41.6	39.3	40.3	40.8
Got advice	Did not seek	Not useful	2.0	2.2	1.8	2.2	1.7	2.0	2.0
No advice	Actively sought		1.5	2.1	0.9	2.1	1.0	1.0	1.8
No advice	Did not seek		51.8	50.4	53.0	50.3	51.3	53.3	50.7
No advice	Did not seek	Has demand	33.5	34.0	33.1	34.0	31.1	34.7	32.7
No advice	Did not seek	Has no demand	18.2	16.3	19.9	16.3	20.2	18.6	18.0

Source: IFPRI household survey (2016)

To get into the details of demand for agricultural and nutrition-related information, we asked the following question to the respondents: "If you are given a voucher/coupon to pay and demand extension services or technical advice on agriculture or nutrition from anybody, what information/message/advice would you ask."

Of those who said they need extension and advisory services and would be willing to trade their hypothetical voucher or coupon for these advice, two-thirds of such respondents had specific demands for technologies (Table 14). It is surprising that most of these individuals requested advice concerning older agricultural practices. The more commonly demanded advice topics were on minimum tillage, pit planting, manure or fertilizer making, composting pits or piles, soil cover or mulching, intercropping, bunds or ridges, water management practices, crop residue incorporation, crop rotation, Sasakawa-promoted practices, and agroforestry (Table 14). A third of respondents requested for food, health, and nutrition related advice. One implication is that the answers to these requests are available and can be easily provided. Another implication is the need to be more creative in capturing demand for information from farmers as their responses to survey questions would depend only to the information they have heard about.

Table 14—Proportion of people who would use hypothetical vouchers to trade for advice, percent of those who would use vouchers to obtain specific information

If you are provided vouchers for extension services, is there advice or information for which you would trade the vouchers?	Percent	If you are provided vouchers for extension services, is there advice or information for which you would trade the vouchers?	Percent
Soil fertility and land management	**82.1**	**Irrigation**	**12.2**
Bunds or ridges	10.9	Irrigation infrastructure	3.2
Composting pits or piles	19.2	Water harvesting in pits	9.4
Composting toilets	3.6	**Sasakawa-promoted technologies**	**8.2**
Conservation agriculture	0.6	**Agroforestry**	**7.3**
Crop residue incorporation	9.1	**Livestock raising**	**5.2**
Crop rotation	8.4	**Marketing**	**0.3**
Inter-cropping	12.3	**Health and Nutrition**	**33.8**
Pit planting	27.3	Including multiple food groups in diet	5.6
Planting Vetiver grass	5.6	Consuming iron-rich foods	1.9
Soil cover	16.2	Using iodized salt in food preparation	0.8
Zero or Minimum tillage	40.9	Washing hands before preparing food	0.7
Manure or fertilizer making	22.3	Food, nutrition, and health (general)	29.1
Crop choice/diversification	**3.3**		

Source: IFPRI household survey (2016). This summarizes the responses on the question asked to respondents: "If you are given a voucher/coupon to pay and demand extension services or technical advice on agriculture or nutrition from anybody, what information/message/advice would you ask."

Observations: 3,301, 66 percent of full survey sample.

We further analyzed those who expressed demand for information on particular technologies. In general, the majority of respondents do not adopt and do not demand advice on particular technologies being promoted. For example, on zero tillage, 52 percent do not adopt and do not demand, while 8 percent of famers already are adopting it so they do not demand advice on it anymore (Table 15). Of those who demand advice on zero tillage, the majority are currently not adopting but would like information on it, while some (6 percent of respondents) have already adopted it, but would still need more information on how to use the technology more effectively and profitably. This is a similar pattern across the major technologies being promoted.

Table 15—Technology demand, awareness, and adoption, by technology, percent of respondents

Most commonly requested advice	Has reported demand for and . . .			Has no reported demand for and . . .		
	Aware & adopted	Aware & not adopted	Not aware & not adopted	Aware & adopted	Aware & not adopted	Not aware & not adopted
Zero tillage	6	20	15	8	17	34
Pit planting	3	8	16	8	12	53
Manure or fertilizer making	4	4	14	17	13	47
Composting pits	5	8	6	24	19	38
Soil cover	2	7	8	9	14	60
Intercropping	3	2	7	31	10	46
Bunds or ridges	4	2	5	31	11	46
Water harvesting	1	1	8	4	6	81
Crop residue incorporation	4	2	3	36	12	41
Crop rotation	2	2	4	29	18	43
Agroforestry	1	2	4	17	18	57
Planting Vetiver grass	1	2	3	20	25	49
Composting toilets	0	1	2	6	11	79

Source: IFPRI household survey (2016).

Connectivity

A large majority of survey households are well connected to other farmers and potential sources of information. A third of respondents go to the nearest market every day; and 81 percent go to market at least once a week (Table 16). Half use a phone every day and 64 percent use a phone at least once every week. Sixty-two percent of households have at least one cellphone. Forty-five percent listen to the radio every day; 60 percent at least once per week. Not many watch television—only 8 percent watch at least once a week. A quarter of the respondents go to the nearest town at least once per week; and 59 percent go to town at least once per month.

Table 16—Connectivity, communication, and community engagements, percent of respondents

		Gender		Gender of head of household		Age	
	Total	Male	Female	Male	Female	Youth (<35 yrs)	Older (≥35 yrs)
Go to nearest market often	81	84	71	84	71	86	78
Cell phone use everyday	55	61	36	61	36	56	55
Listen to radio everyday	45	53	21	52	21	47	44
Participate in Village Agricultural or Development Committee	42	44	34	44	34	33	47
Participate in local association	33	32	34	32	34	25	37
Observations	*5,065*	*2,314*	*2,751*	*2,282*	*847*	*2,542*	*2,523*

Source: IFPRI household survey (2016).

Almost all group villages have Village Development Committees (VDC), but the majority of group villages (66 percent) still do not have Village Agricultural Committees (VAC) or Group-village Agricultural Committees (GAC) established (Appendix Table 20). These committees provide a venue in which farmers can discuss problems and solutions, articulate their demands, and learn about technologies and practices. Only 42 percent of respondents said they participate in VAC or VDC meetings (Table 16).

Males and older individuals are more likely to participate in the VAC/VDC meetings or activities (Table 17). Lead farmers are much more likely to participate than ordinary farmers. People who are less connected are also less likely to participate in VAC/VDC/GAC. Interestingly, wealth status and education do not predict participation, which implies that these groups are well represented by people with different social status.

Most of the participants rate VAC/VDC/GACs very favorably, regardless of their age and gender (Appendix Table 21). For the people who participate in VAC/VDC/GAC, lead farmers are more likely to rate VAC/VDC/GAC favorably than ordinary farmers (Appendix Table 22). This observation implies that lead farmers tend to benefit more from participation compared to the other farmers. People who have less access to transportation (road) are more likely to rate VAC/VDC/GACs favorably, this implies that the groups can potentially reduce the information cost that is induced by poor transportation. People from the Central region are less likely to rate VAC/VDC/GACs favorably than the people from the Northern region.

Table 17—"Who are more likely to participate in Village Development Committees (VDC), Village Agricultural Committees (VAC) or Group-village Agricultural Committees (GAC)?": A regression analysis to determine predictors of participation in such committees

Dependent variable: Participate in VAC, VDC, or GAC (0/1)	
Explanatory variables	**Results**
Male individual	0.056 ***
	(0.018)
Youth (< 35 yrs.)	-0.067 ***
	(0.018)
Lead farmer	0.429 ***
	(0.023)
Primary Education	0.025
	(0.022)
Asset 2nd quintile, compared to poorest	0.026
	(0.033)
Asset 3rd quintile, compared to poorest	0.009
	(0.028)
Asset 4th quintile, compared to poorest	0.029
	(0.029)
Asset richest quintile, compared to poorest	0.026
	(0.029)
Farthest to road quintile, compared to nearest	0.038
	(0.031)
Southern region, compared to Northern	0.135
	(0.132)
Central region, compared to Northern	0.003
	(0.123)
Least connected quintile, compared to most connected	-0.079 **
	(0.031)
Observations	*3,503*

Source: IFPRI household survey (2016).

Note: Figures are the marginal effects, that is, if the explanatory variable is a dummy, it is the percentage difference in the likelihood of getting advice on that topic; Standard errors in parentheses; Significant at *p<0.10, ** p<0.05, *** p<0.01, that is, more asterisks means greater statistical significance. Probit model is used here; but the results are very similar logit model was used. Many other explanatory variables are used, such as district dummies and the other wealth and distance quintiles, but we picked a few for presentation purposes.

We looked at the correlation of participation in VACs, VDCs, or associations and other measures of connectivity with the likelihood of an individual receiving agricultural advice. Those using the radio everyday are more likely to receive advice on various topics, except on marketing. Similarly, for those using cellphone every day, they are more likely to receive advice on a variety of topics, except for aquaculture. Participation in associations or cooperatives is also linked to greater access to advice, except on livestock, aquaculture, and environment/forestry. Those who go to the market at least once a week are more likely to get advice only on marketing and agroprocessing. These figures indicate that these processes are potentially important channels that can be explored in disseminating information.

We also linked access to advice with connectivity indicators, indicators of demand (those having demand or need for advice indicated by farmers' willingness to trade their hypothetical voucher in order to obtain advice), and indicators of seeking the advice desired. The major grouping of respondents is those that are connected (frequent use of phone and radio), has demand or need for advice, but do not actively seek it (44 percent of respondents) (Table 18). Of these respondents, half obtained advice and the other half did not. Reaching these group with technologies and advice

can be through radio or phone, and could be complemented by targeted trainings or farm demonstrations. The next largest grouping is those who are not connected, but have demand or need for advice, but do not actively seek it (24 percent). This group are particularly in need of the more traditional methods, such as face-to-face extension visits.

Table 18—Correlations between connectivity and demand for advice, advice seeking behavior, and whether advice was obtained, percent of respondents

Access indicator				Percent
Connected (N=1,775)	Would use voucher	Seek	Obtained advice	0.2
			No advice	0.0
		Don't seek	Obtained advice	23.5
			No advice	20.3
	Would not use voucher	Seek	Obtained advice	2.4
			No advice	0.0
		Don't seek	Obtained advice	7.0
			No advice	9.1
Not connected (N=1,126)	Would Use voucher	Seek	Obtained advice	0.2
			No advice	0.0
		Don't seek	Obtained advice	9.0
			No advice	14.7
	Would not use voucher	Seek	Obtained advice	1.0
			No advice	0.0
		Don't seek	Obtained advice	3.9
			No advice	8.6

Source: IFPRI household survey (2016).

Pluralistic extension system

Pluralism in the context of extension services means diversity of options and diversity of knowledge sources to enable competition and complementarity between extension service providers for improved efficiency and quality. Pluralism can be at the level of service providers and their frontline workers, at the level of trainers of service providers, or at the level of scientists and researchers, or source of knowledge. The main feature of pluralism in the provision of agricultural advisory services is diversity and competition to improve accountability, efficiency, and quality of service provision.

From our household and community surveys, we derive some insights on manifestations of the pluralistic agricultural extension system in Malawi. We look at pluralism in terms of the diversity of sources of advice received, the variety of topics being discussed, and the diversity of service providers that farmers can choose from in demanding advisory services. Forty-two percent of respondents received advice from multiple sources or providers (Table 19); 12 percent received advice from only one source or provider; while the rest did not receive agriculture-related advice. A quarter of farmers are receiving advice from NGO workers and other sources; 17 percent of farmers obtain advice from government agents' visits only; 16 percent receive the advice they need from NGO agents and other sources only; and 9 percent of farmers obtain advice from both. This indicates some diversity in sources or providers and in the methods or approaches used to obtain advice. There seems to be an increasing trend of pluralism compared to the complete dominance of government extension services by the time of the development of the National Extension Policy in early 2000s. However, the non-state service providers are dominated by international NGOs, who can be considered more as donors than as local service providers. They function on external funding, usually operating within short-term project cycles. The sustainability of their efforts is a major issue. In reality, there are only a few local organizations that are extension service providers and only a few households received advice from them. This suggests that a major challenge remains in strengthening and supporting local organizations to become effective extension service providers – this despite the National Agricultural Extension Policy having a strong emphasis on capacity strengthening of local organizations.

At community level, 99 percent of group villages have been visited by government agents; only 15 percent of group villages have been visited by non-government agents; 14 percent of group villages have been visited by both government and non-government agents (Appendix Tables 23 and 24). Of 299 group villages or sections, only 46 (15 percent) indicated having non-government agents or workers who come to village to give advice. So, there still remains significantly limited coverage in the provision of agricultural advisory services by non-government actors.

Table 19—Provider of agricultural advice, by type of advice, percent of respondents

	Produc-tion	Livestock	Aquacul-ture	Marketing	Process-ing	Environ-ment	Health/ Nutrition
No access	58	77	95	85	76	65	55
Received advice	42	23	5	15	24	35	45
… from multiple sources	12	4	1	3	4	8	9
… from single source	31	19	5	12	20	27	36
… from government agents	26	13	2	6	13	17	6
… from non-government agents or other sources	25	13	4	11	14	25	42
… from both	9	3	1	2	3	6	3
… from government agents only	17	10	1	4	10	11	3
…, but not from government agents	16	10	4	9	11	18	39

Source: IFPRI household survey (2016).

Technology awareness and adoption

Table 20 lists some of the major agricultural management practices that are being promoted by government programs. This is illustrative and not comprehensive, but is provided with the aim of understanding the level of awareness and issues in the adoption of some of these technologies being promoted.

Table 20—List of some major agricultural practices promoted by government programs in the last 3 years.

Major groupings of agricultural practices	Department of Agricultural Research	Department of Crops	Lilongwe ADD
Improved varieties	Many different improved varieties being developed and promoted by DARS. The focus of their research is on varietal research. They also research on and promote management practices to maximize yield of the improved varieties	Promotes improved varieties, especially hybrid varieties for maize and rice	Promotes improved varieties, especially high-yielding maize varieties
Soil fertility	Chemical + organic fertilizer; Intercropping with legumes	Chemical + organic fertilizer; Intercropping with legumes	Manure use; Under-sowing with tree crops; Intercropping with legumes
Drought mitigation or moisture retention	Conservation agriculture (CA), which includes crop residue, crop rotation or intercropping; minimum tillage, is a soil fertility and moisture retaining practice	Promotes CA; water harvesting	Promotes CA; Manure use; Planting sorghum, millet, cassava, or sweet potato for improved water infiltration (this targets semi-commercial farmers); rain water harvesting in box ridges, swale, planting pits, or tanks; planting legumes for reduced evaporation
Sustainable land management			Contour ridging for reduced soil erosion; Gully reclamation to rehabilitate degraded land
Farm mechanization		Use of tractors, or ploughs, ridgers, and oxcarts	
Pest and disease management	Farmers are advised to consult with plant clinics or plant doctors	Safe application of pesticides; integrated pest management	
Postharvest handling	Farmers are encouraged to use of postharvest machineries, apply storage chemical (and safe use), proper storage structure, and bagging	Farmers are encouraged to use metallic silos and apply pesticides during storage (with safe use)	
Crops, livestock, and fisheries diversification		Farmers are encouraged to diversify from maize to other crops rice, legumes, wheat and other oil seeds like soya beans. Farmers are taught to monitor these new crops	Pasture establishment; Stall feeding for improved animal nutrition; Integrated crops-fish farming; Fish polyculture; Growing indigenous vegetables for nutrition improvement

Source: Various interviews with representatives of agencies.

In the past, extension and advisory services have focused on disseminating information on improved varieties. We still see this to some extent. Yearly reminders by extension agents (or at least those more active ones) are still being done on proper and timely planting, proper spacing, and planting densities, which are often referred to by farmers as the Sasakawa program-promoted technologies, as well as on row planting and soil fertility management practices, such as intercropping and use of inorganic and organic fertilizer. Promotion of tree planting in field crops has increasingly been

emphasized in recent years. Composting toilets, both as a soil fertility and a public health and sanitation related practice, are also being promoted by some projects in recent years. Practices to control for erosion and flood are also being promoted, such as contour bunds and planting Vetiver grass. Due to growing concerns on the effects of climate change, drought mitigation or moisture retention measures are increasingly being promoted. These include conservation agriculture, which combines minimum tillage, soil cover or mulching, and intercropping or crop rotation with legumes, and water harvesting in box ridges, pits, swales or tanks. There is also growing interest in promoting crop diversification and integrated crop-fish-livestock farming to reduce reliance on maize.

These technologies have been promoted in Malawi for decades, but the household survey dataset suggests that many of these technologies are relatively new or not well-known to some communities and farmers. For example, soil cover, crop residue or mulching; minimum tillage; and pit planting have been known to some farmers since the 1980s, but more than 68 percent of respondents were just learning about them for the first time in the last five years according to the household survey. Similarly, manure making or fertilizer mixing, water harvesting in pits or swales, composting pits or piles, and composting toilets are also older agricultural management practices, but more than 50 percent of farmers were just learning about them for the first time in the last five years. Despite the Sasakawa-promoted technologies (one seed per hole, proper seeding rate, and proper spacing) having been around as extension messages since the late-1990s, many farmers are just learning and trying out these crop management practices for the first time in the last five years. Conservation agriculture that combines soil cover (for moisture retention), minimum tillage and intercropping or crop rotation with legumes (for soil fertility) is currently heavily promoted in Malawi with both government and non-government programs supporting it. Practices as old as intercropping, crop rotation, crop residue, bunds/ridges, agroforestry, and planting Vetiver are being learned for the first time by 30 to 45 percent of farmers in the last 5 years.

In general, it seems that there is still low awareness of the agricultural technologies being promoted. This signals low or weak coverage of extension services provision to date, but at the same time indicates that more extension services can help to disseminate these practices. Given the high levels of connectivity and frequent use of radio and cellphone, these channels are potentially cost-effective means of promoting awareness of viable options and solutions to farmers' constraints. In terms of specific type of technology, awareness rates range from 14 to 49 percent for soil fertility and land management technologies and 34 percent for agroforestry (Table 21). Awareness of composting toilets and pit planting is particularly low at 14 and 26 percent, respectively.

Table 21—Awareness of, experimentation with, and adoption of agricultural technologies, percent of respondents

	Aware of	Tried out		Currently adopted*	
	as % of full sample	as % of full sample	as % of those aware	as % of all plots	as % of all households
Soil fertility and land management					
Bunds or ridges	41.1	32.3	78.6	20.5	25.9
Composting pits or piles	48.7	27.0	55.4		
Composting toilets	14.2	4.7	33.2		
Crop residue incorporation	47.4	34.8	73.5	24.2	29.5
Crop rotation	46.0	31.8	69.2	30.3	35.4
Intercropping	38.3	31.2	81.5	41.9	63.3
Pit planting	25.9	10.4	40.1	4.2	7.6
Planting Vetiver grass	42.0	19.6	46.8		
Soil cover/mulching	27.6	11.7	42.3	9.6	14.4
Zero or Minimum tillage	42.4	13.3	31.3	3.9	6.4
Manure or fertilizer making	35.2	22.6	64.1		
Sasakawa program-promoted technologies*		8.6		12.6	17.5
Agroforestry	**33.8**	16.6	49.1		
Health and Nutrition					
Including multiple food groups in diet	63.4	42.7	67.4		
Consuming iron-rich foods	24.6	18.6	75.4		
Using iodized salt in food preparation	44.5	38.9	87.3		
Washing hands before preparing food	80.1	77.7	97.0		

Source: IFPRI household survey (2016). *2016 cropping season. *These practices include proper and timely planting, proper spacing, and proper planting densities that were promoted by Sasakawa Global 2000.

Those trying out different improved technologies range from 4 to 35 percent of all respondents, or from 31 to 81 percent of those aware of these technologies. The actual adoption rates in 2016 cropping season range from 4 to 42 percent of all plots or from 8 to 63 percent of those who are aware. Most of the technologies have low adoption rates. Use of crop rotation and intercropping are relatively well-adopted. More than half of the farmers still are not aware of many of these practices, so there is room for extension services to teach farmers on the benefits and steps involved.

When we asked farmers to list new practices tried out in the last three years (using open-ended questions), not many farmers reported trying out new practices (Table 23). The most commonly reported new practices mentioned were composting pits or piles, Sasakawa technologies (proper and timely planting, proper spacing, and proper planting densities), minimum tillage, bunds or ridges, crop residue incorporation, and crop rotation. However, of these, only 6 to 9 percent of farmers reported trying them out in the last three years. The large majority of farmers have not tried any new technology in the last several years.

Food and health related technologies have relatively high adoption rates, potentially because the monetary costs and efforts needed in adopting them are low compared to the other production related technologies. But more is definitely needed in promoting these practices, including on eating multiple food groups, consuming more iron-rich food, and using iodized salt.

Table 22 focuses on the technologies that has been experimented with in last three years. We further asked them whether they were still adopting the technologies that they experimented with, and whether they would keep adopting in the future. Even though only a small portion of farmers have tried out the technologies in the last three years, most of them kept adopting them after their experiments, and also indicated that they would keep adopting in the future. In other words, there are very few dis-adopters once they start trying a technology. This observation implies that getting the farmers to experiment with the new technologies is crucial for their final adoption. Thus, it is worth identifying the constraints that constrain farmers' willingness to try new technologies.

Table 22—Technologies experimented with in last three years

Technology	Experimented with… in last 3 years, as % of full sample	Still adopting… as % of those experimented	Will keep adopting… as % of those experimented	Year range of first experimented with…	
Soil cover	5.0	89.3	98.7	1983	2016
Zero or minimum tillage	7.2	75.0	96.7	1995	2016
Crop rotation	5.7	94.8	99.6	1958	2016
Intercropping	3.6	94.0	98.8	1960	2016
Crop residue incorporation	5.9	95.7	99.0	1962	2016
Composting pits or piles	7.6	92.2	99.2	1982	2016
Composting toilets	0.3	88.2	93.3	2006	2015
Agroforestry	2.8	95.8	99.3	1973	2016
Bunds or ridges	6.5	92.7	98.0	1964	2016
Pit planting	5.0	90.0	97.8	1996	2016
Planting Vetiver grass	3.1	94.2	100.0	1985	2016
Water harvesting in pits	0.9	84.8	100.0	1980	2016
Manure or fertilizer making	5.3	79.3	99.1	1998	2016
Including multiple food groups	22.3	95.6	99.4	1955	2016
Consuming iron-rich foods	5.1	98.4	100.0	1955	2016
Using iodized salt in food	7.7	99.0	100.0	1969	2016
Washing hands before eating	14.0	98.6	99.0	1958	2016
Crop choice	1.0	9.8	100.0	2013	2015
Sasakawa-promoted practices*	8.6	93.8	99.3	1963	2016
Irrigation	0.2	77.8	100.0	2009	2016
Marketing	0.1	50.0	100.0	2013	2015
Improved seeds/variety	0.9	100.0	97.7	1990	2016
Herbicides	0.1	80.0	75.0	2009	2015
Pesticides	0.0	100.0	100.0	2013	2015

Source: IFPRI household survey (2016). * These practices include proper and timely planting, proper spacing, and proper planting densities that were promoted by Sasakawa Global 2000.

It is definitely worth looking at why substantial number of those aware of new technologies are not adopting them—is it lack of sufficient knowledge on the technology, a problem with the technology itself, or other issues? Bunds or ridges, crop residue incorporation, and inter-cropping are the most adopted technologies among soil fertility and land management. Although pit planting was introduced some time ago, the adoption rate is very low—at 7 percent of all households. One possibility for this low adoption could be that pit planting is highly labor-intensive, but this needs to be further investigated. Conservation agriculture also has low adoption rate (24 percent), mainly because it requires adopting soil cover, minimum tillage, and inter-cropping (or crop rotation) at the same time. Zero or minimum tillage has noticeably low adoption rate—it involves a habit change for the farmers and apparently requires more efforts from the extension services. Except for intercropping, most of the techniques observed on the plots have less than 50 percent adoption rates—these may be related to limited available materials to use, but this can be further investigated. Moreover, while

almost all are aware of the value of eating six food groups per meal or at least per day, only 64 percent said they are adopting or following this advice. This can be further investigated.

Table 23 shows the predictors of technology awareness. There is significant gender gap in awareness. Males are more likely to be aware of almost all types of technologies than females. Wealthier individuals are more aware of the technologies being promoted. This raises the question of whether there's discrimination in providing information to less wealthy farmers. Interestingly, farmers in the Southern region are more aware of conservation agriculture than in the Northern region; however, farmers are more aware of irrigation in the Northern region than in the South.

Table 24 shows the correlations between individual and household characteristics and decisions to try out particular technologies in the past three years. Males are more likely to try out the technologies than females, but this gender effect is only obvious for Sasakawa-promoted technologies (proper and timely planting, proper spacing, and proper planting densities) and crop diversification. Younger individuals under 35 years-old are less likely than their elder counterparts to try new practices, regardless of the types of the practices or technologies. This age effect might reflect that younger individuals have less knowledge and experiences in farming technologies, which further translate into low adoption. Lead farmers are much more likely to try out new technologies than ordinary farmers, especially technologies such as conservation agriculture, fertility-enhancing practices, and health and nutrition related practices. If we divide the population into wealth quintiles, the wealthiest quintile group are 12 percent more likely than the least wealthy group to try out any technologies. This could be a reflection that people who are relatively less wealthy do not want to bear more uncertainty in trying out new technologies. People from the Central region are less likely to try out the technologies than the people from the North. Connectivity to social media and social networks also matter to try-out behavior; people who are more connected tend to try more technologies than the people who are isolated from social media and networks. This means that information access is crucial in affecting people's behavior.

Table 25 shows the predictors of technology adoption in 2016. Unlike awareness and try-out behaviors, there is no obvious gender gap in adoption. Younger farmers are less likely to adopt fertility-enhancing technologies, external inputs, irrigation, and agroforestry related technologies. Being a lead farmer, having more education, and having more wealth all predict higher adoption rates. Adoption rate of fertility-enhancing technology is significantly lower in Central region compared to the North.

Table 23—Predictors of individuals' awareness of new technologies, regression analysis

Variables	Any technology	Conservation agriculture	Fertility-enhancing	Crop diversification	External inputs	Irrigation	Sasakawa	Agroforestry	Health and nutrition
Male individual	0.049***	0.077***	0.049***	0.035***	0.082***	0.038***	0.016**	0.110***	0.057***
	(0.009)	(0.013)	(0.008)	(0.007)	(0.015)	(0.009)	(0.007)	(0.014)	(0.012)
Youth (<35 yrs.)	-0.017*	-0.049***	-0.019**	-0.004	-0.019	-0.008	-0.017**	0.006	-0.024*
	(0.009)	(0.013)	(0.008)	(0.007)	(0.015)	(0.009)	(0.007)	(0.015)	(0.013)
Lead farmer		0.227***	0.123***	0.061***	0.312***	0.192***	0.087***	0.297***	0.182***
		(0.013)	(0.006)	(0.015)	(0.023)	(0.021)	(0.016)	(0.024)	(0.014)
Primary Education	0.027**	0.081***	0.031***	0.012	0.074***	0.035***	0.019**	0.095***	0.045***
	(0.011)	(0.015)	(0.010)	(0.009)	(0.019)	(0.012)	(0.010)	(0.019)	(0.015)
Asset 2nd quintile,	0.036***	0.028	0.028**	0.009	0.012	-0.003	0.024	0.012	0.033
compared to poorest	(0.012)	(0.021)	(0.011)	(0.014)	(0.027)	(0.016)	(0.018)	(0.027)	(0.021)
Asset 3rd quintile,	0.034***	0.034*	0.033***	0.022*	0.062***	0.009	0.062***	0.018	0.028
compared to poorest	(0.011)	(0.018)	(0.010)	(0.013)	(0.023)	(0.014)	(0.016)	(0.022)	(0.018)
Asset 4th quintile,	0.049***	0.059***	0.045***	0.039***	0.078***	0.025	0.074***	0.067***	0.038**
compared to poorest	(0.010)	(0.018)	(0.010)	(0.014)	(0.023)	(0.015)	(0.017)	(0.023)	(0.018)
Asset richest quintile,	0.036***	0.061***	0.034***	0.039***	0.103***	0.032**	0.051***	0.125***	0.058***
compared to poorest	(0.012)	(0.019)	(0.011)	(0.014)	(0.024)	(0.016)	(0.016)	(0.024)	(0.018)
Farthest to road quintile,	-0.009	0.011	-0.000	-0.023**	-0.080**	-0.002	0.001	-0.033	-0.003
compared to nearest	(0.015)	(0.021)	(0.013)	(0.009)	(0.023)	(0.014)	(0.012)	(0.023)	(0.021)
Southern region,	0.108	-0.268***	0.046	-0.037	0.128	0.271***	0.050	0.026	0.065
compared to Northern	(0.089)	(0.096)	(0.068)	(0.051)	(0.113)	(0.084)	(0.055)	(0.109)	(0.104)
Central,	0.057	0.104	0.061	0.028	0.115	-0.029	-0.050	0.261***	0.071
compared to Northern	(0.065)	(0.092)	(0.059)	(0.040)	(0.100)	(0.079)	(0.052)	(0.095)	(0.092)
Least connect quintile,	-0.062***	-0.083***	-0.045***	-0.019*	-0.061**	-0.039***	-0.021*	-0.060**	-0.036
compared to most	(0.020)	(0.025)	(0.018)	(0.011)	(0.026)	(0.013)	(0.011)	(0.025)	(0.023)
Observations	*4,416*	*5,001*	*5,001*	*5,001*	*5,001*	*5,001*	*5,001*	*5,001*	*5,001*

Source: IFPRI household survey (2016).

Note: Figures are the marginal effects, that is, if the explanatory variable is a dummy, it is the percentage difference in the likelihood of getting advice on that topic; Standard errors in parentheses; Significant at *p<0.10, ** p<0.05, *** p<0.01. Probit model is used here; but the results are very similar logit model was used. Many other explanatory variables are used, such as district dummies and the other wealth and distance quintiles, but we picked a few for presentation purposes.

Table 24—Predictors of whether individuals try out new technologies in the past three years, regression analysis

Variables	Any technology	Conservation agriculture	Fertility-enhancing	Crop diversification	External inputs	Irrigation	Sasakawa	Agroforestry	Health and nutrition
Male individual	0.036**	0.012	0.020	0.007**	0.008	0.002	0.015**	0.004	0.008
	(0.015)	(0.010)	(0.013)	(0.003)	(0.006)	(0.003)	(0.007)	(0.003)	(0.010)
Youth (<35 yrs.)	-0.083***	-0.054***	-0.073***	-0.001	-0.024**	0.000	-0.018**	-0.010***	-0.024**
	(0.015)	(0.010)	(0.013)	(0.003)	(0.006)	(0.003)	(0.007)	(0.004)	(0.010)
Lead farmer	0.463***	0.317***	0.402***	0.012	0.092***	0.034***	0.088***	0.072***	0.232***
	(0.022)	(0.024)	(0.024)	(0.007)	(0.015)	(0.012)	(0.016)	(0.014)	(0.023)
Primary Education	0.064***	0.038***	0.044***	-0.003	0.016**	-0.001	0.020**	0.003	0.009
	(0.019)	(0.013)	(0.017)	(0.003)	(0.007)	(0.003)	(0.010)	(0.004)	(0.012)
Asset 2nd quintile,	-0.009	0.015	0.006	-0.004	-0.007	0.015	0.025	-0.007	-0.016
compared to poorest	(0.027)	(0.020)	(0.025)	(0.003)	(0.010)	(0.013)	(0.018)	(0.005)	(0.017)
Asset 3rd quintile,	0.072***	0.003	0.035	-0.001	0.012	0.006	0.061***	0.000	-0.010
compared to poorest	(0.023)	(0.016)	(0.022)	(0.004)	(0.010)	(0.007)	(0.016)	(0.005)	(0.015)
Asset 4th quintile,	0.138***	0.048***	0.106***	0.006	0.013	0.027*	0.072***	0.001	0.017
compared to poorest	(0.024)	(0.018)	(0.023)	(0.005)	(0.010)	(0.014)	(0.017)	(0.005)	(0.016)
Asset richest quintile,	0.120***	0.040**	0.094***	0.003	0.021*	0.019	0.050***	0.001	0.001
compared to poorest	(0.025)	(0.018)	(0.023)	(0.005)	(0.011)	(0.012)	(0.016)	(0.005)	(0.016)
Farthest to road quintile,	-0.010	-0.009	-0.016	0.000	0.001	0.005	0.001	-0.001	-0.012
compared to nearest	(0.024)	(0.016)	(0.021)	(0.004)	(0.009)	(0.006)	(0.012)	(0.005)	(0.015)
Southern region,	0.065	-0.041	0.057		0.015	0.013	0.049	0.001	-0.023
compared to Northern	(0.109)	(0.064)	(0.092)		(0.031)	(0.011)	(0.055)	(0.017)	(0.063)
Central region,	-0.182*	-0.149**	-0.256***	0.006	-0.083**		-0.049	-0.019	-0.199***
compared to Northern	(0.095)	(0.062)	(0.082)	(0.010)	(0.038)		(0.052)	(0.018)	(0.064)
Least connected quintile,	-0.125***	-0.056***	-0.073***	-0.001	-0.028**	0.003	-0.020*	-0.009*	-0.038**
compared to most	(0.023)	(0.015)	(0.021)	(0.004)	(0.007)	(0.006)	(0.011)	(0.005)	(0.016)
Observations	*5,001*	*5,001*	*5,001*	*5,001*	*5,001*	*5,001*	*5,001*	*5,001*	*5,001*

Source: IFPRI household survey (2016).

Note: Figures are the marginal effects, that is, if the explanatory variable is a dummy, it is the percentage difference in the likelihood of getting advice on that topic; Standard errors in parentheses; Significant at *p<0.10, ** p<0.05, *** p<0.01. Probit model is used here; but the results are very similar logit model was used. Many other explanatory variables are used, such as district dummies and the other wealth and distance quintiles, but we picked a few for presentation purposes.

Table 25—Predictors of individual technology adoption behavior, regression analysis with awareness variables

Variables	Any technology	Conservation agriculture	Fertility enhancing	External inputs	Irrigation	Sasakawa	Agroforestry	Health and nutrition
Male individual	-0.008	-0.003**	-0.064***	-0.040***	-0.005**	-0.001	-0.039***	0.015
Youth (<35 yrs.)	0.001	-0.002	-0.088***	-0.057***	-0.005*	0.000	-0.056***	0.005
Lead farmer	0.027***	0.016***	0.197***	0.038**	0.011**	0.002	0.058***	0.009
Primary Education	0.014**	0.001	0.046***	0.025*	-0.002	0.001	0.003	0.023*
Asset richest quintile, compared to poorest	0.027***	0.002	0.097***	0.047**	0.000	0.001	0.030**	0.022
Farthest to road quintile, compared to nearest	-0.004	0.004	-0.020	-0.010	-0.002	-0.001	0.017	-0.016
Southern region, compared to Northern	-0.059	-0.002	0.068	-0.005	-0.019	-0.004	0.044	-0.060
Central region, compared to Northern	-0.087	0.002	0.367***	-0.047	-0.015	0.004	0.008	0.064
Least connected quintile, compared to most connected	0.008	-0.002*	0.005	0.000	-0.004	0.000	-0.019	-0.015
Aware of any technology	0.742***							
Aware of Conservation Agriculture		0.130***						
Aware of Fertility enhancing technologies			0.699***					
Aware of External inputs				0.526***				
Aware of Irrigation					0.328***			
Aware of Sasakawa techniques						0.928***		
Aware of Agroforestry							0.409***	
Aware of Health and nutrition								0.860***
Observations	*4,791*	*4,693*	*4,992*	*4,992*	*4,594*	*4,910*	*4,992*	*4,992*

Source: IFPRI household survey (2016).

Note: Figures are the marginal effects, that is, if the explanatory variable is a dummy, it is the percentage difference in the likelihood of getting advice on that topic; Standard errors in parentheses; Significant at *p<0.10, ** p<0.05, *** p<0.01, that is, more asterisks means greater statistical significance. Probit model is used here; but the results are very similar logit model was used. Many other explanatory variables are used, such as district dummies and the other wealth and distance quintiles, but we picked a few for presentation purposes

4. CONCLUSIONS, RECOMMENDATIONS, AND SUGGESTIONS FOR FURTHER RESEARCH

This report analyzes a recently-completed survey of 3,001 households and 299 communities in Malawi, complemented by follow-up visits and in-depth interviews with farmers in four communities and interviews with more than 30 key informants at national, district, extension planning areas (EPA) and section levels. In this report, we are able to describe the current status of access to extension and advisory services in the country. The main results and conclusions are as follows.

First, while the majority of households (75 percent) have reported receiving extension and advisory services in that last two years and rated the advice received very highly, the advice that they received on agricultural technologies does not seem to translate to greater adoption of the agricultural technologies being promoted. Both awareness and adoption of technologies being promoted are low, signaling low or weak coverage of agricultural extension services provision to date or inappropriate technology package for the local conditions. In terms of specific types of agricultural technology, awareness rates range from 14 to 49 percent for soil fertility and land management technologies. Those trying out different improved technologies range from 4 to 35 percent of all respondents, or from 31 to 81 percent of those aware of these technologies. The actual adoption rates in 2016 cropping season range from 4 to 42 percent of all plots or from 8 to 63 percent of those who are aware. Use of crop rotation and intercropping are relatively well-adopted, but other improved technologies have low adoption rates. While extension services can play a role in increasing awareness, further analysis needs to be conducted to understand the reasons for low adoption –whether it is lack of sufficient knowledge on the technology; inappropriateness of the technology; capital, materials, or labor requirements; or other reasons.

Second, food and health related technologies have relatively high adoption rates, because they are relatively simpler and the monetary and other costs needed to adopt them are low compared with agriculture-related technologies. However, more efforts are needed in promoting these practices, especially those where adoption is still relatively low (e.g., eating multiple food groups, consuming more iron-rich food, and using iodized salt). Only a quarter of respondents are aware of the need to consume iron-rich food and only 45 percent are aware of health benefits of using iodized salt. Sixty-five percent of those who are aware of the need to eat a diverse diet (six food groups every day) are adopting it. Further analysis needs to be conducted to understand the reasons for low adoption –whether it is lack of sufficient knowledge on the practice; shortage of production or lack of resources to buy the needed food; or other reasons.

Third, extension service provision is still largely supply-driven, rather than demand-driven as envisioned in the National Extension Policy. Very few farmers (14 percent) are actually demanding or requesting advice from agricultural extension service providers. Further analysis is needed to understand why many farmers are not demanding or requesting such advice – is it because they do not need any information, there are limited processes or channels for demand articulation, or that farmers simply do not believe that the agricultural extension system can help them?

When farmers were asked about their specific demands for technologies and their willingness to trade a hypothetical voucher or coupon for such advice, it was surprising that most of the extension and advisory services requested involved older agricultural practices. These included minimum tillage, pit planting, manure or fertilizer making, composting, soil cover or mulching, intercropping, bunds or ridges, water management practices, crop residue incorporation, crop rotation, Sasakawa-promoted practices (e.g., proper and timely planting, proper spacing, and proper planting densities), and agroforestry. A third of farmers requested food, health and nutrition related advice. One implication is that the extension and advisory services requested are available and provision of these can be intensified through the existing extension system. Another implication is the opportunity to create or facilitate demand for specific extension and advisory services by intensifying general awareness of improved technologies through cost-effective, mass media. Demand for extension and advisory services really depends on the awareness of the demander and what information has been pushed to them in the past. This is substantiated by strong statistical correlation between awareness and demand for certain technologies. Farmers cannot demand or request information or technology that they do not know about. Another implication from survey and research perspective is the need to be more creative in capturing and asking questions on demand for information in survey or interview setting. The responses will depend on what farmers already know. Capturing information needs can start with participatory identification of farmers' constraints and determine how information can play a role on solving it.

Fourth, while the National Extension Policy envisions equity and states that "… the public sector must make sure that the poorest segments of the population, women, youth, and people with disabilities are not left out of the development process." (p. 25), our dataset shows that access to extension services is biased against the more disadvantaged segments of the farming population. The poorest households, households with young heads, those adults with limited formal education, female producers, and those in more remote areas are less likely to access agricultural advice – both from government workers and from other sources. Further analysis of the data from a spatial perspective is needed. There are clear differences by region and by district (see Ragasa and Qi 2016), and looking at these patterns will help in targeting extension services to ensure that famers have access to the information and other advice that they

require to be productive and profitable. The issue of youth is of particular interest. Youth (defined here as less than 35 years of age) are less likely to access advice on most of these topics. In general, youth are less likely to participate in Village Agricultural or Development Committees and less likely to demand or request advisory or extension services. As a result, youth are less likely to be aware, to try out and to adopt improved technologies than their older counterparts. This is a topic that needs further investigation since these results are in contrasts to claims and hopes that the youth the drivers of agricultural innovation and rural transformation.

Fifth, there is some evidence of increasing pluralism and increasing non-government actors' coverage and role in agricultural extension provision as envisioned in the National Extension Policy, although extension service provision is still dominated by government extension workers. Our dataset shows that 66 percent of those accessing extension and advisory services are sourcing them from contacts with government staff, while 25 percent are getting information from non-government actors' contacts. At the community level, 99 percent of group villages have been visited by government agents, and only 15 percent of group villages have been visited by non-government agents. In these latter group villages, only one NGO visits the communities on average. Therefore, there is still limited coverage spatially in the provision of agricultural advice by non-government actors. Moreover, the non-state service providers are dominated by international NGOs, who can be considered more as donors than as local service providers. They function on external funding, usually operating within short-term project cycles. The sustainability of their efforts is a major issue. In reality, there are only a few local organizations that are extension service providers and only a few households received advice from them. This suggests that a major challenge remains in strengthening and supporting local organizations to become effective extension service providers – this despite the National Agricultural Extension Policy having a strong emphasis on capacity strengthening of local organizations.

There seems to be limited options in terms of local service providers and no indications of competition among them. There is also currently no system for farmers' inputs on their selection or for farmers' feedback on their performance. Therefore, the current extension system misses several elements to be characterized as a truly pluralistic extension system. Collection of data from service providers will further help in assessing the situation and constraints on the supply side. But it seems clear that further capacity strengthening of local producer association to be service providers can be facilitated to generate a critical mass of providers that can compete with each other and deliver quality services to farmers. At the same time, farmers' organizations and the structures for demand articulation, feedback and monitoring (Village Agricultural Committees and Stakeholder Panels) can be strengthened. Wider participation in these organizations, committees and panels should be the focus, and ensuring greater engagement of the poorest segments of the population, women, youth, and people with disabilities as emphasized in the National Extension Policy.

Sixth, there is increasing diversity of extension methods and approaches being used, with community or group meetings and radio playing a major role, with increasing use of phone and text messaging. Sixty percent of respondents are getting agricultural extension through community or group meetings. A quarter of respondents reported accessing crop production advice, half of respondents reported getting advice on environmental protection and agroforestry, and 37 percent of respondents reported getting advice on marketing or postharvest from radio. Four percent of respondents got advice on marketing from mobile phones. These approaches can be intensified, especially in the initial awareness and creation of demand for extension and advisory services.

Seventh, there are variety of channels for accessing and providing extension services to rural population that can be further explored. Our dataset shows that a large majority of survey households are well connected to other farmers and potential sources of information: 81 percent go to market at least once a week; 64 percent use a phone at least once every week; 60 percent at least once per week; 59 percent go to town at least once per month; and 42 percent participates in village agricultural or development committees. We looked at the correlation of these measures of connectivity with the likelihood of an individual receiving agricultural advice. Those using the radio or cellphone everyday are more likely to receive advice on various topics. Participation in associations or cooperatives is also linked to greater access to advice, except on livestock, aquaculture, and environment/forestry. Those who go to the market at least once a week are more likely to get advice only on marketing and agroprocessing. These figures indicate that these processes are potentially important channels that can be explored in disseminating information.

Interestingly, other farmers are reported to be a major source of awareness of technologies: 33 to 56 percent of respondents indicated getting information of many technologies being promoted from fellow farmers. This is an important finding, indicating a major role for social networks and information spillover in communities in the spread of improved agricultural technologies.

Lastly, lead farmers' coverage seems lower than expected and the outcomes from the lead farmer approach seem to be limited. Of those farmers receiving advice, only 9 percent reported that they received advice from a lead farmer—the main sources are still government workers (either under government or donor projects), radio, and NGO workers (either own NGO staff or AEDOs hired by NGOs for projects). By specific technology, 7 to 16 percent of respondents reported sourcing advice on the use of these technologies from lead farmers. The performance of lead farmers seems to depend on how active and motivated the AEDO or NGO extension worker is. In general, if the AEDO is active in the community—mainly because there is project or is otherwise personally motivated to do so—lead farmers

are also more active. Otherwise, lead farmers are not active in training neighboring farmers on the use of technologies that they were trained to promote.

Our dataset shows those wealthier segments are the ones who are more likely to get advice from lead farmers. Revisits to communities also reveal that only a few, and mostly those that are in close kinship or have other social connections and form the social circle of the lead farmers, are those who participate in groups trained by lead farmers. The majority of farmers in the community do not participate in the lead farmer-led training sessions.

Our dataset also reveals that characteristics of lead farmers are different from the other farmers in the communities which they represent. They are also wealthier, own more livestock, have larger landholdings, and are more food secure and generally better-off in various fronts than other farmers. Some studies show that lead farmers who were seen as most similar to other farm families in their input use and landholding size were most effective. Being different from other farmers, lead farmers may not truly represent the conditions and constraints of the community. Moreover, being generally better-off in various fronts than other farmers, the lead farmers may face jealousy and uncooperative behavior among other farmers. For the lead farmer approach to contribute to effective extension service provision, the selection process should be as transparent and participatory as possible. For the lead farmers to be effective, they have to be well-trained and they should have sufficient guidance and follow-up from AEDOs or NGO agents. Our perspective on this is that, rather than focusing on promoting this lead farmer approach, the focus should be on first strengthening the supply-side overall, particularly the capacity of and incentives for the AEDOs and NGO agents to bring new, effective innovations that farmers can try out.

Overall, our results show that the current agricultural extension system at national and district levels has delivered useful advice on agriculture, environment and nutrition to the majority of rural producers across the country and it is becoming increasingly pluralistic, however, key stakeholders will have to do much more and implement bolder actions to achieve a truly demand-driven, pluralistic and equitable system that is envisioned in the National Extension Policy.

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APPENDIX TABLES

Appendix Table 1—Respondents receiving crop production advice by specific topic, percent

Specific technology	Malawi	Male	Female
Weather/climate	28	32	24
Improved planting materials	25	30	19
Soil quality/fertility (did not specify)	20	21	19
Composting	18	19	17
Early or timely planting	14	13	15
Irrigation	12	15	9
Pit planting	11	12	10
Manure making/organic fertilizer use	7	6	7
Crop residue incorporation	6	5	6
Crop pest/disease control	6	8	3
Soil cover	4	4	4
Planting Vetiver grass	4	4	5
Chemical fertilizer use	3	5	2
Box ridges	3	3	3
Zero or minimum tillage	2	2	3
Intercropping	2	2	2
Bunds	2	2	2
Crop rotation	1	1	1
Environmentally friendly practices (did not specify)	2	2	2
Sustainable land management (did not specify)	1	1	1
Other production technique (did not specify)	11	12	10

Source: IFPRI household survey (2016)

Appendix Table 2—Lead farmers per group village, number

	Overall	North	Central	South
average	2.5	1.8	2.4	2.8
min	0	0	0	0
max	13	4	9	13
Number of group villages	*299*	*24*	*136*	*139*

Source: IFPRI household survey (2016)

Appendix Table 3—Rating on advice from lead farmers and on general perceptions on lead farmers in their community, percent of respondents

a) Respondents who received advice from lead farmers and their ratings of the advice, percent of respondents (N=138)

	Not satisfied or useful	Somewhat satisfied or useful	Satisfied or useful	Very satisfied or useful
Were you satisfied with the advice from lead farmer?	2	2	20	76
Was the advice from lead farmer useful?	3	2	24	71
	All respondents who received advice from lead farmer			
Did you act upon it or did you follow advice from lead farmer?	80			
Was it something that you needed or wanted?	93			
Was it something that you expressed demand for or had requested?	22			

b) General perceptions of respondents of lead farmers in their community, percent of respondents (N=4,500)

Statements	Strongly disagree	Disagree	Agree	Strongly agree
Selection is transparent and fair	4	6	55	35
Selection committee is competent and fair	4	7	55	35
I trust the selection committee	4	6	55	34
I trust the lead farmer	3	5	57	36
I respect the lead farmer	2	3	58	37
Community respects the lead farmer	2	6	55	36
Lead farmer is competent	3	8	54	34
Lead farmer is doing well	3	10	53	34
Lead farmer is effective	3	10	52	34

c) Indicators of effectiveness of lead farmer approach provided by group villages, percent of group villages

	National	Northern	Central	Southern
Are lead farmers in the community effective?				
Poor	3.4	8.8	5.0	1.3
Fair	8.3	19.7	11.2	4.1
Good	39.3	57.6	50.4	28.3
Very good	48.0	13.9	32.0	65.2
Are the lead farmers in the community respected?				
Not respected	3.3	6.3	4.6	1.8
Somewhat respected	4.8	20.0	2.8	3.5
Respected	41.2	52.7	59.2	26.6
Very much respected	49.9	21.0	32.5	67.1
What is the process of selection?				
Open selection; Community meets to select	93.0	95.0	91.9	93.5
There is a selection committee	1.0	-	1.1	1.1
Village head	0.1	-	0.3	2.9
Extension worker	2.8	-	3.3	2.4
Other	3.0	5.0	3.4	0.2
Does community have targets for lead farmers?				
No	78.0	81.5	84.2	73.0
Yes	21.8	18.6	15.5	26.6
Can community change lead farmer?				
No	51.9	65.3	63.0	41.8
Yes	47.7	34.7	36.5	57.8

Source: IFPRI household survey (2016)

Appendix Table 4—"Who are accessing information through lead farmers?" Regression analysis of predictors of access to information through lead farmers

	(1) Access to production advice through lead farmer	(2) Access to any advice through lead farmer
Male individual	-0.010	0.000
	(0.014)	(0.004)
Youth (<35 years of age)	0.026*	0.010***
	(0.014)	(0.004)
Primary education	-0.023	-0.002
	(0.015)	(0.004)
South, compared to North	-0.023	0.004
	(0.024)	(0.007)
Central, compared to North	-0.040*	-0.006
	(0.024)	(0.007)
Asset 2nd quintile, compared to poorest	0.065*	0.021**
	(0.036)	(0.009)
Asset 3rd quintile, compared to poorest	0.083***	0.022***
	(0.030)	(0.008)
Asset 4th quintile, compared to poorest	0.073***	0.025***
	(0.027)	(0.007)
Richest quintile, compared to poorest	0.073***	0.020***
	-0.026	-0.007
Farthest to road quintile, compared to nearest quintile	0.016	-0.007
	-0.022	-0.005
Observations	*2,049*	*11,707*
Pseudo R-squared	0.02	0.03

Source: IFPRI household survey (2016)
Standard errors in parentheses; Significant at *** p<0.01, ** p<0.05, * p<0.1

Note: [a] All the sources were read out loud to respondents. Responses can be multiple.
[b] % of those receiving advice. The total per column can be more than 100% since responses on sources of advice can be multiple.
[c] Includes all NGOs, FBOs, and private companies, but respondents have been classifying them interchangeably. It is also possible that those reported as government agents are working for the NGO, and those reported NGO are AEDOs from government.

Appendix Table 5—Categorization of lead farmers by type of supporting agency

Type of supporting organization	Number of lead farmers	Percentage of total
Neither	16	3
Government only	364	69
Non-government only	63	12
Both	88	17
Total	*531*	*100*

Source: IFPRI household survey (2016)

Appendix Table 6—What other positions do lead farmers have, by region and type of supporting agency, percent of lead farmers

Positions	Total	By region			By type of agency supporting lead farmer			
		North	Central	South	Neither	Govern-ment only	Non-govern-ment only	Both
Village headman	4	4	7	2	6	5	2	3
Village elder	7	6	8	6	9	8	3	6
Club/group chairperson	24	19	20	29	44	25	13	23
Club secretary	9	4	8	11	0	9	10	13
Club member	11	9	14	8	3	9	17	16
Party member	2	0	1	2	0	1	5	1
None	43	58	43	42	37	44	51	38
Total number of lead farmers	*531*	*47*	*231*	*253*	*32*	*349*	*63*	*87*

Source: IFPRI household survey (2016).

Appendix Table 7—Lead farmer's motivation, by region and type of supporting agency, percent of lead farmers

Motivation	Total	By region			By type of agency supporting lead farmer			
		North	Central	South	Neither	Govern-ment only	Non-govern-ment only	Both
Prestige	5	11	4	6	3	2	2	2
Greater access to information	65	70	68	62	56	40	48	40
Self-satisfaction of helping others	60	70	62	57	19	21	21	25
Training provided	56	87	59	47	13	32	17	30
Inputs and materials provided	6	13	6	5	9	4	11	2
Total number of lead farmers	*531*	*47*	*231*	*253*	*32*	*349*	*63*	*87*

Source: IFPRI household survey (2016).

Appendix Table 8—Lead farmer's training on each technology, by region and type of supporting agency, percent of lead farmers

Technology on which trained	Total	By region			By type of agency supporting lead farmer			
		North	Central	South	Neither	Govern-ment only	Non-govern-ment only	Both
Soil cover	23	36	29	16	9	21	21	38
Minimum tillage	35	30	35	35	25	33	27	53
Crop rotation	16	15	23	9	3	17	14	16
Intercropping	12	9	12	12	6	11	6	20
Crop residue incorporation	11	13	11	11	13	11	6	14
Composting pits	24	43	23	22	31	24	24	23
Agroforestry	13	26	13	10	13	11	14	18
Bunds or ridges	18	15	8	27	31	17	16	17
Pit planting	29	49	31	25	19	30	21	39
Planting Vetiver grass	10	11	11	9	16	11	8	9
Water harvesting in pits	6	0	1	12	6	7	3	5
Manure or fertilizer making	19	26	18	19	13	20	24	16
Sasakawa-promoted techniques	7	2	7	8	9	6	11	8
Total number of lead farmers	*531*	*47*	*231*	*253*	*32*	*349*	*63*	*87*

Source: IFPRI household survey (2016).
Note: Sasakawa-promoted techniques included guidance on proper and timely planting, proper spacing, and proper planting densities.

Appendix Table 9—Whether lead farmer received training on the lead farmer concept, communication, and specific technologies, percent of lead farmers

Trainings	Total	By region			By type of agency supporting lead farmer			
		North	Central	South	Neither	Govern-ment only	Non-govern-ment only	Both
Received training on lead farmer concept?								
Yes	70	85	71	65	53	66	76	87
No	30	15	29	35	47	34	24	13
Received training on communication and dissemination?								
Yes	58	72	62	52	53	54	62	75
No	42	28	38	48	47	46	38	25
Received training on specific technologies?								
Yes	62	53	64	62	66	59	65	71
No	38	47	36	38	34	41	35	28
Total number of lead farmer	*531*	*47*	*231*	*253*	*32*	*349*	*63*	*87*

Source: IFPRI household survey (2016)

Appendix Table 10—Lead farmer's suggestions on improving extension training and provisions, by region and type of supporting agency, percent of lead farmers

Suggestion for improving agricultural extension service provision	Total	By region			By type of agency supporting lead farmer			
		North	Central	South	Neither	Govern-ment only	Non-govern-ment only	Both
Visit and follow up	44	43	48	40	63	43	44	39
More compensation	22	30	23	21	38	20	22	25
More interaction	26	34	27	23	34	23	22	38
Combine with input provision	31	23	35	29	34	28	37	38
Combine with credit provision	19	17	23	16	38	16	30	17
Total number of lead farmers	*531*	*47*	*231*	*253*	*32*	*349*	*63*	*87*

Source: IFPRI household survey (2016)

Appendix Table 11—Activities undertaken as a lead farmer, by region and type of supporting agency, percent of lead farmers

Activities undertaken	Total	By region			By type of agency supporting lead farmer			
		North	Central	South	Neither	Govern-ment only	Non-govern-ment only	Both
Train fellow farmers	93	100	95	91	97	92	94	97
Implement technologies	63	66	73	54	31	62	71	72
Organize demonstrations	41	60	50	30	16	41	43	52
Help farmers conduct demonstrations	35	49	45	25	9	37	25	46
Facilitate development and implementation of work plan	18	40	24	9	3	18	11	29
Discuss progress of activities	32	51	42	20	9	31	35	46
Conduct follow-up	24	51	28	15	9	24	21	30
Give feedback	27	43	33	19	6	26	24	43
Liaise with extension workers	31	55	38	21	6	32	27	43
Champion community-based M&E	14	23	21	7	6	15	10	20
Collect basic data and info	24	57	32	11	6	24	25	31
Establish farmer clubs	23	28	32	13	19	22	14	31
Establish farmer organizations	8	15	12	4	3	9	5	10
Facilitator in farm business school	8	11	13	2	3	7	6	11
Participate in farmer business school	9	13	14	4	3	8	8	16
Total number of lead farmers	*531*	*47*	*231*	*253*	*32*	*349*	*63*	*87*

Source: IFPRI household survey (2016)

Appendix Table 12—Lead farmers' methods of delivering information, by region and type of supporting agency, percent of lead farmers

Method of delivering information	Total	By region			By type of agency supporting lead farmer			
		North	Central	South	Neither	Government only	Non-government only	Both
Field days	8	6	12	4	3	6	5	20
Flyers	1	0	1	0	0	1	3	0
Field visits	19	32	18	17	28	17	13	29
Mobile phones	21	45	25	13	6	21	14	31
Demonstration	13	23	16	9	9	11	13	23
Community meetings	65	62	65	66	72	63	63	74
Local leaders	11	6	13	9	9	9	14	15
Farmer field school	4	6	6	2	3	3	5	8
Group approach	7	4	9	5	9	6	6	8
Face to face	29	38	28	28	38	27	24	37
Village Agricultural Committee	8	11	6	8	6	5	10	16
Group-village Agricultural Committee	5	4	3	7	6	4	8	8
Total number of lead farmers	*531*	*47*	*231*	*253*	*32*	*349*	*63*	*87*

Source: IFPRI household survey (2016)

Appendix Table 13—Lead farmers' challenges in delivering information, by region and type of supporting agency, percent of lead farmers

Lead farmer challenge	Total	By region			By type of agency supporting lead farmer			
		North	Central	South	Neither	Government only	Non-government only	Both
Less time for own farming	14	15	13	13	9	13	6	22
Farmers not cooperative	34	36	36	32	44	32	35	39
Family members affected	4	2	4	4	3	4	5	3
Depleting of own resources	24	43	25	21	28	21	16	43
Lack of support from extension agents	19	11	16	23	31	17	21	18
Transportation	52	72	56	45	53	50	48	63
Lack of cooperation from follower farmers	40	36	45	37	50	36	48	47
Lack of cooperation from village head	10	2	10	12	19	7	14	17
Lazy farmers	43	66	43	38	41	42	44	46
Total number of lead farmers	*531*	*47*	*231*	*253*	*32*	*349*	*63*	*87*

Source: IFPRI household survey (2016)

Appendix Table 14—Solutions to the challenges in delivering information suggested by lead farmer, by region and type of supporting agency, percent of lead farmers

Lead farmer proposed solution	Total	By region			By type of agency supporting lead farmer			
		North	Central	South	Neither	Government only	Non-government only	Both
Support from local leaders	47	49	50	44	47	45	35	63
More incentives for lead farmer	35	43	34	34	41	33	32	41
More support from extension agents	51	60	54	47	81	47	54	56
Support from community	44	47	46	42	50	40	46	57
Total number of lead farmers	*531*	*47*	*231*	*253*	*32*	*349*	*63*	*87*

Source: IFPRI household survey (2016)

Appendix Table 15—Indicators used to evaluate lead farmers, by region and type of supporting agency, percent of lead farmers

Evaluation indicator	Total	By region			By type of agency supporting lead farmer			
		North	Central	South	Neither	Govern-ment only	Non-govern-ment only	Both
Productivity and yield changes	51	64	50	49	34	52	43	59
How many farmers adopted technologies	56	74	63	47	34	56	59	64
Farmers trained, number	44	53	42	43	28	43	41	52
Whether shared information with Village Agricultural Committee	12	15	12	12	6	12	11	16
Whether shared information with community	18	21	16	19	19	17	16	25
Total number of lead farmers	*531*	*47*	*231*	*253*	*32*	*349*	*63*	*87*

Source: IFPRI household survey (2016)

Appendix Table 16—Whether lead farmer interacted with other lead farmer in the past 12 months, by region and type of supporting agency, percent of lead farmers

Interacted with other lead farmer?	Total	By region			By type of agency supporting lead farmer			
		North	Central	South	Neither	Govern-ment only	Non-govern-ment only	Both
Yes	83	96	90	75	47	84	89	89
No	17	4	10	25	53	16	11	11
Total number of lead farmers	*531*	*47*	*231*	*253*	*32*	*349*	*63*	*87*

Source: IFPRI household survey (2016)

Appendix Table 17—Rating on the usefulness of extension services received, from IHS-3 (2010) and IHPS (2013), percent of households

	2013 (across all providers)	2010 (across all providers)	2010 (across topics)
Not useful	1	2	1
Somewhat useful	7	8	4
Useful	23	41	52
Very useful	69	48	43
Observations	*2,002*	*725*	*18,314*

Source: IHS-3 (2010) and IHPS (2013) from the National Statistical Office.

Appendix Table 18—From whom agricultural extension information was demanded, percent of respondents

To whom demand was expressed	Percent
Government extension agents	54.7
Radio	21.4
External people, e.g., researchers, interviewers	11.7
Group/organization leaders	3.8
Village leaders	3.4
Village agricultural committees	2.3
Stakeholder panel	1.2
SMS/text/mobile phone	0.6
Others	1.1

Source: IFPRI household survey (2016)

Appendix Table 19—Method used to express demand for agricultural extension information, percent of respondents

Method of expressing demand	Percent
During face-to-face individual visit with agent	48.9
Village meeting	24.3
Radio	22.1
Visited agent at his/her work/residence	1.8
SMS/text/mobile phone	1.1
Through my group/organization	0.5
In farmer clusters	0.1
During farmer field day	0.1
Other method	1.3

Source: IFPRI household survey (2016)

Appendix Table 20—Presence of Village or Group-village Agricultural Committee or Village Development Committee in local area, percent of respondents and communities

	Respondents	Communities
Village or Group-village Agricultural Committee in the area	34	54
Village Development Committee in the area	67	99
At least one such committee (VAC/VDC/GAC) in the area	72	99

Source: IFPRI household survey (2016

Appendix Table 21—Rating of local Village or Group-village Agricultural Committee or Village Development Committee, percent of respondents

		Gender		Gender of Head		Age	
	Total	Male	Female	Male	Female	Young	Older
Very useful	72.3	74.1	70.2	74.4	75.3	70.8	73.5
Useful	24.7	22.8	27.2	22.7	22.5	26.8	23.7
Somewhat useful	1.8	1.9	1.6	1.9	1.6	1.6	1.9
Not useful	1.2	1.3	1.1	1.3	1.1	1.5	1.1
Observations	*1,925*	*1,018*	*907*	*1,004*	*921*	*763*	*1,162*

Source: IFPRI household survey (2016)

Appendix Table 22—"Who are more likely to rate VAC/VDC/GAC favorably?": Regression analysis of predictors of individual's ratings of Village or Group-village Agricultural Committee or Village Development Committee (VAC/VDC/GAC)

Dependent variable: Dummy variable (0/1) as to whether respondent views VAC/VDC/GAC as very useful	
Explanatory variable	**Results**
Male individual	0.033
	(0.028)
Youth (< 35 yrs.)	-0.015
	(0.030)
Lead farmer	0.120***
	(0.030)
Primary education, 0/1	0.012
	(0.032)
Asset 2nd quintile, compared to poorest	-0.021
	(0.053)
Asset 3rd quintile, compared to poorest	-0.006
	(0.045)
Asset 4th quintile, compared to poorest	-0.013
	(0.045)
Asset richest quintile, compared to poorest	-0.056
	(0.046)
Farthest to road quintile, compared to nearest	0.115***
	(0.041)
Southern region, compared to Northern	-0.126
	(0.257)
Central region, compared to Northern	-0.365*
	(0.202)
Least connect quintile, compared to most connected	0.001
	(0.052)
Observations	*1,300*

Source: IFPRI household survey (2016).

Note: Figures are the marginal effects, that is, if the explanatory variable is a dummy, it is the percentage difference in the likelihood of getting advice on that topic; Standard errors in parentheses; Significant at *p<0.10, ** p<0.05, *** p<0.01, that is, more asterisks means greater statistical significance. Many other explanatory variables are used, such as district dummies and the other wealth and distance quintiles, but we picked a few for presentation purposes.

Appendix Table 23—Agricultural advisory services providers in group village, by percent of group villages surveyed

Agricultural advisory services providers	percent
Extension workers visiting community	91
Government agents	91
Non-government agents	15
Both government and non-government agents	14
Non-government only	1
Government only	78

Source: IFPRI community survey (2016).

Appendix Table 24—Non-state agricultural extension service providers reported by group village-level informants, by district

District	Non-state service providers
Blantyre	Project Concern International (PCI) (4), DAPP (2), Concern Universal, Save the Children, Shire Basin
Chikwawa	Total Land Care, NASFAM, Ubale
Chitipa	Total Land Care (2)
Dedza	Concern Universal (4), Total Land Care (3), CADECOM (2), World Vision
Dowa	NASFAM, Alliance Once, Total Land Care, Clinton Foundation
Lilongwe East	CARE, FUM, NASFAM
Lilongwe West	Self-Help
Machinga	NASFAM, Emmanuel International (6), CADECOM (2), ADRA, Total Land Care
Mangochi	Great Lakes, NASFAM
Mchinji	NASFAM (2), Exagris, Clinton International, Concern Worldwide
Mzimba	Find your feet, Total Land Care
Ntchisi	Total Land Care (2)

Source: IFPRI community survey (2016).

Note: The figures in parentheses represent the number of sections that mentioned the specific service provider.
Caution: These are likely to be underestimates, as there may be other non-state agricultural extension service providers working in other sections in the district that were not covered in our survey.

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This version incorporates the content of written reviews of earlier drafts of the document by Todd Benson, Flora Nankhuni, Marie Cadrin, Lonester Sibande, Nikolas Bosscher, and Bob Baulch. It also benefitted from the feedback received during the presentation of preliminary results from this research to stakeholders on agricultural extension in Malawi on 7 and 9 November 2016. All remaining errors are the authors.

Financial support for the overall project under which this research was conducted was graciously provided by the Government of Flanders and by Gesellschaft für Internationale Zusammenarbeit (GIZ), the development agency of the German government.

Significant complementary funding for the farm household survey was received from the Strengthening Agricultural and Nutrition Extension (SANE) project, which is funded by the United States Agency for International Development (USAID) mission in Malawi as an activity of Feed the Future, the U.S. Government's global hunger and food security initiative, and is implemented by a consortium of institutions led by the University of Illinois.

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The Malawi Strategy Support Program (MaSSP) is managed by the International Food Policy Research Institute (IFPRI) and is financially supported by the United States Agency for International Development (USAID). The research presented here was conducted as part of the CGIAR Research Program on Policies, Institutions, and Markets (PIM), which is led by IFPRI. This publication has been prepared as an output of MaSSP and has not been independently peer reviewed. Any opinions expressed here belong to the author(s) and do not necessarily reflect those of IFPRI, USAID, PIM, or CGIAR.