USAID
FROM THE AMERICAN PEOPLE

The Government of the
Republic of Malawi

2013 Assessment

Malawi Agricultural Market Information System

Ministry of Agriculture and Food Security
Department of Agricultural Planning Services

MALAWI
Strategy Support Program

INTERNATIONAL
FOOD POLICY
RESEARCH
INSTITUTE
IFPRI

2013 Assessment

Malawi Agricultural Market Information System

Ministry of Agriculture and Food Security
Department of Agricultural Planning Services

Malawi Strategy Support Program

About IFPRI

The International Food Policy Research Institute (IFPRI), established in 1975, provides research-based policy solutions to sustainably reduce poverty and end hunger and malnutrition. The Institute conducts research, communicates results, optimizes partnerships, and builds capacity to ensure sustainable food production, promote healthy food systems, improve markets and trade, transform agriculture, build resilience, and strengthen institutions and governance. Gender is considered in all of the Institute's work. IFPRI collaborates with partners around the world, including development implementers, public institutions, the private sector, and farmers' organizations. IFPRI is a member of the CGIAR Consortium.

About USAID

Since 1961, USAID carries out U.S. foreign policy by promoting broad-scale human progress at the same time it expands stable, free societies, creates markets and trade partners for the United States, and fosters good will abroad. USAID works in over 100 countries to promote economic prosperity; strengthen democracy and good governance; protect human rights; improve global health; advance food security and agriculture; improve environmental sustainability; further education; help societies prevent and recover from conflicts; and provide humanitarian assistance in the wake of natural and man-made disasters.

Program/Project No. Mtf/Mlw/054/Ifp

Copyright © 2013 International Food Policy Research Institute. All rights reserved.
Contact ifpri-copyright@cgiar.org for permission to reprint.

International Food Policy Research Institute

2033 K Street NW, Washington, DC 20006-1002 USA

Design: Joan Kirstin Stephens Design

Preamble

Malawi's medium term goals as articulated in the Malawi Growth and Development Strategy (MGDS) are wealth creation and poverty reduction through sustainable economic growth. This requires transforming the country from a predominantly importing and consuming to a manufacturing and exporting one. The Government of Malawi (GoM) has implemented several sector-wide development strategies in support of these policy goals. Key among these is the Agricultural Sector-Wide Approach (ASWAp), a strategic development and investment plan for the agricultural sector which began in 2010. The ASWAp document articulates Malawi's ambition to transform, modernize and diversify its agricultural sector with a view to raise agricultural productivity, improve food and nutrition security, and increase agricultural incomes of rural people. The ASWAp is in line with the New Partnership for Africa's Development (NEPAD) Comprehensive Africa Agriculture Development Program (CAADP).

Formulating and implementing an effective development strategy such as the ASWAp is a complex task requiring long-term commitment from stakeholders. Building the country's long-term capacity in generating and utilizing the data and knowledge there is need to design, implement and refine Malawi's development strategies to ensure sustainable success in achieving the ASWAp goals.

In view of this the Statistics Unit (SU) of the Planning Department of the Ministry of Agriculture and Food Security (MoAFS) implemented the *Support to Agricultural Statistics* or "***AgStatsupport***" between June 2012 and September 2013 to build the basis for a well-coordinated and integrated agricultural statistical system within the broader National Statistical System (NSS) of the country. The *AgStat support* was implemented in collaboration with the International Food Policy Research Institute's (IFPRI) Malawi Strategy Support Program (MaSSP), and the National Statistical Office (NSO) with financial support from United States Agency for International Development (USAID). The *AgStat support* has two main outputs as follows:

i. Establishment of an Agricultural Statistics Forum (ASF) that harnesses the buy-in and support of all key stakeholders including agricultural statistics; and

ii. Development of an Agriculture Strategic Master Plan (SMP) for the country to guide investments and future activities of the agriculture statistics subsector. This was developed in close collaboration with technical support from the Food and Agricultural Organization (FAO)

This series is an output of the *AgStat support* and comprises several reports based on core activities that were carried out separately but which are ultimately interlinked and will culminate in the development of the SMP. These include:

1. Inventory of Agricultural Statistics Stakeholders in Malawi
2. Strategic Master Plan (SMP) Inception Report
3. AgStat Study Tour report
4. **Agricultural Market Information System (AMIS) assessment**
5. Agricultural Production Estimates Survey (APES) information flows assessment (Under Embargo until September 2017)
6. Pilot of field based data entry for the Agricultural Production Estimates Survey (APES) (Under Embargo until September 2017)
7. A Strategic Master Plan of the Agriculture Statistics subsector in Malawi

Table of Contents

Executive Summary

This report is an analysis of the current mandate and operation of the Agricultural Market Information System (AMIS) of the Ministry of Agriculture and Food Security (MoAFS). It was funded through the International Food Policy Research Institute (IFPRI) with funds from the United States Agency for International Development for the Government of Malawi (GoM).

AMIS consists of five surveys covering prices of crops, livestock, horticulture, inputs, and farmgate crop prices. The Statistics Unit within the Department of Planning implements AMIS through the Agro-Economic Survey Unit (AESU). Data are collected by approximately 200 enumerators, each of whom is assigned to a market. Data from 72 of these markets are collated for dissemination via the MoAFS web site.

The report is a direct contribution to the development of the Strategic Master Plan (SMP). The objective of the study was "to adapt the current AMIS to the current needs of key stakeholders in order to provide relevant information for [Agricultural Sector-Wide Approach] ASWAp steering." The three components were: (1) to review and revise the AMIS mandate and purpose, (2) to assess proposed technology options based on the review and revision results, and (3) to outline institutional adaptations and longer-term investments to implement and maintain the "new" AMIS, for input to the SMP (Section 1).

The methodology for this study (Section 2) involved a review and analysis of available documents and data, and interviews with the Department of Agricultural Planning Services (DAPS), the Statistics Unit (SU), and the AESU team, National Statistical Office (NSO) personnel, and other MoAFS personnel who use AMIS data. The methodology also included interviews with other line ministries, agencies, development partners, and private-sector representatives who contribute to or utilize the information, and additional interviews with potential future providers or contributors of market information and potential providers of technological platforms for market information. A survey was conducted of 20 enumerators across remote and central markets in 10 districts across all three regions, traders in the markets where data are collected, and 12 focus group discussions (FGDs) involving 103 male and female farmers in the 20 markets.

Details of individual consulted are in Annex 2. Annex 3 has details of secondary sources reviewed and consulted.

It was not possible to meet all the identified stakeholders within the time available, but a good range of stakeholders were met with representatives from each category.

Section 3.1 reviews AMIS's purpose, mandate, and implementation. The AESU does not have a specific document that explicitly sets out its original mandate, purpose, and related subsidiary objectives. From other documents and interviews, MoAFS (for crop and market decisions) and smallholder farmers were the key intended users of AMIS.

The first change in mandate is that interviewees referred to a wider range of users than decisionmakers in MoAFS and farmers. AMIS data users include other government ministries and agencies; development partners; researchers, such as academic bodies; private-sector players, specifically traders and buyers; and consumers. This revised mandate recognizes that AMIS data are useful to more stakeholders than was explicitly stated in the original mandate.

A key implication of a wide range of users is that data demands differ. For example, policymakers, planners, and academic researchers seek longitudinal data with national coverage to enable analysis over time and location to identify changes and trends. However, farmers and traders want data that are current for particular markets where they operate to decide where and when to transact. The main point is that data use determines the data qualities needed based on accuracy, completeness, timeliness, relevance, and accessibility. A second change in mandate was a shift from the original duality of MoAFS and farmers to an emphasis on farmers.

These changes highlight a need to determine explicitly the AMIS mandate and the primacy of the different data users, so that the design and implementation of AMIS are aligned with its mandate. A revised mandate statement is proposed in the Way Forward section for GoM's consideration.

To determine what the AMIS mandate should be, how MoAFS and farmers use data and their views on the current and desired qualities of the data were examined. It was found that data are used for trading-related decisions, food and nutrition security (FNS) decisions, and strategy and policy monitoring decisions.

In relation to trade-related data, within MoAFS, DAPS in general, and the Agricultural Trade and Market Development Unit more specifically, AMIS data are used for making the original decision to set minimum prices for crops. AMIS data were also used to intervene in the maize market to restrict domestic maize trading in 2008 and 2009, when prices were increasing rapidly. A third example was MoAFS's collaboration with the Ministry of Industry and Trade for decisions to restrict imports and exports, when data from AMIS indicate that prices for a commodity are increasing rapidly (indicative that export restrictions or bans be imposed) or falling rapidly (indicative that import restrictions or bans be imposed).

In terms of private-sector trade decisions, the FGDs found a majority of farmers were aware that market price data from GoM are disseminated, particularly through the radio, but they had mixed views on the data's reliability as a source to act upon. Instead, farmers who were buying and/or sellers generally accessed a range of sources of information on market prices, rather than only one source. If they used only one source, then it was "friends." Information was actively sought out through face-to-face and phone contact at the time a transaction was planned. The data from private sources were more frequently used and relied upon than GoM data.

Part of the rationale for giving price information is to enable farmers to choose where and when to sell. Selling may be driven by a need to realize cash to make some purchase or payment, so the timing may not be under the farmers' control. In terms of farmers' choice of market, it was found that although price is a major factor in their decision regarding where to sell and to buy, it was not the only, or necessarily the most important, reason. Farmers were looking at the net price after transport costs, as well as such factors as convenience, certainty of selling, speed of selling, availability of items to buy, safety, and established relationships.

Traders reported that they do not use AMIS data for trading activity, but have developed their own methods for collecting data, mainly through establishing a network of contacts with other traders (for the bigger traders) and friends for the smallest traders whom they can contact to get price information when they need it. Although price information is very important, and more so for farmers' decisionmaking on where to buy and sell, the traders also consider the other costs in selling (transport) and the risks of not selling or not buying enough. Their ability to choose particular markets is also constrained by their available resources.

In relation to FNS decisions, AMIS data are used for FNS assessments to identify potential problem areas where prices indicate a significant imbalance between supply and demand, and for purchasing decisionmaking. The data users undertake further analysis and bring in other data sources, including gathering and cross checking primary price data. AESU could be well suited for providing that additional and tailored analysis, if the analysis is appropriately resourced. Many of the interviewees were concerned about data reliability and completeness, and some desire for more timely information.

In terms of reporting and monitoring activities by international bodies, other parts of GoM, and researchers, they use AMIS data, but have doubts about the quality of the data. These stakeholders would like other data to be available and have an interest in improving agricultural statistics, including initiatives by the Food and Agriculture Organization of the United Nations to standardize the data collection and processing with its international requirements. Ensuring broad confidence in all agricultural statistics is important, as lack of confidence in some statistics undermines confidence in the agricultural statistics arena.

Section 3.3 reviews the implementation of the AMIS surveys. This section contains detailed findings on each of the five surveys with related recommendations. In relation to data collection (Section 3.3.1), there were some differences in the way enumerators were implementing the surveys. As a result, there is a need for additional training of enumerators to address variations in the methodology and understanding of the surveys. One key difference is over the number of trials per survey per day, with variations from one to three. This appears to be a function of the commodity being measured, since some do not vary across the day (eggs, meat, etc.), and the degree of work

required. On the latter, the workload to measure so many crops across three trials, particularly in very busy markets, appears too great and impractical. Another issue is the frequency of collection, as some surveys are weekly and others are biweekly. The collection frequency and product coverage need to fit the purposes (and needs) of the target groups, the resources that are realistically available, and the methodological minimum requirements, rather than ideal requirements.

There were challenges in the methodology for livestock surveying, notably obtaining the necessary equipment for measurement and the logistics of getting to livestock markets that can be remote and take place very early in the morning (5.00 a.m.). The farmgate survey is really a survey of remote markets where some farmers sell to traders. This is only one farmgate, and it is important that policymakers understand that there are other types of farmgate sales at quite different prices. It would be better to term this a remote buying point farmgate survey, so that it is not misleading on the range of farmgate prices. The challenging logistics of accessing remote buying points also means that enumerators may not be attending these as regularly as their main market. Finally, the input survey appears to rely on getting prices from input suppliers with a permanent presence. Some of these refer the enumerators to their head offices for prices. There is a rationale for this survey to be conducted at the input supplier headquarters, with periodic spot checking of local prices, rather than as a primarily enumerator-conducted survey. It is noted that data for many of these surveys are not being published at present.

Finally, in relation to data collection, there are challenges in the supervision of enumerators in that supervision is irregular and insufficient and so does not ensure that all enumerators are consistently using the AMIS methodology . In the light of these issues, it would make sense to review the methodology for all the surveys to ensure they are fit for their purposes and that the data are collectable.

In terms of data management (Section 3.3.2), there is an issue with data retrieval by AESU. The current budget for this activity equates to approximately US$1/survey/enumerator/week to retrieve data, which is insufficient to gather all the price points for that week, and thus contributes to data gaps. Other issues are a basic lack of functioning computers, requiring considerable sharing, and limited Internet access.

Data dissemination (Section 3.3.3) is direct to a limited number of data users, but primarily through the MoAFS website (www.moafsmw.org). This website only carries the retail market data for up to 72 markets and is not regularly updated. Data from the other 128 markets are submitted to the Agricultural Development District (ADDs) but are not being systematically recorded. It would be appropriate to consolidate activities, so that data can be collated and disseminated based on available resources.

Three alternative providers of market information were reviewed (Section 3.4): the Malawi Agricultural Commodity Exchange (MACE), the Agricultural Commodity Exchange (ACE), and the Malawi Market Linkages Initiative (M-MLI). Together, these providers use the Esoko system, which is providing and disseminating market price information and Auction Holdings Commodity Exchange information to a range of users. This review highlighted the use of cellular technologies and short messaging service (SMS) for gathering and disseminating information.

The second objective of the study was to review technology options within the limited technical expertise of the consultants in this area. The technology options depend on the purpose of the system. Thus, MoAFS has to determine if it will seek to (1) serve farmers and leave it to the market, (2) provide the information itself, or (3) work with market players in a partnership.

Option one is a market-based solution that benefits from private-sector investment providing relevant information in a manner that is accessible to users, in which case it is paid for and may create a sustainable service. However, the private sector will most likely focus on a more limited range of markets and products than AMIS currently collects, and will target those who are willing to pay for the information, such as traders. Over time, if the model were effective, then it might expand its coverage of markets and target groups.

Option two would maintain wide coverage of markets and products, but would need to find a method to deliver data to farmers and traders that meets their need for immediacy in a manner that is accessible to them and enables

them to make better decisions. The current AMIS does not achieve this. Therefore, this would probably mean investing in a license to use the Esoko platform or a technology similar in performance to Esoko or other cellular-based platforms, to speed data collection and dissemination. In essence, this model would require considerable investment and compete with private-sector provision.

For option three it is possible that all the players who are interested in market data could agree on a common data collection methodology, standards, and quality control that are necessary, but realistic and feasible. GoM could focus its collection resources on less-served markets, and supporting data collection in products that the private sector is not interested in collecting. The private sector could provide access to its technology and marketing. GoM could provide access to radio for weekly dissemination, with more specific and timely information provided to subscribers. Based on discussion at the Agricultural Statistics Forum on January 23, 2013, this is the preferred first choice.

The methodology and technology choices flow from the purpose. Providing data that are useful for farmers and traders requires a real-time data system that is likely to be cellular and web-based, with uploading of data from the field, to be checked and released centrally. There would still be a case for broadcasting on the radio, though probably tailored to localities through local radio, given technology literacy challenges. From this real-time system, other data could be aggregated, or the data could be provided in their original disaggregated form for other users to analyze.

In terms of data collection, cellular-based devices could be utilized to enable real-time data submission and, following verification and checking, the data could be posted and made available by SMS alerts or by accessing a real-time web-based platform where users can retrieve data whenever they want to. The use of cellular data entry would imply a shift in resources from data entry centrally to data entry remotely, with the central resource playing a verifying role to check and approve data to show on the system to external users. The implication is that fewer people would be needed at headquarters for the data entry, thus enabling more data analysis and dissemination.

In relation to the institutional structure (Section 5), the input from the consultants is limited to issues relating to the AMIS operation, rather than to a full institutional review. These issues are the relationship between SU and NSO on survey methodologies, coordination, reporting, and linkages; the relationship between SU and ADDs/ District Agriculture Development Offices (DADOs) on oversight of enumerators and supporting resources; and the relationship among AESU, the private sector, and development partners in relation to real-time information for trade decisions by farmers and traders.

NSO currently implements market surveys through its economic department to gather data, such as for the consumer price index. NSO recognizes the very wide coverage of the AMIS survey and sees opportunities for coordination. There are potential synergies, if a common data collection methodology could be agreed upon. This would allow coordinated collection, would reduce duplicative activity, and would make data much more compatible and comparable. However, there are substantial challenges to harmonizing data collection methods.

In terms of the relationship between AESU and the ADDs/DADOs, the ADDs viewed the enumerators as being the responsibility of the AESU, but some enumerators are drawn into other ADD- and DADO-related activities. There are also challenges in the provision of allowances and transport for enumerators to do their work. The DADOs could provide basic supervision to ensure that the enumerators at the very least survey markets as and when they should be.

In relation to the private sector, if AESU wishes to disseminate data to farmers and traders, there is opportunity for a partnership with development partners and the private sector. ACE and M-MLI are projects funded by development partners licensed by Esoko, a commercial entity, to use its platform. ACE and M-MLI have a data gathering, management, and dissemination technology and system that are operational and of potential interest that could be the subject of a partnership approach.

Section 6 details the study's conclusions and recommendations. As requested, the consultants have developed mandate:

The mandate of AMIS is to provide the Ministry of Agriculture and Food Security (MoAFS) with accurate and timely market price information for selected agricultural commodities and markets to enable better decisionmaking and monitoring of MoAFS's policies and strategies. AMIS will also inform other ministries and governmental bodies for food and nutrition security (FSN) - and market-related decisions, policies, and strategies. Finally, AMIS will collaborate with nongovernmental bodies to create a constructive partnership to provide real-time market price information to meet the needs of key stakeholders (traders and farmers).

The recommendations are contained in the relevant sections of this report but are also summarized in the concluding section:

Mandate:

That the current mandate and target group of AMIS is determined and explicitly stated, so that its design, resourcing, and implementation are aligned with a clear mandate.

Methodology:

That SU/AESU review the benefits of data collection from markets that are not consolidated into AMIS and for which data are not disseminated or available to users, with a view to increasing the number of markets on which data are consolidated and disseminated.

That AESU determine if reducing the number of trials to two or even one per day would significantly weaken the robustness of the collection method and the data.

That AESU review whether the workload for each survey and for the five surveys in total is realistic and/or whether it is encouraging enumerators to falsify their results to meet their workload requirement. This should include consideration of what incentives are necessary to motivate and supervise the enumerators to do a good job.

That AESU review whether weekly collection of data is appropriate, or whether a less frequent biweekly interval would be sufficient for the purposes for which the data are actually being used, in that farmers do not appear to be making widespread use of the data for market selection and timing decisions.

That the periods for data collection be clarified, to determine if they need to be changed for different locations, or remain standard across the survey. This may depend on the crop profiles of areas.

That AESU review whether the range of products for which data are collected should be narrowed to enable collection of priority products to a higher standard.

That the Livestock Wholesale Market Survey method be thoroughly reviewed to clarify what is intended to be measured and how best to collect the data. If this is live weight of animals being traded, then appropriate equipment is required, along with resourcing to get enumerators to the points of sale when the sales are taking place. What is being measured at present is wholesale prices for butchery.

That any revisions to the method take account of both the practical difficulties of collection at livestock selling points/markets, usually early in the morning, and the limited resources available, so that any collection is feasible.

That stakeholders consider moving to remote data collection for the inputs survey from the headquarters of multi-outlet agro-input dealers, supported by periodic spot checking through the use of resources freed up by not conducting the data as an enumerator survey.

That the farmgate survey method be thoroughly reviewed to clarify what is intended to be measured and how best to collect the data, bearing in mind that there are many types of "farmgates." If measurement is only of remote markets, then it would be better to change the name from "farmgate" to something like "remote-market/buying point" prices. It would then also be useful to define what is classed as being "remote," so that it includes buying points that fit within a clear set of criteria.

That any revisions to the method take account of the practical difficulties of collection at remote markets and the limited resources available, so that any collection is feasible.

Field operations:

That AESU clarify the role of the enumerators with the necessary authorities within MoAFS as well as with the ADDs and DADOs.

That AESU re-emphasize the importance of AMIS data to MoAFS officials, so that they may assign enumerators to other duties appropriately.

That a refresher course be undertaken following any revisions to the methodology that might occur following this review.

That induction training be conducted before or at the point of deployment of new enumerators, and that manuals be provided to all enumerators at this time.

That all enumerators be provided with measuring equipment.

FNS stakeholders:

That SU/AESU discuss with its key FSN data users, such as the Famine Early Warning System Network and the Malawi Vulnerability Assessment Committee, the format and presentation for sharing data and any common analytical tasks that it could undertake that would benefit most users.

That SU/AESU discuss with those that are gathering primary price data, such as the World Food Programme, how this activity can be coordinated to achieve the best results for all parties.

That MoAFS consider how SU/AESU could be resourced to undertake tailored analysis as a potential revenue source.

Resources:

That additional resources be made available for data retrieval from the field, especially given the devaluation of the Malawi Kwacha, or an alternative form of data submission and retrieval be used.

That the method of data submission and retrieval by phone and posting data sheets be reviewed to determine if more cost-effective, timely and efficient methods are feasible.

That additional resources be made available for computer work stations, anti-virus protection, and backup facilities.

Data dissemination:

That the MoAFS web site be expanded to contain data from all five surveys, and that prior survey data be made available so that users can access the historical archive of data.

That radio be more regularly utilized for data dissemination to farmers.

Public-private partnerships:

That MoAFS discuss with ACE/M-MLI and AHCE the opportunities for collaborating on data collection and dissemination, potentially combining the market coverage of the AMIS enumerators with the technology of the private sector to provide real-time information to traders, farmers, and consumers who want the data. Under this system, MoAFS would have control of the data sets for use by MoAFS, GoM, and other FNS stakeholders.

List of Acronyms

ACE	Agricultural Commodity Exchange
AHCE	Auction Holdings Commodity Exchange
ADD	Agricultural Development Division
ADMARC	Agriculture Development and Marketing Corporation
AEDO	Agricultural Extension Development Officer
AEOs	Agricultural Extension Officers
AESU	Agro-Economic Survey Unit
AgStat	Agricultural Statistics
AHCE	Auction Holdings Commodity Exchange
AHL	Auction Holdings Ltd
AIMS	Agricultural Input Market Survey
AMIS	Agricultural Market Information System
APES	Agricultural Production Estimates Survey
ASWAp	Agricultural Sector-Wide Approach
ATMDU	Agricultural Trade and Market Development Unit
COM	Comprehensive Operational Manual
DADO	District Agriculture Development Office
DAPS	Department of Agricultural Planning Services
DFID	Department for International Development
DHIS2	District Health Information Software 2
DoDMA	Department of Disaster Management Affairs
EPA	Extension Planning Area
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FCMPRMS	Field Crops and Meat Products Retail Market Survey
FEWS NET	Famine Early Warning Systems Network
FGD	Focus Group Discussions
FNS	Food and Nutrition Security
FNSJTF-TS	Food and Nutrition Security Joint Task Force, Technical Secretariat
GoM	Government of Malawi
GTPA	Grain Traders and Producers Association

HCRMS	Horticultural Crops Retail Market Survey
ICT	Information and Communication Technology
IDEAA	Initiative for Development of Equity in African Agriculture
IFPRI	International Food Policy Research Institute
IRLADP	Irrigation, Rural Livelihoods and Agriculture Development Project
IFPRI	International Food Policy Research Institute
LWMS	Livestock Wholesale Market Survey
MACE	Malawi Agriculture Commodity exchange
MGDS	Malawi Growth and Development Strategy
MIS	Market Information System
MK	Malawi Kwacha
M-MLI	Malawi-Market Linkages Initiative
MoAFS	Ministry of Agriculture and Food Security
MoEPD	Ministry of Economic Planning and Development
MoF	Ministry of Finance
MoIT	Ministry of Industry and Trade
MT	Metric Ton
MVAC	Malawi Vulnerability Assessment Committee
NFRA	National Food Reserve Agency
NGO	Nongovernmental Organization
NSO	National Statistical Office
ORT	Other Recurring Transactions
SMP	Strategic Master Plan
SMS	Short Messaging Service
SU	Statistics Unit
ToR	Terms of Reference
USAID	United States Agency for International Development
WFP	World Food Programme
WRS	Warehouse Receipt System
YSP	Yield Subplot

1. Introduction

This introduction following is adapted from the terms of references (ToRs) presented in Annex 1: Terms of references.

This study forms part of the early actions on the Agricultural Market Information System (AMIS) to be implemented as part of the program for Strengthening Evidence-based Decisionmaking in Malawi's agricultural sector. The lessons learned from the assessment and implementation of technical solutions and capacity-building efforts within the AMIS early actions contribute to the transformation of Agricultural Statistics (AgStat) in Malawi and the development of a Strategic Master Plan (SMP) for the agricultural sector.

AMIS consists of five surveys, conducted on a regular basis:

1. The Field Crops and Meat Products Retail Market Survey (FCMPRMS), commonly known as the retail price survey;
2. The Horticultural Crops Retail Market Survey (HCRMS), commonly known as the horticulture price survey;
3. The Livestock Wholesale Market Survey (LWMS), commonly known as the livestock market survey;
4. The Farmgate Survey; and
5. The Agricultural Input Market Survey (AIMS).

The FCMPRMS, HCRMS and LWMS are conducted weekly in 200 markets, though information is only disseminated for 72 markets. AIMS is conducted biweekly from November to February and monthly from March to October, to reflect the activity in the input market, while the Farmgate Survey is carried out biweekly during the harvest season (March to October).

AMIS is implemented by the Statistics Unit (SU), through the Agro-Economic Survey Unit (AESU) within the Planning Department of the Ministry of Agriculture and Food Security (MoAFS).

The following text is extracted from the ToRs:

"The overall objective of this assessment is:

To adapt the current AMIS to the current needs of key stakeholders in order to provide relevant information for Agricultural Sector-Wide Approach (ASWAp) steering.

The assessment is divided into three parts:

1. *Review and revise the AMIS mandate and purpose.*
2. *Assess proposed technology options based on the review and revision results.*
3. *Outline institutional adaptations and longer-term investments to implement and maintain the "new" AMIS, for input to the SMP.*

The specific activities of part one include:

- *A critical review of AMISs' original mandate and purpose and its current function.*
- *A review of other market information systems/ providers, including but not limited to the Malawi Agricultural Commodity Exchange (MACE), the Agricultural Commodity Exchange (ACE), and Auction Holding Ltd.*
- *Consultations with past, present, and potential future users of information provided by AMIS, including but not limited to departments/units within MoAFS (Food Security Unit, Trade and Marketing Unit, Senior Management), smallholder farmers, the World Food Programme (WFP), the Department of Disaster Management Affairs (DoDMA)/Malawi Vulnerability Assessment Committee (MVAC), the Famine Early Warning Systems Network (FEWS NET), the Food and Agriculture Organization of the United Nations (FAO).*

- *Based on the reviews and consultations, the development of a proposal for a "new" AMIS that will meet the information requirements of stakeholders in the sector and complement already existing market information systems and identify potential information and communication technology (ICT) solutions to improve the efficiency of AMIS data collection, transfer, analysis and dissemination.*

The specific objectives of part two will, in part, depend on the recommendations of part one. It is expected that a detailed assessment of the proposed technology option will be carried out by a technology service provider.

In the third part of the AMIS assessment, it is expected that the consultants who undertook parts one and two will work together to establish the required institutional adaptations and longer-term investments to implement and maintain the "new" AMIS."

The ToRs were clarified in discussion, with the focus on the review of AMIS, recognizing that the technological assessment requires specialist knowledge, and that the institutional arrangements are mainly within the ambit of the team working on the SMP.

This report is the outcome of the study and is structured as follows: Section 2 provides the methodology that was followed; Section 3 reviews AMIS's purpose, mandate, and implementation; Sections 4 and 5 provide insights on the technological options and institutional arrangements, respectively; and Section 6 presents the report's conclusions and recommendations. Recommendations are also presented within the relevant sections.

2. Methodology

The methodology for this study involved the following elements:

1. A review of available documentation and analysis of available data.
2. Interviews with AMIS management in the Department of Agricultural Planning Services (DAPS) and the AESU team that collects, processes, and disseminates AMIS data.
3. Interviews with National Statistical Office (NSO) personnel who second the personnel.
4. Interviews with MoAFS personnel who use AMIS data.
5. Interviews with other line ministries, agencies, and government bodies that contribute to or utilize AMIS information.
6. Interviews with development partners and private-sector representatives who contribute to or utilize the information.
7. Interviews with potential future providers or contributors of market information.
8. Interviews with potential providers of technological platforms for market information.
9. Interviews with 20 enumerators (who conduct the survey) across 20 remote and central markets in 10 districts across all three of Malawi's regions.
10. Interviews with 8 traders in the markets where data are collected.
11. Focus group discussions (FGDs) in 12 groups involving 103 male and female farmers in the 20 markets surveyed.

The lead consultant was James Kajamu, supported by Jason Agar. The interviews with enumerators and traders, and the farmer' FGDs were conducted by Richard Kusseni, accompanied by Francis Kalonga, Officer-in-Charge of AESU.

Details of the interviewees for the study are included in Annex 2: Individuals consulted. Details of sources consulted are included in Annex 3: Sources consulted. Details of the instruments are in Annex 4: FGD Topic Guide and Annex 5: Enumerator Interview Questionnaire.

The main challenge encountered was the unavailability of a few stakeholders for interviews and background documents. Of those stakeholders who were interviewed, a few were only able to give limited time and/or information. Overall, a wide range of stakeholders was covered, and the consultant believes the enumerators obtained the overall range of views required.

For the enumerator interviews, the market traders challenged some of the information the enumerators submitted, such as the frequency with which enumerators actually come to the market. From the data available, it cannot be concluded that the enumerators were not visiting the markets frequently, as the traders may have not been aware of their presence, but it is a possibility.

A limitation acknowledged from the outset was the consultant's competence in determining the technological options (Section 4), as this requires specialist expertise. The role was therefore to identify possible options in broad terms, for more specialist assessment to follow.

It was also acknowledged that this was not an institutional review, but that the consultants would outline institutional issues and possible ways forward (Section 5).

3. Review of AMIS

This section reviews AMIS, including its mandate and implementation. This involves reviews of the views of stakeholders; the actual implementation of the AMIS surveys by enumerators, to determine what gaps and opportunities exist; and the AMIS Comprehensive Operational Manual (COM 2009)[1], to determine if the enumerators and AESU staff in general are following the manual's instructions for conducting the surveys and managing AMIS.

3.1 AMIS MANDATE AND PURPOSE

The main sources of information for this section were the available documents and stakeholder interviews. The available documents were the COM 2009, including the survey questionnaires; published results; and supervisor reports.

3.1.1 Original Mandate and Target Users

AESU does not have a specific document that explicitly set out its original mandate, purpose, and related subsidiary objectives. However, a statement of mandate can be taken from the COM 2009:

"… the Ministry of Agriculture and Food Security has a vision of having 'A nation with sustainable food security and increased agro-based incomes.' To realize such a vision, the Ministry's mission is 'to promote and facilitate agricultural productivity so as to ensure food security, increased incomes and creation of employment opportunities through the sustainable management and utilization of natural resources, adaptive research and effective extension delivery system, promotion of value-addition and agribusiness and irrigation development.' Among other factors, it is therefore imperative for the Ministry to have accurate agricultural market information in order to attain this mission. As such, the importance of [the] agricultural market information system cannot be overemphasized especially in the face of liberalized agricultural markets and privatized agricultural organizations." COM 2009, page 1 (underlining added by consultant).

The above statement highlights that agricultural statistics are "imperative" for MoAFS to attain its mission. Therefore, MoAFS is an important intended user of AMIS.

The following extracts widen the intended users for agricultural market statistics to include smallholder farmers:

"The Comprehensive Operational Manual has been developed in line with the country's National Agriculture Policy which recognizes that inadequate access to markets is one of the binding constraints to increasing and reducing fluctuations in smallholder productivity. The policy, therefore, seeks to integrate smallholder farmers into domestic and international agricultural markets by amongst others, ensuring access to up to date information on consumer tastes and market practices and procedure[s]." COM 2009, page vii, Foreword (underlining added by consultant).

And:

"Deregulation of the agricultural markets and liberalization of trade, in line with global trends, have integrated our agricultural marketing and trading value chains into the global agricultural markets and trade. However, a challenge arising out of the new trading and marketing dispensation is that farmers are now required to become sharp entrepreneurs and be able to take managerial decisions in terms of what to produce, how and for whom to produce, in line with contemporary market requirements. The ability of economic agents to respond intelligently to the

production and marketing challenges posed above rest[s] on their ability to access, interpret and apply the basic agricultural marketing information in their agribusinesses. Without timely and reliable market information, farmers operate under huge risks as they do not know when to produce, where and at what price their product will be sold or inputs bought." COM 2009, page 1 (underlining added by consultant).

In response to the above perceived need, DAPS developed AMIS: "to integrate isolated agricultural market information on one platform, and to use it as a channel to disseminate basic agricultural market information to the farming community." COM 2009, page 1.

From the above, it can be determined that the original mandate and purpose of AMIS were to provide agricultural market information statistics to two key user groups: to MoAFS, in order to inform its policy and planning, and to farmers, to assist in making crop market decisions. Although other groups, such as traders and consumers, have been added, they appear not to have been in the original mandate so far as can be discerned.

3.1.2 Initiatives to Fulfill the Mandate

In fulfilment of this mandate, the COM 2009 and stakeholders noted that there have been several attempts to gather and disseminate agricultural market price information to farmers. For example, the World Bank funded the Agriculture Marketing and Estate Development Project, 1988–95, which was followed by another program funded by the European Union (EU).

Up to 2013,[2] MoAFS received support for its agricultural statistics work through the EU-funded Food and Nutrition Security Joint Taskforce, Technical Secretariat (FNSJTF-TS)[3] for gathering, analyzing, and disseminating agricultural market information. MoAFS also co-funded[4] the MACE run by the Initiative for Development of Equity in African Agriculture (IDEAA) from 2004 to 2009.[5]

NSO operates a common service, providing technicians to line ministries, such as MoAFS. The Chief Statistician within MoAFS is located within DAPS and oversees the operation of AESU, which is staffed by NSO statisticians, but is formally part of MoAFS. AESU is responsible for collecting, recording, and disseminating AMIS data and the Agricultural Production Estimate Surveys (APES).

With support from these two sources, AESU/MoAFS recruited, trained, and posted 200 enumerators in markets across the country[6] to administer the five AMIS surveys. The AESU headquarters team collected the survey data from the enumerators by a mix of phone and mail, processed the data, and finally disseminated information in collaboration with others through radio, Short Messaging Service (SMS) or "texts," e-mails to subscribers, and the MoAFS website. With the ending of the MACE and IDEAA, information is currently sent to a small group of users by email and posted on the MoAFS website. Data are typically available on the website within one month of the month it relates to—e.g., December 2012 data became available in early January 2013.

AESU receives an allocation of other recurring transactions (ORT) funds for its central operations with resources for the field-based enumerators also allocated though the district agricultural structures. Due to limited funds, data are only collected and processed centrally from 72 of the 200 markets at which enumerators are posted. Enumerators operating at the other markets submit written copies of the data sheets to the District Agricultural Development Offices (DADOs), where they are is held, but not processed or disseminated.

3.1.3 Evolution of the Mandate and Target Users

There were different views on what the original mandate was and how much it may have changed, but based on the available documents and interviews, the mandate and target users have evolved.

The first change is that interviewees referred to a wider range of users than only MoAFS decisionmakers and farmers. Interviewee statements indicated the inclusion of the following AMIS data users:

- Other parts of government, including ministries and agencies;
- Donors and development partners, including donors and development organizations;
- Researchers, such as academic bodies;
- Other private-sector players, specifically traders and buyers; and
- Consumers.

This widening of identified users recognizes that AMIS data are useful to a wider range of stakeholders than was explicitly stated in the original mandate. This is not necessarily suggesting that all of these have become "target users," to whom the data are tailored and disseminated, but rather that there are more potential users of the data than stated in the original mandate. The Head of the Agro-Economic Surveys Unit (AESU) stated that these wider groups were part of the original mandate, though based on the documents this inclusion appears to be a more implicit than necessarily explicit recognition.

A key implication of having a wide range of actual and potential users is that the data demands may differ slightly or even quite considerably. For example, policymakers, planners, and academic researchers generally seek longitudinal data with national coverage to enable analysis over time and location to identify changes and trends. However, farmers and traders are more interested in data that are current for particular markets where they operate in order to make a decision on where and when to transact. Food security organizations need data from many locations at frequent intervals (weekly), valuing immediacy of availability relative to policymakers and planners who would be more interested in aggregated (monthly/seasonal data) with less emphasis on immediacy.

The main point is that data use determines the data qualities needed based on:

1. Accuracy – What degree of accuracy is required?
2. Completeness – How complete does the data set need to be over time and location?
3. Timeliness – When are the data needed, particularly how soon after their collection?
4. Relevance – What data are needed and to what degree do they need to be aggregated and analyzed?
5. Accessibility – In what format do the data need to be made available and presented, so they can be accessed through different means and media (e.g., simplified and short for SMS).

A second change in the original remit was a shift in emphasis from a duality of target users (MoAFS and farmers) to a greater emphasis on farmers. There were contradictory views on this, but several interviewees within MoAFS emphasized the greater importance of AMIS to farmers and lesser importance to policymakers. This also included a shift from focusing only on farmers to include traders and consumers; in other words, a shift in focus from an internal MoAFS audience to an external audience. As noted, this was not a consensus view and should probably be seen as a blurring of the dual focus of the original mandate, with some interviewees seeing the provision of information to farmers and traders as AMIS's primary focus. The views

depended partly on the particular area of work of the interviewees, but also perhaps it is easier to explain serving large numbers of the public who face considerable asymmetry of information when making selling decisions, as opposed to serving small numbers of MoAFS personnel in their decisionmaking, even if the latter also has indirect impacts on many people.

It is important not to overstate these "changes" to the original mandate, partly because the statement of the original mandate is not entirely clear, and arguably these changes are implied and in any case are more shifts than wholesale changes. What it does indicate is that there is a need to determine explicitly the AMIS mandate and the primacy of the different data users, so that AMIS's design and implementation are aligned with its mandate.

Therefore, it is recommended:

That the current mandate and target group of AMIS be determined and explicitly stated, so that its design, resourcing, and implementation are aligned with a clear mandate.

The consultants were requested to propose a mandate statement. The actual statement ultimately depends on the role that MoAFS wishes to adopt. In the sections that follow, the information strongly indicates that the AMIS data are not being used substantively by farmers or traders, but are used by policymakers and food and nutrition security (FNS) stakeholders. A revised mandate statement is therefore proposed in section 6 for consideration and discussion.

3.2 AMIS DATA USE

To determine what the AMIS mandate should be, it is necessary to examine what people use AMIS data for and their views on the data's actual and desired qualities. From the interviews, data are used for decisions that fall into three broad categories: trading-related decisions, FNS-related decisions, and strategy/policy monitoring decisions.

3.2.1 Trading-related Decisions

3.2.1.1 Government Decisions

Three examples were provided by (mainly) governmental stakeholders of how AMIS data were used to inform decisions by the Government of Malawi (GoM) to intervene in markets:

Within MoAFS, DAPS in general and the Agricultural Trade and Market Development Unit more specifically highlighted the use of AMIS data for making the original decision to set minimum prices for crops. Setting minimum "indicative" prices for many field crops is now an annual exercise, and AMIS price data, such as on farmgate prices and retail market prices, are clearly a necessary input to such an exercise.

A second example of AMIS data use was for decisions to intervene in the maize market to restrict domestic maize trading in 2008 and 2009, when prices were increasing rapidly. A ceiling was put on maize prices, domestic maize trade was restricted, and exports were banned. AMIS survey data were used to highlight rapid or large price changes, price hotspots, and price trends for agricultural produce in particular markets. AMIS data are used for identifying price changes and anomalies for decisionmakers to determine what action is needed.

A third example was MoAFS collaboration with the Ministry of Industry and Trade (MoIT) for decisions to restrict imports and exports, when data from AMIS indicate that prices for a commodity are increasing rapidly (indicative that export restrictions or bans be imposed) or are falling rapidly (indicative that import restrictions or bans be imposed). In recent years, there have been relatively more restrictions for exports,

such as regular restrictions for maize and soya, than for imports. AMIS price data played a role in these decisions and can inform the general picture of how particular commodity markets are operating. Also important, price data indicate the overall supply and demand position, as the data are a derived indicator of the balance between these two factors, but are probably insufficient on their own, in the absence of other data on production, trade etc.[7] This caveat is also true of the use of information for the other decisions mentioned above—AMIS data are necessary and useful, but are insufficient to make the decisions without other data and further analysis.

In terms of the quality of the data for decisionmaking, MoIT noted that the data have some gaps, that their quality can be poor, and that they are not always timely. Where important decisions are being made to intervene in a market, reliable data would be necessary as the basis for those decisions; otherwise, interventions could lead to unintended distortions.

3.2.1.2 Private-sector Decisions

A key target group for AMIS data is farmers, as well as traders and consumers. Data for the farmers and traders mainly came from interviews and FGDs conducted across 20 markets. This was not a representative sample, but rather a sample with a qualitative focus to understand how farmers and traders make decisions, how they use information, where and when they source information, and what information they would like. The FGD Topic Guide is included in Annex 4: FGD Topic Guide.

- *FARMERS*

Based on the farmer FGDs, a majority of farmers were aware of agricultural price data from GoM disseminated through the radio (mainly), from Agricultural Extension Officers (AEOs) and by SMS (limited). None of the farmers was aware of "AMIS" as the source of the price data they had heard on the radio, though some did connect the activities of the enumerators with the information that was being disseminated. Several groups spoke of MoAFS and GOM generically as the source. In the main, those who were aware of information over the radio had noted that it was price information for particular markets, though a few referred the information they were aware of being the buying prices at Agriculture Development and Marketing Corporation (ADMARC) markets or GoM-set minimum prices. There was a degree of confusion over what the data were.

Although an overall majority of interviewees were aware of agricultural data being given over the radio from GoM, within the FGDs there were split views on the availability of information from GoM:

"The Government is not doing anything as far as providing price information is concerned" Young female farmer (backed up by two others), FGD Ng'abu.

In the above case, the four other (out of seven) FGD participants at Ng'abu disagreed. They said they were aware of the information on prices over the radio; however, they also stated that the information was not always reliable.

Farmers in other FGDs were also critical of the data, mainly that they were not reliable and/or not up to date. To have formed such an opinion means that these farmers (or their families and friends) had tested the information for some of the crops and markets. They said:

"The government provides price information on products at different markets, but the information is not useful as the prices are usually lower at the markets than those broadcasted on the radio by the time the farmers get there." Male farmer, FGD

Kasungu, which was a consensus view of the group.

"Information is usually available regularly on the radio about different market, but sometimes when you go to the market you find that the prices are different and then your plan becomes disturbed." Female farmer, FGD Lunzu.

Although not conclusive, of those who were aware of the price information, no one stated that the data were always reliable. Rather, those who expressed a view said that the price data were either unreliable or were of mixed reliability.

In summary, the FGDs found a majority of farmers were aware that market price data from GOM are disseminated, particularly through the radio, but there were mixed views on the data's reliability as a source to act upon.

As well as mentioning GoM as a source of information, farmers gave other sources of information on markets and prices as:

1. "Friends"[8] who were asked for information.
2. Physical visits to one or more markets to check prices. This was mentioned in two FGDs, but it was evident from other comments that farmers visit markets regularly and gather information on prices alongside other activities at the market, such as buying inputs.
3. IDEAA, through the radio and SMS. No other nongovernmental organizations (NGOs) were mentioned as sources of price information, though they were helping on some market-related activities in some cases.
4. Buyers, such as Kulima Gold, Farmers World, Mulli Brothers, and Export Trading. One or more of these was mentioned in most of the FGDs as a source. In addition, for cotton, the buyers were listed as Great Lakes and Cargill in Shire Valley.
5. In one case, the enumerator was giving information about prices at other markets, which the farmers seem to have appreciated.

Talking to friends and family was the most commonly mentioned and widely spoken about source in all the FGDs. In most cases, it seems that the person wanting the information would take steps to find it, such as speaking face-to-face with identified "friends" or calling them by phone, which was also commonly mentioned. This indicates that farmers were willing to spend money through airtime units to get information from sources they believed had the information and were reliable.

In all FGDs, it was stated that these major buyers promoted their prices through the radio and display posters at their premises, as well as giving information through their agents based at certain markets. This is also the case when they are selling farm inputs. This suggests that the larger buyers and traders are actively communicating information on buying and selling prices to farmers, though of course this is only covering their own operations and prices.

IDEAA was mentioned in 7 of the 12 FGDs, though some farmers noted that IDEAA is no longer operating. IDEAA was classed as an NGO, which it was, though the source of its information was not clearly linked with GoM.

The above sources were regarded as reliable, with no negative comments made about the quality of the information obtained from them. It is possible and perhaps probable that some farmers did find prices had changed if they visited the market the next day; rather, they understood that the price they were given was for the day when it was given and that it could change. It

would be possible for farmers to verify that the price they were given was correct for the day when it was given, and if not, then the farmer would presumably not use that source again. There were suggestions that at any point they were given inaccurate or unreliable information. The only negative comments related to the low[9] prices offered by some buyers, not that they promoted one price and offered a lower one.

In summary, farmers who were buying and/or sellers generally accessed a range of sources of information on market prices, rather than only one source. If they used only one source, it was "friends." When planning a transaction, they actively sought information through face-to-face and phone contact. They relied more on data from private sources than GoM data.

Part of the rationale for giving price information is to enable farmers to choose where and when to sell. Selling may be driven by a need to realize cash to make some purchase or payment, so the timing may not be very much under the control of farmers.

The FGDs shed considerable light on the choice of market by farmers for selling and/or buying. As expected, the buying prices paid by traders were an important factor in the choice of market, being explicitly stated in 9 of the 12 FGDs as an important factor, and implied in the other ones. In several cases, the farmers said that comparing prices relative to other available markets and selling points yielded the most important information, as opposed to just getting one price for one market.

However, price was not the only factor, and in some cases was not the most important factor. A more sophisticated view of price is the recognition that it has to be related to other costs incurred, particularly transport costs, which are a major factor in decisionmaking. It is the net price after transport and other costs that affects the choice of market:

"Since I am very close to the market, I do not have to pay any transport costs to have my products at the market." Elderly male farmer, FGD Hewe.

"Sometimes you may end up making losses if transport costs are not properly calculated." Female farmer, FGD Mkanda.

It was noted that if farmers had sufficient volume (and resources), they would consider travelling further, but limited volumes to sell meant it was not viable to travel more. In many cases, the amounts being sold were sufficient for transport to market by walking or by bicycle, so did not incur transport costs. Not having cash available for transport is likely to be a binding factor on the range of markets where a farmer can sell, as well as the impact on the farmer's profit of high transport costs making travel to some markets not viable, particularly for relatively small amounts of produce to sell or buy. It was clear that price information was not sufficient to make a decision, as the farmer also had to have up-to-date knowledge of the transport costs.

Another factor partly related to "cost" that was mentioned is the time it takes to travel to the market and to sell produce when at the market. For some sellers, there was considerable value in being able to sell quickly, rather than spend the whole day selling some or all of their produce at the prospect of better prices. This appears to be a key attraction of markets where there is a wholesale activity, such as Limbe, where participants gave the advantage of being able to travel there quickly and relatively cheaply, due to good transport links,[10] and to be able to sell quickly and return home within a short period of arriving at the market. Other examples of this were:

"I prefer Kasungu market because the sales are faster, since most people around the Boma work and have stable income sources." Female farmer, FGD Kasungu.

"I prefer selling at this market as it is very close, and when I have a problem at home, like when I need money for maize milling, I quickly come to the market and do some quick sales...." Female (soybean) farmer, FGD Ntchisi.

The latter quote also emphasizes that the farmer uses her crop as a store of value, probably because she does not want to hold cash, cannot access a savings mechanism, or wants to maximize her returns by selling only when she has to at as late a point in time as possible. In this case, the seller would want a market that is available on the day she needs to sell, with the result that markets that operate daily would be more attractive than waiting for a weekly or biweekly market (a point made at the FGD Mchinji). Convenience and ability to convert produce into cash quickly are important in choosing a market.

Related to this last factor were the size of the market, the expected number of buyers, and the certainty of sale. At larger markets sellers can find a buyer for whatever they bring, even if the prices may not be as good. This advantage was mentioned as being important, particularly for perishable items like tomatoes. At Hewe, several farmers said they preferred Hewe to smaller local markets closer to their homes for reasons of certainty of sale. Markets at Bomas (Kasungu), close to urban centers (Lunzu and Limbe), or close to borders (Ngabu, Mchinji, and Hewe) or markets that are just big markets with a diverse range (mentioned at Jali FGD) offer the attraction of greater certainty of selling:

"Limbe market is a very large market attracting people from so many parts of Blantyre, thus providing an assurance that commodities would be bought." Female farmer, FGD Limbe.

"Since the market is close to the urban city of Blantyre, there are a lot of buyers from commodities to livestock products." Female farmer, FGD Lunzu.

"It also becomes risky to take perishable commodities like tomatoes over long distances. I would therefore rather sell to a trader who would in turn take the products to markets that are far." Young male farmer, FGD Mkanda.

In the last case, there is an explicit recognition that the trader takes a margin and makes some of the profit the farmer could have made. However, this farmer was not willing to take the risk of no sale. Certainty of selling was more important than potentially getting a higher price or profit.

Related to this is that not all products are traded at a market, so sellers or buyers of a commodity may have a more restricted choice than all the markets they could physically reach. This is the case for more specialized crops (often nonfood crops), such as cotton, but also for livestock, which is not traded at all markets.

Sometimes the farmers were choosing markets where they could sell what they had to sell and buy what they wanted to buy, even if this required some trade-off. For example, farmers who are selling produce in order to buy inputs may decide to travel to the market where inputs are available and sell their produce there, even if there might be another market with better prices for selling. They have to factor in transport costs and time to travel to more than one market, as it may not be possible to make the sale and purchase in a round trip

in one day. It is known from other work that farmers do not like to keep cash from a sale for very long if they have something specific to buy, as there can be other demands for that cash, risk of theft, and risk of squandering it. They prefer to sell and then buy immediately, which implies a market where this can be done in one visit.

Relational reasons were given as factors in the choice of market. This included relations with existing customers and a more intangible need for mutual support in the area:

"There is a good understanding with the buyers, and sometimes commodities can be supplied on credit because we know each other." Female farmer (selling tomatoes), FGD Rumphi.

"We support each other by selling to people who are close, since most of our buyers come from within areas that are close." Female farmer, FGD Rumphi (a sentiment repeated in Chatoloma).

Final factors were the trust in buyers and the security at the market. There was widespread recognition that traders tamper with the scales, and some markets have a worse reputation than others. This was explicitly stated at the FGD in Kasungu, though not apparently about Kasungu market. In such cases, the farmers are calculating that what they might gain through a more attractive unit price offered, they might lose by underweighing. It was not explicit in the FGDs, but this would appear to be a particular risk with livestock sales.

Participants in the FGD at Mkanda mentioned the risk of theft at some markets. They were not talking about Mkanda, but about other markets where they could sell. In this case, the loss of money would outweigh the attraction of getting a higher price.

Although not stated in the FGDs, there is potentially a degree of habit, as well as the opportunities for social interaction and other activities that may persuade a farmer to travel to a particular market. Although prices and profit may be major factors, not all decisions about the choice of a market are made for these reasons alone. Therefore, although price information is necessary and helpful, it is not the only factor that will affect choices of markets.

In summary, although price is clearly a major factor in farmers' decisions about where to sell and where to buy, it was not the only, or necessarily the most important, reason. Farmers were looking at the net price after transport costs, as well as such factors as convenience, certainty of selling, speed of selling, availability of items to buy, safety, and established relationships.

■ *TRADERS*

Although the farmers in the FGDs are "trading," in the sense of selling goods or buying goods, the distinction between farmers and traders here is that traders are buying goods in order to sell them. Traders may also be farmers, but the principal activity is buying from others in one place to sell to others in another place or at a later date. Traders may supplement their sales with their own farm production, but it is the overall focus and the combination of buying in order to sell that distinguishes specialized traders from farmers who are doing some trading.

Of the eight traders interviewed at different markets, only one mentioned getting information on prices from the radio as one of his sources. Seven of the eight said that "friends" were their main source of information, with the eighth giving a physical visit to the market and visiting customers (mainly restaurants in his case) as the main source. Half of the traders stated that they used phones to contact their friends for these prices, with

the others mentioning physical visits to markets and talking to their friends.

The above information relates to small-scale traders. An interview with the Grain Traders and Processors Association (GTPA), which mainly represents larger traders, found that the larger traders do not use AMIS information for several reasons:

1. Their trade is partly international, so they look internationally for price information.
2. The price of a commodity is a function of its grade, but AMIS data do not take account of the grades.
3. The price of a commodity is a function of its transport, storage, and handling costs, but AMIS data do not account for these costs when calculating average prices.
4. AMIS data are not reliable enough to make trading decisions, and are is too out of date by the time they is disseminated. Because the difference between last week's and this week's price could be the same as the margin on the trade, the traders need reliable, up-to-date prices.

To get reliable information on where to buy and sell, traders use an established network of contacts[11] with other traders at the next level up and down from their scale of operations.[12] When large traders and processors want to source product, they contact traders whom they have dealt with at the next level down, who then contact traders at the next level below them. This enables the chain of traders to work out the buying prices at each level, after deducting costs and margins from their own selling prices. In this way, a relatively small number of phone calls by the large traders (often fewer than 10), can mobilize a network of several hundred traders down the chain.[13] Information on the indicative prices can flow back quickly as to whether the trade is possible, as well as information on the current "going rates" in the areas where the traders buy. Often the large traders focus on particular areas where they have good contacts and relations and have bought regularly before, perhaps their own home district, as this enables them to buy well.

A trader from Nkhata Bay summed up the attitude of traders:

"The government does not help much on providing price information. Traders have to make their own initiatives to get price information."

Traders were not being critical of AMIS or information from GoM. Rather, they have just developed their own methods to get the particular information they want when they need it, which appears to generally serve their needs.

The above indicates that larger and smaller traders do not access or use AMIS information for making decisions on trading, but rely on their networks of contacts to get information.

The trader interviews in the markets surveyed highlighted a range of factors in choosing a market. A price at which the commodity was selling was important for both when the traders were buying and when they were selling. The traders were looking for a sufficient margin, after transport and related costs between the buying and selling prices. Prices were related to the relative supply and demand in an area, which was important to understand and get information about.

Another important price-related factor for selling was the number of traders selling the same commodity in that market. The traders explicitly said that competition would drive down the prices, while fewer sellers would enable a degree of seller price setting. For some commodities, the prices were fixed by the sellers communicating with each other, giving the examples

of meat, beans, eggs, and tomatoes. Although the prices were stated to be not negotiable, the seller could add to the unit that was sold, as a "prize" or similar incentive to the potential buyer.[14]

Traders said they looked at levels of demand and supply, as well as the certainty of buying and selling. The traders are searching for places with high supply if buying and high demand if selling. The benefit from this is better prices to buy at, better prices to sell at, and more certainty of being able to buy and sell enough on each visit. The certainty of buying and selling is important, as it is usually better to make a margin on more (certain) sales than a very high margin on a few (uncertain) sales. This is a risk-reducing strategy, suggesting that there is some trade-off with price, if that means being able to sell all the produce that the traders need to sell to make their return. This is more important when there are factors of perishability and return transport costs when produce is not sold.

In summary, traders do not utilize AMIS data for trading activity, but have evolved their own methods for collecting data, mainly through establishing a network of contacts with other traders (for the bigger traders) and friends (for the smaller traders) whom they can contact to get price information as and when they need it. Although price information is very important, and more so than for farmers in making decisions about which markets to buy and sell at, the traders also consider the other costs in selling (transport) and the risk of not selling or not buying enough. Their ability to choose particular markets is also constrained by their available resources.

■ *CONSUMERS*

Although consumers were stated to be current target users for AMIS, no data were published or obtained from the interviews on whether and how consumers actually use AMIS data. In the consultant's view, it is not very likely that consumers are making widespread use of AMIS data, as they need to retrieve the data from a website, and they have the same issues about untimely data that traders identified. It is more likely that consumers would, like farmers and traders, use personal networks and visits to markets to obtain information on prices, and would choose markets based on a range of factors, such as convenience, cost of transport, certainty of purchase, and other reasons for visiting (other purchases or other activities). This is not a conclusive view, in the absence of data one way or the other.

3.2.2 FNS-related Decisions

FNS was an important decisionmaking area identified in stakeholder interviews. FNS decisions are made by GoM, through its ministries and agencies; by donors, who often provide funding for FNS activities; by other development partners, whose role is to monitor and analyze FNS information; and by organizations whose role is to implement FNS actions, such as food/cash-distribution and food/cash-for-work programs.

Malawi's Ministry of Economic Planning and Development (MoEPD), which chairs MVAC, stated that AMIS data are used to analyze and assess Malawi's food security situation, including identifying areas of the country where food supply shortages spark significant rises in prices, particularly for maize. The use of secondary data sources, such as AMIS price data, enables MVAC to pinpoint potential problem areas that can be investigated through additional primary field research. MVAC collects its own price data from these potentially problematic markets, and can triangulate this information with AMIS data because there is a time lag for data in the markets it is interested in. This involves regular checking of prices in the selected markets.

MVAC also collects data on the supply chain and how it is functioning, to corroborate with the other data. MoEPD has stressed the importance of the crop production estimates as a key additional source for MVAC FNS decisionmaking. Therefore, MVAC uses AMIS data to help identify markets that may have FNS issues and impacts, but it also requires APES and other primary data to undertake its analysis.

In terms of the fitness of the AMIS data for the task, MoEPD indicated that the quality of the data is good, though some data gaps require AESU to improve its systems to check data quality and ensure that enumerators are doing a good job. There was also concern about the information's timeliness, with the time lag possibly due to capacity constraints within AESU. This appears to necessitate data cross checking and more regular data collection in identified vulnerable market areas.

MoEPD's biggest concern was the impact on FNS issues when FNSJTF-TS funding ends:

"Tech Sec was doing a good job: sending information, calling for high-level meetings on grain reserves and other important matters in food security. I hope that will be maintained by the Government when the project finally phases out." MoEPD.

Donor agencies and development partners were interviewed, such as the United Kingdom's Department for International Development (DFID), FEWS NET and WFP. All indicated that they utilize AMIS data for analysis (e.g., for FNS assessments).

FEWS NET is a major user of AMIS data, to the extent that it has put in its own data link to AMIS to speed its access to the data. FEWS NET undertakes data analysis using AMIS and other data, produces regular reports on FNS and disseminates them to interested stakeholders by email (about 300 recipients), and undertakes briefings and on its web site. In general, FEWS NET has a very positive view of AMIS data, particularly its time series nature, although there are some reservations about data discrepancies, lack of automation, and additional analysis that could be done. FEWS NET recognizes that AESU has equipment constraints that limit AMIS's capacity and would ideally like to see more coverage of other markets. FEWS NET believes enumerators are sometimes drawn off into other activities by DADOs, which partly accounts for data gaps.

Data were also used to help establish purchase prices for WFP's Purchase for Progress (P4P) program, which buys food crops from small-scale producers for use in P4P's distributions.[15] Data were reportedly useful for budgeting purchases by looking at market prices and price trends and for assessing the modality of purchasing, whether cash or food distributions, which depend on the market's functioning. WFP indicated it monitors prices in selected markets. In the past, WFP has used AESU and AMIS, but more recently, it has used Malawi-Market Linkages Initiative (M-MLI) and ACE enumerators.[16]

WFP's decision to switch data sources appears to have been based on issues of data quality. WFP's cross checking of data in the field found large discrepancies, mainly that prices were higher than reported by AMIS. WFP believes the causes of the discrepancies were that enumerators were not always going to the markets to actually measure, but were falsely recording data; that difficulties in getting traders to cooperate resulted in favoring cooperative traders; and that the enumerators were poorly equipped to do the measuring in practical terms. WFP also noted AESU's budget limitation, particularly the lack of funding for airtime, which led to more data gaps, even when enumerators had actually collected the data. On a positive note, WFP indicated that the timeliness of AMIS data was relatively good,

and ideally WFP would like to work with AMIS. This highlights that for FNS stakeholders, although the data need to be relatively timely, the current 3–4-week lag after collection is sufficient for policymakers' and planners' purposes, as AMIS data are not their only source of information.

Most of the interviewees indicated that further analysis of AMIS data is required, as the data do not provide the particular analysis that they want. DFID welcomed the conversion of price data to maps as a useful step, suggesting a potential need for further analytical and presentational action to improve the usefulness of AMIS data.

The need for users to undertake further analysis is not necessarily a valid criticism of AMIS, as it is difficult to undertake analysis on behalf of data users without a full appreciation of the specific analyses they require. Since there is a range of data users, it would be a challenge to analyze data when the analytical demands may differ considerably between different users. In such a case, sharing the data set in a relatively unanalyzed form might be the most appropriate action, but as noted by DFID, there may be some value in discussing with key users how to improve the data presentation, format, and level of analysis. This suggests an opportunity for AESU to undertake tailored data analysis activities for data users, if AESU had sufficient capacity to do so. As in many other countries, this could be a fee-for-service analysis.

In terms of the data quality, the feedback was mixed, including the need to improve the data's timeliness with a strong desire by some interviewees to make the data real-time.[17] The comments about real-time data may be a function of the initiatives by Esoko and others to provide real-time data, setting the benchmark expectation for AMIS. There were also comments about the reliability and completeness of the data, noted by WFP above, and others.

Overall, it can be stated that AMIS data are used for FNS assessments to identify potential problem areas where prices indicate a significant imbalance between supply and demand, and for purchasing decision-making. The data users undertake further analysis and bring in other data sources, including cross checking and gathering primary price data. Providing that additional and tailored analysis could be an appropriate role for AESU, if it is appropriately resourced. There were concerns from many of the interviewees over data reliability and completeness, and some desire for more timely information.

It is recommended:

That AESU discuss with its key FSN data users, such as FEWS NET and MVAC, the format and presentation for sharing data and any common analytical tasks that it could undertake that would benefit most users.

That AESU discuss with those who are gathering primary price data, such as WFP, how this activity can be coordinated to achieve the best results for all parties.

That MoAFS consider how AESU could be resourced to undertake tailored analysis as a potential revenue source.

3.2.3 Monitoring and Reporting Activities

AMIS information has been or could be utilized in decisionmaking in other areas.

The ASWAp Strategic Plan is the key guiding document for the MoAFS. Although meeting the ASWAp Secretariat was not possible, the market and commercial emphasis in the ASWAp Strategic

Plan suggests that AMIS data should be useful for monitoring progress regarding target crops and commercialization.

3.2.3.1 International Bodies

A number of international bodies, such as FAO, World Bank, the International Food Policy Research Institute (IFPRI), and WFP use AMIS for providing data on the situation in Malawi to their international headquarters and for meeting global reporting requirements, such as WFP's The Market Monitor and FAO's The State of Food and Agriculture. FAO is working with AESU on incorporating a standardized reporting format into AMIS, using its FAO-AgriMarket software that would enable data to be fed into its international reports. This software program is currently run as a parallel system to the AMIS data, with dual entry. At some point, a decision will be required to use one of the two systems to reduce duplication.

This type of global reporting information provides these organizations and a wider global audience with a more complete picture of the situation in Malawi for external bodies that are making decisions, such as allocation of resources or program design. Incorporating Malawi's data into a global reporting system using a standardized method will enable Malawi-based decisionmakers and researchers to make relevant international comparisons.

Some of these international bodies were not entirely confident with the quality of agricultural data, particularly production data. In the main, they were most interested in production data, which they believed had been regularly manipulated over recent years for political reasons, rendering the data very unreliable. Although these bodies thought AMIS data had not been subject to the same pressures for manipulation, they were concerned about the data's comprehensiveness, the methodology used for gathering the data, and the reliability of the data that had been gathered. In relation to the desire of some organizations, such as FAO, for more information, AESU said it already had too many surveys to conduct for the resources available and would find it difficult to implement new surveys.

3.2.3.2 Other Parts of Government

Interviews were conducted with other parts of government, such as the Ministry of Finance (MoF), but the interviewee in this case was unable to identify how MoF uses of AMIS data. However, AMIS data were reportedly used for the design of the social protection program in 2012, as it was important to see the impact on food prices of the devaluation of the Malawi Kwacha (MK).

3.2.3.3 Academics

Interviews with academics at Bunda College, suggested that AMIS data are utilized for a mix of teaching and research/modelling work. However, the academics were generally critical of the data's comprehensiveness (gaps) and coverage (not all markets), perhaps reflecting their particular research needs and the rigor of their research work, which meant that AMIS data could not easily be utilized. The academics had concerns about the independence of data gathering and analysis, having in mind the more sensitive area of production statistics. The suggestion was for greater independence of bodies gathering data, such as NSO, duplicate collection to provide verifiability, and a single large database for ease of access by external parties.

The main challenge for improving the quality and extending the range of data collected and disseminated, including beyond market-related data, is that of resources, as AESU is already very stretched in meeting the current requirements for AMIS data. The issue of confidence in production data is a matter of concern, but beyond the scope of this study. It is an important issue for the SMP team to address, as lack of

confidence in one key area of agricultural statistics can spill over into a general undermining of confidence in agricultural statistics. This is important, as it undermines the use of agricultural statistics in policy, planning, and program decisionmaking.

In summary, AMIS data are used for a range of reporting and monitoring activities by international bodies, other parts of government, and researchers. However, there are doubts about the quality of the data, even though the data are being used. These stakeholders would like other data to be available and have an interest in improving agricultural statistics, including initiatives by FAO to standardize the data collection and processing with its international requirements. Ensuring that there is broad confidence in all agricultural statistics is important, as lack of confidence in some statistics undermines confidence in the agricultural statistics arena.

3.3 AMIS IMPLEMENTATION

This section reviews the collection, management, and dissemination of AMIS data. A key source was the interviews with 20 out of the available 67 enumerators in the 72 markets where data are collected from and disseminated.[18] Information was also obtained through discussions with AESU staff and the AMIS supervisory reports for 2008 and 2009.

3.3.1 Data Collection

The primary activity of AMIS is data collection. There are 200 enumerators, with 197 in the field collecting data on a regular cycle from markets. Of these, data from 72 of the most significant markets are ultimately recorded and disseminated by AESU. Data from all 200 markets are submitted to the DADO, so that the data on the markets that are outside the core 72 are actually being collected; however, the data are reportedly stored at the ADD level, but are not disseminated within the ADD to farmers and others.

This creates a situation where data are collected, but not consolidated or disseminated. The data appear to be unused, despite the use of resources to collect the data. In a system that faces considerable resource constraints, the logic is to reduce the number of markets where data are being collected but not integrated, and concentrate resources on integrating more markets. This would result in data collection from fewer markets, but potentially more markets being drawn into the AMIS database and disseminated.

It is recommended:

That AESU review the benefits of data collection from markets that are not consolidated into AMIS and for which data are not disseminated or available to users, with a view to increasing the number of markets for which data are consolidated and disseminated.

The interviews with enumerators covered a range of topics, including training and the implementation of the different surveys. There are also important issues concerning the supervision of enumerators.

3.3.1.1 Comprehensive Operational Manual and Training

The methodology for the five AMIS surveys is set out in detail in the COM 2009. The consultants reviewed the manual and found that the details of the different surveys were clearly set out. This view was supported by the enumerators who were interviewed; most expressed very positive views about the COM as a ready reference source, which helped them to deal with issues in implementing the surveys. The following

comments exemplify the positive views on the quality of the COM 2009 content:

"[The] manual has been useful in clarifying issues when I have been in doubt." Enumerator, Nkhata Bay.

"I usually had to consult my supervisor on some issues in the market before I got the manual, but now the manual makes it a lot easier." Enumerator, Jali.

Some enumerators who were in post for a period reported delays before they received the manual:

"I used to use pamphlets extracted from the manual before I was given the actual manual." Enumerator, Zomba.

One enumerator felt that there were some discrepancies between the questionnaire formats that he had compared to the manual, but this was the only criticism of the content in the 20 interviews.

In terms of training, two enumerators stated they had been in post since 2003, and the rest reported coming on board between 2005 and 2007. In most cases, the enumerators had not been trained formally when commencing work, but said they had a combination of orientation and practice surveys with a supervisor or another enumerator who had more experience. The orientation was reported to have been carried out at the DADO, and then the new enumerator would be accompanied by an experienced enumerator or supervisor to the market for hands-on experience on data collection.

The enumerator comments on not being trained formally may reflect different views on what constitutes training. In the consultant's view, undertaking surveys under supervision is a recognizable form of training, even if it is not formal "classroom-based" training. The consultant also believes this is an appropriate form of training, due to its strong practical orientation and direct relation to the required task. What the enumerators were commenting on appeared to be the lack of a formal training course in the classroom away from their places of operation.

Several enumerators stated that their induction and orientation to AMIS work took place two to three months after starting, which suggests some inefficiency, as they would be unable to do the work. However, once the enumerators were trained, few if any problems were reported with their induction or their ability to implement the technical aspects of data collection and reporting:

"The induction was very comprehensive, which made work easy, even without a manual for 4 years." Enumerator, Kasungu.

One common request from enumerators was to have refresher courses. Several reported attending such courses, but the last one was reported to have been in 2009. The stated reasons for the refreshers were to ensure consistency of survey implementation and to share experiences with colleagues. According to AESU, 45 enumerators have attended statistical training and refresher courses on three occasions, which is approximately once a year. Based on the issues raised about the implementation of the methodology, a structured program of refresher and induction training for new enumerators makes sense.

It is recommended:

That a refresher course be undertaken following any revisions to the methodology that might occur following this review.

That induction training be conducted before or at the point of deployment of new enumerators, and that training manuals be provided to all enumerators at this time.

3.3.1.2 Survey Methodology

This subsection reviews the five surveys in turn, picking out issues concerning the methodology, particularly the adherence to the COM 2009 methodology by the enumerators.

■ *FIELD CROPS AND MEAT PRODUCTS RETAIL MARKET SURVEY*

Based on the enumerator responses, the majority explained how they were collecting data for the FCMPRMS, which followed the sampling method, as per the COM 2009. However, there were deviations in two aspects of sampling.

Seven of the enumerators (out of 20) were undertaking two trials instead of three. The reason given was the amount of time that it takes to undertake three trials across the range of produce, which was mainly related to the challenges of persuading traders to allow the measurement required for the survey. The reasons for traders' reluctance to participate in the survey included they did not want to have to rearrange produce once it had been measured, as they often put the poor produce at the bottom of the heap, with the good at the top. Also, the survey measurement might expose some traders who have manipulated their scales. Presumably, traders also cannot sell to customers if an enumerator is occupying their time and measuring their produce:

"The sellers are not happy with the task of reheaping their products." Enumerator, Thyolo.

There was also the issue of enumerators not buying the produce:

"Most sellers do not like the idea of having their products measured without buying from them. They think it's a waste of time." Enumerator, Ntcheu.

"Some sellers can be harsh. They complain that we do not buy from them and, as a result, they are so uncooperative in most cases." Enumerator, Mtonda.

Two enumerators (both in Zomba District) stated that NSO, World Vision, and InterAid buy sellers' products in order to do their measuring, so this makes traders particularly reluctant to allow measurement without buying:

"NSO does a similar data collection, but they buy the products from the sellers and, as such, they (the sellers) are resentful to provide AMIS data, since the products are not bought." Enumerator, Zomba (possibly this is for determining the inflation index).

The other common deviation was that seven enumerators[19] were selecting the starting point for sampling by a method other than starting with the number of the interval as per the COM 2009. These enumerators were using the calculated interval (as per the manual) in six of these seven cases, though one enumerator was trying to get representation from different parts of the market:

"When I have counted the sellers, I just select any three based on the location in the market to ensure that there is a representation on each part of the market." Enumerator, Zomba.

Overall, these could be described as relatively minor deviations from the method, as the enumerators were all following a random sampling method, even if it varied in some aspects. However, it does mean there is

an inconsistency in data collection. This is something that ought to be easy to rectify through refresher training and regular supervision.

Two other comments of note were that one enumerator reported not having measuring pails, so borrowed these from the traders, and one enumerator said that for some crops there were three or fewer sellers, so only those who could be persuaded to participate were included.

As already noted, there is a need for refresher training. In addition, it is recommended:

That all enumerators be provided with measuring equipment.

The issue of reducing the trials to two was also found for other surveys, and so will be discussed here, but not repeated for the horticulture and livestock surveys. While there may be inefficiencies in the implementation of these surveys by these particular enumerators, it was not possible to assess whether the task load is realistic in the actual conditions of all or some of the markets covered in the enumerator survey. Although these enumerators may be inefficient, it may also be the case that other enumerators were only conducting two trials, but claimed to have conducted three, because they knew this was the correct method.[20]

To address this issue, it would first be useful to review whether there is much difference in prices over the day in the three time slots given for each trial to see if there is a necessary methodological reason for three trials as opposed to two or even one. If that review concludes that there are minimal price changes over the day, then the logic is to reduce the number of trials, so that this makes the workload more manageable and/or allows other tasks to be added to the enumerators' task load that are more valuable.

It is important that a balance be achieved in data collection between an ideal and what is realistic and cost- effective. The assessment needs to take account of the frequency and extent of price changes found in three trials, as well as the risk that requiring too challenging a number of trials gives the enumerators the incentive to invent data, rather than fall short of their task load. As the enumerators operate under minimal supervision, by necessity, then it is important to recognize the risks of and reasons for inventing data.

For the FCMPRMS, enumerators collect data for up to 22 commodities that may be present in a market. Around 6–8 of these may not be regularly in stock (judging by data gaps in monthly reports), but that still leaves 14–16 products for which three trials are required. This equates to 42–48 trials each of three sellers, which totals 126–144 measurements. These would have to take no longer than 3–4 minutes, if done in an 8-hour working day with no loss of time for other reasons. If there were to be an activity at the market, or if it were raining heavily, then availability for measurement would be reduced.

In addition, each commodity requires enumeration of the sellers, which can be challenging in a large market, especially as new sellers may arrive, and other sellers who have been included depart early. The method assumes that the number of sellers at the start of the day is the same as at the end, which is very unlikely to be the case. There is also the reported reluctance of sellers to have their produce measured, which takes time to persuade them to participate, along with more time spent persuading the next selected seller to participate.

Based on the requirement for weekly data collection of this survey and for the horticulture and livestock surveys, and biweekly collection for the other two surveys, this suggests the enumerators' workload is challenging. A proper assessment of the workload would be

appropriate, as it seems that some enumerators are simply adjusting the method to fit what they can do, while others may just be inventing data.

The above calculations and analysis are indicative and clearly not conclusive, but in the consultant's opinion, it is better to take a realistic view of the task load, to make sure it is possible, as this will improve data quality and eliminate pressure to submit false figures.

If from a methodological standpoint the review determines that three trials are necessary, yet the workload is unrealistic, then the workload needs to be adjusted. For example, it might be appropriate to reduce the number of products for which prices are measured to ensure that three trials can be conducted only for the most important products. This could and probably should vary by market—for example, pigeon peas are very important in parts of the Southern Region, but not in other regions.

The choice of products to measure through three trials might also be based on which products actually show price changes within a day—for example, the feedback on products like eggs, tomatoes, and meat suggests that prices are fixed for the whole day and across the whole market. That same principle may apply for some crops, so that only one trial is required for crops that do not typically show variances within a day.

One stakeholder interviewee questioned whether weekly collection was necessary for all commodities. The question probably relates to the use that the data are being put to. If data are for policy and planning, then biweekly collection may well be sufficient. Collection is already biweekly for farmgate and inputs. The only compelling reason for weekly collection is if the data are to be disseminated to farmers and traders for trading purposes. This is discussed later.

In summary, the collection frequency and product coverage need to fit the purposes (and needs) of the target groups, the resources that are realistically available, and the minimum rather than ideal methodological requirements. Reviewing the methodology in the light of these issues would make sense.

It is recommended:

That AESU determine if reducing the number of trials to two or even one per day would significantly weaken the robustness of the collection method and the data.

That AESU review whether the workload for each survey and for the five surveys in total is realistic, and/or whether it is encouraging enumerators to falsify their results to meet their workload requirement. This should include consideration of what incentives are necessary to motivate and supervise the enumerators to do a good job.

That AESU review whether weekly collection of data is appropriate or whether a less frequent biweekly interval would be sufficient for the purposes for which the data are actually being used, in that farmers do not appear to be making widespread use of the data for market selection and timing decisions.

That AESU review whether the range of products for which data are collected should be narrowed to enable collection of priority products to a higher standard.

That the periods for data collection be clarified, to determine if they need to be clarified, to determine if they need to be changed for different lcoations, or remain standard across the survey. This may depend on the crop profiles of areas.

These recommendations apply to all the five surveys, so will not be repeated for the remaining four.

■ *HORTICULTURAL CROPS RETAIL MARKET SURVEY*

There were strong similarities in the conduct of the HCRMS to the FCMPRMS, particularly as the method and interval for collection are virtually the same, so the comments are similar in terms of compliance and variances.

In essence, the sampling method was being followed, but the main variance was the use of two instead of three trials per day. The more minor variances were the sample interval and nonstandard methods for selection being used.

The issue of traders being reluctant to participate due to the need to reheap commodities was worse with horticultural crops, mainly on account of tomatoes, which require careful stacking, and because poor-quality tomatoes are often at the bottom of the heaps, hidden from sight. Further, because some of the commodities are perishable and easily damaged with handling, particularly tomatoes, traders are very reluctant to let the enumerators pour them from one container to another. Bananas were also mentioned as goods that are damaged with excessive handling:

"There is reluctance of some sellers to have their commodities measured. They complain that the enumerators sometimes break their tomatoes but do not buy." Enumerator, Ntcheu.

"Fruits like tomatoes raise issues. Most sellers are not willing to have it measured and then leave them the task of reheaping without buying some of the product." Enumerator, Jali.

"There is so much reluctance from the farmers to have horticultural commodities, like tomatoes, measured because they easily lose their quality if moved from one bucket to another." Enumerator, Bvumbwe.

"Most sellers complain that I should buy the commodities because I waste their time and make them reheap their products." Enumerator, Ng'abu.

The consequence of this was that it was difficult to undertake three trials, both because it took more time to persuade sellers and because the enumerators were trying to avoid conflicts with sellers by having to handle the produce three times.

As already noted, it is recommended that refresher training be conducted, to address the use of nonstandard methods of sampling. As with the FCMPRMS, there is a need to review the methodology to ensure it is necessary to undertake three trials per day for three sellers every week.

■ *LIVESTOCK WHOLESALE MARKET SURVEY*

The way the LWMS was conducted varied from the manual's instructions.

The first major difference was in the sampling. The majority of enumerators were not sampling or using a sampling interval, as the number of sellers was often too few to make sampling possible. Enumerators also indicated that prices were reported to be the same across the day, rather than changing, such as for eggs. Prices were also the same across the sellers, making the need to sample multiple sellers unnecessary, as the information did not change.

The majority of enumerators were also not doing three trials as directed, as the wholesale trading was taking place very early in the day, so that the live animals could be butchered and sold that day. Some enumerators, for example at Rumphi, reported that the actual sale of cattle occurs at 3 a.m., so it was not practical to get to the sales and, even if they could, the sales were

for a short period of time, so three trials would not be possible or sensible. For livestock and livestock products that were being sold all day, the enumerators indicated that the prices were not changing across the day.

Enumerators were looking for the original sellers/owners of the animals, but often interviewed only the butchers, as the sellers had long departed by the time the enumerators came to the market. The manual indicates that prices can be obtained from buyers or sellers, so this is not a divergence, but the enumerators understood that they were supposed to get information from the farmers/sellers:

"The main issue surrounding live sales of animals is that the actual owners of the animals are not asked on the prices; as such, the information can be distorted." Enumerator, Hewe.

There is a point that there could be trade in animals that is not for immediate butchery, which would be missed if only the butchers are interviewed. The enumerators also felt that the butchers might be lying and overstating the actual price they paid:

"No sampling is done, and prices of live animals are collected from butcher men, because the farmers who sell the live animals are usually long gone by the time enumerators come to the market." Enumerator, Chikwawa.

Although enumerators knew that they should be doing live measurement, they were unable to do this in most cases, due to the sales having taken place much earlier and the animals being long gone or slaughtered, and because they did not have the necessary measuring equipment to do neck sizes or weighing bands.

A final anomaly was the inclusion of eggs in this survey. It would seem that eggs ought to be in the retail price survey, not a wholesale price survey, as the trade that is being monitored in the market would appear to be retail. That is possibly true of hides too, but this could not be determined.

It is recommended:

That the Livestock Wholesale Market Survey method be thoroughly reviewed to clarify what is intended to be measured and how best to collect the data. If this is live weight of animals being traded, then appropriate equipment is required, along with resourcing to get enumerators to the points of sale when the sales are taking place. What is being measured at present is wholesale prices for butchery.

That any revisions to the method take account of both the practical difficulties of collection at livestock selling points/markets, usually early in the morning, and the limited resources available, so that any collection is feasible.

That AESU review whether weekly collection of data is appropriate, or whether a less frequent biweekly interval would be sufficient.

■ *FARMGATE SURVEY*

Of the five surveys, the Farmgate Survey showed the most variance from the method recommended in the manual.

It is possible to characterize[21] several different types of farmer to buyer 'farmgate' sales:

1. Farmers may sell maize to neighbors for cash, barter, or supply of labor. The advantage to both parties of transacting in the village is savings in transport (cost and effort) and time. This type of intercommunal trading is common in the immediate post-harvest period from April through October/November, when available supply in the village tends to run short. The GTPA (2005) study found that the prices at which these trades

took place were lower than the prices in the local markets at these times, and that this farmgate trade was the most common method of sale/purchase. Arguably, this is a more accurate reflection of retail prices of maize in the early part of the post-harvest marketing season. Supply of labor by poorer households to better-off households is common, paid in maize or cash. This is most common during the growing season (November to March), as considerable ganyu (off-farm labor) is required for each season's crops by farmers with more land than their available household laborers can handle. These better-off farmers either sell maize to get cash to pay the ganyu, or use stored maize from the previous season to pay in-kind.

2. When they need money, farmers may sell in small quantities money to someone in the village, such as a bigger farmer or better-off person who is effectively a village-based trader. This can occur before the maize is dry, so that the buyer takes on the role of drying the maize, while the farmers who sell get immediate cash before they would be able to sell to a trader in a market/buying point.

3. Farmers may sell to an itinerant trader who comes to the village looking for maize. This may be a sale for cash or even just a trade for cups of salt.

4. Farmers may travel with their produce to a rural buying point, where one or more remote-market traders set up their scales. These are visible, as a scale is hung on three poles. In some cases several buyers cluster, particularly for some commodities like livestock.

5. Farmers may travel to a trading center, market, or even the Boma, depending on their location. There are buyers with temporary buying points (like the remote-market traders) who set up during the buying season for particular commodities, as well as buyers with fixed premises. These buyers buy from the three categories of "smaller" traders, such as village-based traders, itinerant traders, and remote-market traders, but they also buy directly from farmers who can reach that bigger market.

6. Farmers may travel to an ADMARC depot if there is one in their locality that they can reach to sell maize. However, although ADMARC announces a price that it will buy at, it often does not have the resources to buy. When it does buy, it seems that traders and larger farmers are the ones who can organize transport and persuade ADMARC officials to buy from them. This does not appear to be an important farmgate outlet for smaller farmers, less so due to transport costs, and more so due to the risk of going with produce only for the likelihood of an uncertain sale (see earlier comments on the importance of certainty of sale).

All of the above transactions could be described as farmgate sales, if a farmgate sale is defined as the "first" sale by the farmer who produced the crop to another buyer. Even if this transaction were restricted to first sales to traders, then it would only exclude category one above, who are the better-off farmers. The above information is focused on maize, and it would be necessary to consider the pattern for other farm produce, though several of the features of buyers in points 2–5 would be apparent.

Generally speaking, the closer to the farmgate, the lower the price paid, as the cost, time, and effort of moving the produce are borne by more by the buyer. The cost of transporting is a function of the location, so the more remote from trading centers, markets, Bomas, and cities, the lower the prices. GTPA indicated that it does not make sense to consider prices without reference to transport costs.

According to the COM 2009, the AMIS methodology takes the sales by farmers to remote-market traders as the proxy for farmgate. There is merit in simplifying what is a complex set of alternative "farmgates," but it is important to ensure that policymakers who make decisions, such as on minimum farmgate prices, should be clear that there is a range of alternative farmgate transactions and that the information they get from AMIS is for remote markets only.

It would be useful to better analyze the range of transactions and the relative volumes, including at different times of the year, if decisionmakers wanted to get a more accurate "farmgate price." This might then be a composite of the different prices, or might enable disaggregated reporting of the different categories of farmgate prices. It is important to recognize that the selection of the types of farmgate prices surveyed directly influence the prices reported—a point that should be borne in mind when using farmgate data for analysis and decisionmaking.

Turning to the implementation of the methodology, almost all the enumerators found it difficult to sample in the remote markets selected, as these markets had too few sellers and often only one or very few buyers. As a result, they tended to measure all sellers who came and took an average across them, or took the price for one, as all sales were at this price, even if there were several traders. Often there were three or fewer buyers and sellers:

"There are usually a few farmers/traders at farmgate. Price information is taken from all available on a commodity." Enumerator, Luchenza.

"Usually, no sampling is done because the farmers are mostly very few and are not found at one place. However, when there are many, the sampling like that of the retail market survey is carried out." Enumerator, Rumphi.

Related to this, some of the enumerators talked about getting information from farmers and some from traders. It is possible that the data come from farmers when they are present, but given the scarcity of sellers, the enumerators may just be asking traders for the prices.

A second issue, reported by two enumerators, was having to use the trader scales. Traders were very reluctant to let the enumerators use their scales, because many traders underweigh their products, would generally result in overstating the prices being paid for the true volume:

"Trader scales are used instead, but they normally have stronger springs than the standard scale. For this reason, the traders are reluctant to use the standard scales." Enumerator, Kasungu.

A third major variance was that data were being collected weekly (four enumerators), monthly (one enumerator), and not at all (two enumerators), rather than biweekly as per the COM 2009.

The reason for weekly collection was not clear, unless it was to claim allowances, as this is more frequent than required. The June 2008 Supervision Report welcomed weekly collection. However, this would seem to be an incorrect implementation of AMIS and would lead to data that were less comparable to the data being collected biweekly. One enumerator wondered why AESU was not collecting farmgate data. Too frequent collection may be part of the explanation and would be an unnecessary cost in a system with limited resources.

The reasons for less frequent collection or no collection were given as lack of transport and no or insufficient overnight allowances. It was indicated that enumerators were supposed to be allocated bicycles, but this had not happened. The issue of transport and

allowances was raised by the majority of enumerators and confirmed by AESU:

"There is an entitlement of 2 to 3 nights' allowance for farmgate data, but [it] is never available for us." Enumerator, Zomba.

"Transport is the main challenge to get to farmgate because the office does not provide the allowance for the expense." Enumerator, Thyolo.

The enumerator at Mkanda attributed his failure to collect farmgate data to the pressure from work that he is assigned by the Extension Planning Area (EPA) office. He said he is mostly assigned to duties of an Agricultural Extension Development Officer (AEDO), rather than those of an AMIS enumerator, and the EPA does not consider AMIS as important as an AEDO's duties.

The reported periods for farmgate data collection varied between a start in March or April and ending between August and November. This may be related to the variation in season start and end dates across the country, with the earlier start and end dates in southern districts, and later ones in northern districts.

Gathering farmgate data is a challenge, starting with a clear and consistent interpretation of what is "farmgate." The current Farmgate Survey focuses on measuring prices in remote small markets and buying points, as a proxy for the farmgate. This may have misleading consequences for data analysis and policies if decisions are made based on "farmgate" only being remote markets with very limited trading.

It is recommended:

That the Farmgate Survey method be thoroughly reviewed to clarify what is intended to be measured and how best to collect the data, bearing in mind that there are many types of "farmgates." If measurement is only of remote markets, then it would be better to change the name from "farmgate" to something like "remote-market/buying point" prices. It would then also be useful to define what is classed as being "remote," so that it includes buying points that fit within a clear set of criteria.

That any revisions to the method take account of the practical difficulties of collection at remote markets, and the limited resources available, so that any collection is feasible.

That AESU re-emphasize the importance of AMIS data to MoAFS officials so that they may assign enumerators to other duties appropriately.

■ *AGRICULTURAL INPUT MARKET SURVEY*

The AIMS enumerators had several variations in practices. Some were not sampling from all input suppliers, but were either taking just input suppliers who were parts of large groups (Export Trading, Kulima Gold, Farmers World/Agora, etc.) because they were regarded as "stable" (which meant regularly offering inputs) and because they maintained records. Other enumerators adopted a census approach to include all the input suppliers in the market, as there were often not more than four and sometimes fewer than four.

The enumerators reported challenges obtaining data from smaller input suppliers, because they did not keep good records. On the other hand, there were also challenges with "large" suppliers who were part of a group, as they tended to refer the enumerators to their headquarters to obtain the data they needed. In the latter case, the data from that input supplier could not be included.

Since there appears to be a degree of selection of larger and "stable" dealers, as well as difficulty in

obtaining permission to get prices at the local level from agro-input dealers with headquarters, basing this survey on prices collected from the larger input dealers is an option. To avoid the issue of false reporting, the resources freed up by using this method, could be used to do spot checks, which would encourage the companies to report accurately. This might also enable weekly monitoring for the whole season and avoid collection errors.

The enumerators reported that they were not sampling, as the prices were the same. There were two cases of using nonstandard averaging, such as taking the midpoint of the highest and lowest prices. The latter would be within the method, if only two values were collected, but the phrasing of the responses did not imply that the midpoint was due to only two values being collected.

As with the Farmgate Survey, the periods specified in the COM 2009 for collection varied as to when the more frequent (biweekly) and the less frequent collection of data occurred. The most frequent variation was starting in October or November, through to finishing biweekly collection in February, March, or April. As with the Farmgate Survey, this may reflect genuine differences in the seasonal calendar.

In one area, Mtonda/Ntcheu, the enumerator reported that there were no input suppliers in the market. In Luchenza, the enumerator reported that he had not been trained in the input survey, so was not collecting data.

There were also comments about the reporting of data, with more indication than for the FCMPRMS that AESU was not collecting data were regularly from enumerators.

As previously, refresher training on the methodology is required.

It is recommended:

That the periods for data collection be clarified, to determine if they need to be changed for different locations, or remain standard across the survey. This may depend on the crop profiles of areas.

That stakeholders consider moving to remote data collection for the inputs survey from the headquarters of multi-outlet agro-input dealers, supported by periodic spot checking through the use of resources freed up by not conducting the data as an enumerator survey.

3.3.1.3 Supervision of Enumerators

AESU reported that it has not been able to regularly supervise enumerators, due to resource constraints. The COM 2009 indicates that supervision should be quarterly, but this was not possible in 2012. A car was supposed to be allocated for AESU supervision, but no transport was available, which has constrained the supervision.

The supervisory reports for 2008 and 2009[22] indicate a range of issues concerning supervision, many of which are apparent in the survey conducted for this report. There is concern that some enumerators may not actually visit markets in the periods that the different surveys require. This would be easily hidden by fabricating results or would show in missing results for particular weeks.

Because uncovering the degree of fabrication of results is difficult, it remains a suspicion. Nevertheless, stakeholders who use the data reported that they suspect there is some fabrication, as the results differ from their own surveys. Arguably, this is not sufficient evidence to draw such a conclusion, as discrepancies could be a function of the other party's method and implementation, but it is indicative because AESU

supervisory reports also contain the same suspicion. Farmers and traders reported that some enumerators were very visible and regularly attended the markets, but others noted that they did not see the enumerators every week. Again, this feedback is not conclusive, as the enumerator may have a valid reason not to attend the market (sickness, leave, assigned to other duties) or may not have been noticed by the traders, but it is indicative that there may be a problem of attendance to be addressed.

The data for maize for August to November 2012 give some insight into the degree of missing values. It is presumed that maize would be available in all markets for all weeks.

The considerable jump in missing values in September was due to assignment to other activities, such as Farm Input Subsidy Programme registration and distribution.

If five enumerators were missing, this would equate to 7.0% of the possible maximum values. The other reason for missing values is limited phone airtime at AESU, which means that even if enumerators collect the data, AESU does not retrieve the data from them that week. It is unclear to what extent the missing data is attributed to noncollection by enumerators or nonretrieval by AESU. Both are likely to be factors.

According to AESU, when the data come later by subsequent phone calls or by post, the data are recorded in the AESU records, but the monthly published data sheets are not reissued. Issuing a monthly data sheet provisionally and then in final version after a small elapsed time would reduce some of the data gaps.

However, it is evident that supervision falls short of the required level and that some of the noncompliance with the COM 2009 methodologies could be addressed by more regular supervision visits, particularly to enumerators who are regularly missing values in their data reporting, or are providing inconsistent data.

On a separate issue, the DADOs appear to be using the enumerators for other activities. One enumerator was operating more like an AEDO which negatively affected his enumeration activities. Other stakeholders noted that demands on the enumerators might be taking them away from their core roles.

It is recommended:

That the supervision of enumerators be given greater priority, including sufficient resources. This might include working with the DADOs who regard supervision as AESU's sole responsibility.

TABLE 1 Missing Values, Maize, August–November 2012

Month	Missing values	Possible maximum values	Percentage
August (5 weeks)	94	360	26.1%
September (4 weeks)	147	288	51.0%
October (4 weeks)	94	288	32.6%
November (4 weeks)	91	288	31.6%

Source: Extracted from monthly reports published on MoAFS website.

That the necessary stationery be made available to the enumerators to ensure accurate data completion.

That a system of spot checks be instituted to determine if enumerators are providing false data.

That a system that incentivizes and rewards accurate and timely collection be instituted.

That arrangements be made for dedicated allowances for enumerator transport from the local budgets for them to access interviewees. In the absence of sufficient resources, it would be better to scale back data collection activities to those activities that can be fully resourced.

That the role of the enumerators regarding the DADOs be clarified.

That monthly data issued be marked as provisional, with the updated versions (with data gaps filled) issued within a short period once more data are collected by phone and post, reducing the number of gaps.

3.3.2 Data Management

The interviews with AESU and other stake-holders highlighted a number of issues about data management, covering data retrieval from enumerators, data entry, data checking, and data storage.

3.3.2.1 Data Retrieval

AESU and the enumerators indicated that data were not always retrieved on a weekly basis, which they directly attributed to insufficient budget for airtime to call all enumerators each week (MK 84,000 (US$240)/month).[23] Across 72 enumerators, this equates to approximately US$3.33 per enumerator per month. Three surveys are reported weekly, with the other two biweekly, at least for part of the year. This equates to approximately US$1/survey/enumerator/week to retrieve data, which is insufficient to gather all the price points for that week, even without time wasted calling back or lost connections or discussing data queries.

As well as submitting data over the phone, the enumerators are required to submit to AESU by post completed data sheets/questionnaires with the price information collected. In the past, this has proved problematic, due to the unavailability of the forms and funds for postage. It was not possible to determine whether, and if so, how extensively AESU cross checks the data collected by phone with the data submitted by post, and whether data are actually submitted by post. It is known that AESU does review the data received over the phone and queries enumerators about any considerable anomalies, such as major price changes.

3.3.2.2 Data Entry

For data entry, the AESU headquarters team is reported to have 20 staff, but only five functioning workstations, not all of which is dedicated to data entry. This means that there is a considerable imbalance in activity, as staff wait for access to a work station.

3.3.2.3 Data Storage

It was reported that the AESU computers do not have anti-virus software or a full backup system, making the AESU database vulnerable to catastrophic loss.

3.3.2.4 Data Dissemination

FEWS NET has provided AESU an Internet link so that AESU can send data more immediately and avoid using memory sticks, which can carry viruses. While this support has been beneficial to both parties, AESU still has very limited Internet access. Inestments for AESU's internet access is required as that would widen the unit's data retrieval and dissemination opportunities.

It is recommended:

That additional resources be made available for data retrieval from the field, or that an alternative form of data submission and retrieval be used.

That the method of data submission and retrieval by phone and posting data sheets be reviewed to determine if more cost-effective, timely, and efficient methods are feasible (see Section 4). It is anticipated that the identified solution is likely to involve some Internet access.

That additional resources be made available for computer work stations, anti-virus protection, and backup facilities.

3.3.3 Data Dissemination

At present, data are disseminated primarily through the FNSJTF-TS, who have been posting the FCMPRMS on the MoAFS website (www.Moafsmw.org). This posting is relatively up to date, about two to three weeks after collection, but this would appear not to be sufficiently up to date for the data to be of use to market players, who require more immediate data to make decisions, such as the price today/yesterday.

The MoAFS website has data from the inputs survey, though the data sheets for September do not cover all the items on the input survey. The consultant was unable to locate data from the horticulture, livestock, and farmgate surveys on the MoAFS website, or to find data for the retail crops and inputs surveys prior to August 2012, which may suggest that there is an archiving issue. Policymakers, planners, and researchers need time-series data that they can easily retrieve.

The use of a website has made the published information relatively easy to retrieve. Prior to the website's establishment, data from the five surveys were circulated periodically by email to subscribers.

When IDEAA was active through MACE, there was regular dissemination of AMIS data by radio and SMS. It is unclear if AMIS data are currently being disseminated through the radio, but the data are not being sent via SMS. According to AESU, the phasing out of MACE has affected data quality, timeliness, and dissemination.

It is recommended:

That the MoAFS website be expanded to contain data from all five surveys, and that prior survey data be made available so that users can access the historical archive of data.

That radio be more regularly utilized for disseminating data to farmers.

3.4 ALTERNATIVE SOURCES OF INFORMATION

As part of the study, stakeholders involved in providing market information were interviewed, including the former Director of IDEAA, about MACE (which is no longer operational), the ACE, and M-MLI. Together, these groups operate the Esoko system, which is providing price information, and Auction Holdings Commodity Exchange (AHCE), which intends to disseminate market price information to a range of users. This section reviews these past, current, and potential providers as alternative and complementary to the AMIS data.

3.4.1 IDEAA/MACE

No formal review of IDEAA and MACE or published documents were available to the consultants, so it is difficult to assess their effectiveness and potential.

According to interviews, MACE had 40 of its own enumerators in 13 markets where data were being

collected and sent back to farmers working though the Telecom Networks Malawi cellular network. MACE also offered price information gathered for eight agricultural commodities in 38 markets through AMIS enumerators. MACE and AMIS enumerators could upload information into an automated database. MACE provided AMIS enumerators an allowance of US$20/month for airtime and was satisfied with the response of the enumerators in terms of data quality and motivation.

Farmers, traders, and any other interested party could inquire about prices through the automated database by texting the name of a product and market. A charge was made per inquiry, though usage levels, fee income, and user satisfaction with the data could not be determined.

AESU believes that MACE was helpful to farmers, providing them with market information particularly through weekly radio programs with national coverage. The farmer FGDs conducted for this assignment confirmed that farmers were aware of the information from IDEAA.

It was reported that IDEAA's and MACE's direct engagement in market linkages ultimately resulted in its closure, as it started purchasing from farmers, but failed to sell or get paid for what it had sold, including by GoM. IDEAA and MACE also did not raise sufficient income from subscriptions to the SMS service it provided.

AESU notes that after MACE was phased out and AESU capacity building in the use of the technology was completed, IDEAA did not hand over to AESU the technology or equipment, such as the server, so the dissemination of market prices via SMS could not continue.

Ideally, AESU would like to continue with the MACE model to try SMS and web-based systems for data transfer and dissemination.

It should be noted that MoAFS was actively supporting MACE and IDEAA. In the future, MoAFS should consider concentrating its information-related investment through a single structure or mechanism, rather than than running parallel approaches that are not fully integrated.

3.4.2 ACE/M-MLI/Esoko

ACE is a not-for-profit agricultural commodity exchange facilitating trade in the physical spot and forward markets. ACE has an online trading platform where market participants can post offers to sell or bids to buy. When the bid and offer match, a trade is concluded by the ACE team.

The online platform is now linked to a Warehouse Receipt System (WRS), where market participants can access finance and markets. This activity is supported by M-MLI, a United States Agency for International Development-funded multi-country project started in 2009, originally operating in seven countries, but under a separate extension in Malawi. M-MLI was designed to strengthen two weak links in the crop value chain. First, by supporting the establishment of strategically located grain-bulking centers, and second, through a financially sustainable real-time market information system (MIS) to help farmers and traders make better decisions about when to trade.

To fulfill this second objective, M-MLI brought in the Esoko communication platform (www.esoko.com).[24] After Esoko was established, M-MLI transferred the management and promotion of the Esoko network to ACE. For the last 18 months, ACE has placed its own enumerators in 28 markets to collect weekly prices using an established sampling methodology whereby

prices are uploaded immediately ACE's Esoko account via mobile phones.[25] Once uploaded, the prices go to an approval screen, where the ACE Enumeration Manager reviews them for anomalies, such as large price changes and obvious errors. The manager can call an enumerator to check if an anomaly is an entry or calculation error or if it is correct. If there is still a doubt, the manager can call key informants in the markets to verify prices. ACE has weekly price reviews where staff look at all markets to detect any unusual data that should be checked. Once a price is verified as being correct, it is approved and becomes visible on ACE's website and is distributed via SMS according to subscriber requirements. The data are not aggregated.

Currently, 2,000 users receive SMS alerts when the new prices on commodities are available. These users pay US$0.60 per month to receive the alerts. It is not clear who the actual users of the platform are. The consultant's view is that users would most likely be traders (even if some of them are also farmers), larger farmers, and farmer associations. It would be useful to obtain a full profile of users. In the consultant's view, smaller farmers would probably still rely mostly on information from "friends," as indicated in the farmer FGDs, if their behavior were consistent, since these are accessible trusted sources, available at low or no cost.

Esoko is looking to partner with mobile networks to make information available through networks.

3.4.3 AHCE

AHCE is part of Auction Holdings Ltd., which exclusively manages Malawi's tobacco auction. AHCE is a new subsidiary that intends to operate for a range of commodities, other than tobacco, deposited at ADMARC warehouses rented by AHCE. AHCE will offer a bid/offer system through brokers, with prices displayed on a website, at the warehouses, sent by SMS and via print and broadcast media. The modalities for all of these are not yet clear.

AHCE will offer a call-in service automated for prices of various crops based on data through the trading platform recorded sales. There will be other methods to access historic time-series data and other agricultural information, such as information on disease outbreaks, and subsidy meetings will be available.

AHCE will be funded by broker membership fees, commissions on sales, and fees from data access. AHCE is not yet operating the system and has a number of issues to work through. AHCE is seeking to draw on its experience in tobacco, where the information is very detailed, though compiling the data depends heavily on the monopoly status of the market through which trades need to be made.

3.4.4 Lessons from Alternative Systems

The experience of IDEAA and ACE/M-MLI/Esoko and the plans of AHCE have some common features:

1. The services have limits in terms of markets and products that are covered—additional coverage requires additional resources.

2. Cellular and web/Internet access technologies enable uploading of data and have the potential for distributing real-time to users—real-time information seems to be valuable, but older information is not so valued by those transacting in a market.

3. Some users are willing to pay a fee for information, though the potential number of users, the revenue potential, and how long users will continue to use the services is unclear. This is likely to depend on the information's reliability and its advantages for

those who have information they cannot obtain from other more reliable and/or cheaper sources.

4. MIS is accompanied by other services that may have greater revenue potential, allowing a degree of cross-subsidy, with information as both a by-product and a necessary component in transactions.

The above give some guidance for how AMIS might move forward. Currently, AMIS information is not accessible to farmers and traders, nor is it timely enough to be of real value, even if it were accessible.

A partnership that integrates private-sector technology with AMIS data collection would move market information to a real-time system that the private sector could continue to provide to users for a fee (as appropriate). Data that are no longer current (i.e., that have been replaced by more up-to-date information for that product or market) could be sent to MoAFS to determine how to utilize and disseminate the data. In this model, the private sector would get additional data collection points and so have more real-time information to sell, while MoAFS would have access to real-time data, more reliably collected that it could then use and/or sell to FNS and other data users who do not demand real-time data.

It is recommended that:

MoAFS discuss with ACE/M-MLI and AHCE the opportunities for collaborating on data collection and dissemination, potentially combining the market coverage of AMIS enumerators with the technology of the private sector to provide real-time information to traders, farmers, and consumers who want the data. Under this system, MoAFS would have control of the data sets for use by MoAFS, GoM, and other FNS stakeholders.

4. Relating the Purpose and Use of AMIS to Technological Options

The ToRs (Annex 1) require the consultant "to assess proposed technology options based on the review and revision results." As noted in the methodology (Section 2), the consultants do not have a technological background, and the inputs to this section are based on the views of stakeholders and are related to the AMIS review in Section 3. Based on the AMIS review, the choice of technologies should be guided by the inter-relation of two factors:

1. Why the data are being collected.
2. How to ensure that the minimum level of quality of data required for the stated purposes is delivered as cost effictively as possible.

4.1 AMIS DATA SYSTEM PURPOSES

As described in Section 3.2, AMIS data are currently used for FNS-related decisions, trade-related decisions, and monitoring and reporting activities. The consultants found that AMIS data are used for:

1. Decisionmaking by GoM and FNS development partners on FNS interventions.
2. Decisionmaking by GoM on market interventions, such as minimum price setting, domestic market restrictions, and export/import restrictions.
3. Researchers working in the agriculture sector.
4. Monitoring of MoAFS policy and strategy implementation, specifically the ASWAp Strategic Plan.
5. Profiles of Malawi's agriculture prepared by international organizations.

Although AMIS data are stated to be targeted at farmers and traders, the feedback suggests that these groups do not use the data for trade-related decisions, such as where and when to buy or sell. Section 3.4 sets out alternative providers of market price information, but notes that the only current operational system (from ACE/M-MLI through Esoko) reaches just a small number of farmers/users (about 2,000). The potential for the Esoko system is likely to be much greater, and the planned system from AHCE will also increase access by farmers to real-time market price information.

4.2 AMIS STRATEGIC OPTIONS

Given, the purposes of AMIS, its broad strategic options are:

1. Leave the collection and dissemination of market data to private-sector "market" players who will allow data collection and dissemination to progressively grow, and focus on providing data for the five sets of uses highlighted above.
2. Take steps to address the deficiencies in AMIS data that lead farmers and traders to use other information.
3. Find a hybrid option that merges the data collection resources of AMIS in 200 markets with the private sector's data collection in fewer markets, and harnesses the real-time capability of the private sector's new technology platforms.

Following are brief assessments of these three strategic options.

4.2.1 Option 1—Let the Private Sector Do the Job

This market-based solution benefits from private-sector investment providing relevant information in a manner that is accessible to users. This service.is potentially sustainable if its demand is great enough relative to its costs. However, the private sector is likely to focus on a more limited range of markets and products than AMIS currently collects, and will target farmers who are willing to pay for the information. This would be the case in the immediate term, but over time, if the model were effective, it would most likely expand its coverage. While having two competing systems is likely to drive

innovation, it could also make this option less viable for both systems. AMIS could focus its efforts on meeting the needs of other stakeholders.

4.2.2 Option 2—Correct AMIS Deficiencies

This approach would maintain wide coverage of markets and products, but would need to find a method for delivering timely, easily accessible data to farmers and traders that enables them to make better decisions. This would probably mean investing in a license to use the Esoko platform or a technology similar in performance to Esoko or other cellular-based platforms, to speed data collection and dissemination. In essence, this model would compete with the private-sector provision.

4.2.3 Option 3—Create a Hybrid Approach

For this option, the considerations are whether there is scope for synergy and what the partnership would look like. It is possible that all the players who are interested in market data could agree on a common data collection methodology, standards, and quality control that are necessary, but realistic and feasible. GoM could focus its collection resources on supporting less-served markets and collecting data on products that the private sector is not interested in. The private sector could provide access to its technology and marketing. GoM could provide access to radio for weekly dissemination, with more specific and timely information provided to subscribers.

Following presentation of the draft report and discussion with the stakeholders, it was agreed to pursue option 3 as a first choice to see if a partnership is possible.

4.3 AMIS DATA SYSTEM METHODOLOGY

The methodology choice flows from the data system's purposes. The methodology issues were raised in earlier sections, as there is a need to consider the data qualities that different uses require.

A very significant choice is between data for farmer/trader trading decisionmaking and most of the other five current uses highlighted above. If the choice is to seek to provide data for farmers/traders for trading decisions, then there is a likely requirement for moving to a real-time data system that is likely to be cellular and web-based, with uploading of data from the field, to be checked and released centrally. There would still be a case for broadcasting on the radio, though the broadcasts would probably be tailored to localities through local radio, given technology-literacy challenges. From this real-time system, other data could be aggregated or the data could be provided in their original disaggregated form for other users to analyze.

There are still significant data collection choices to be made, as highlighted in Section 3.3.1.2. The current surveys need to be reviewed to check if the methodology is delivering what is required and if the overall demands on enumerators are reasonable and not leading to shortcuts or even fabrication of data. These issues are discussed at length in that section and in section 3.3.1.3 on supervision.

One benefit from technology is that it allows for better monitoring of the activities of enumerators, through observing the patterns of data entry and even monitoring from where the data were entered. For example, entry of all the data at one time might be suspicious, rather than entry of the data in batches each day as the data are collected, or if the data were entered from Lilongwe, when the enumerator was supposed to be in Ng'abu.

Other benefits from technology are standardization of entry (by restricting the fields) and particularly the immediacy of entry. Non-entry within a prescribed period should lead to a supervisor contacting the enumerator to find out what the issue is.

4.4 TECHNOLOGY OPTIONS

The areas where technology has a role can be split into data collection, data management, and data dissemination.

4.4.1 Data Collection

Data collection is the area where most AMIS activity takes place and where the challenges with data quality arise. This is probably the key area where quality and efficiency can be improved.

The vast majority of Malawi's trading centers and markets are covered by at least one cellular network, meaning that even basic cell phones can be used to send and retrieve data. The use of a MACE-type or Esoko-based platform for data capture would seem to be the most obvious improvement. It was not possible to obtain details about the system used by MACE, but it appears to have been a basic SMS-based system for entry and retrieval. Esoko offers remote data entry and management (approval before disseminating), but it is important to recognize that this type of cloud/network platform is available from a range of providers.

The main advantage of Esoko is that it is already operational and is being promoted by ACE and M-MLI, which means there are some synergies with their existing activities and with other potential uses that might arise. Focusing on a single platform allows those synergies, but there is also a danger of capture by a single proprietary technology that might ultimately prove to be both expensive, if the provider extracts considerable user fees, and unsustainable, if the technology is insufficiently flexible for future that uses are not yet determined. Technologies can very quickly become redundant. This happened with Malswitch and Net1's universal electronic payment system technology, which very rapidly became out of date, yet Malswitch was locked in. The key for MoAFS would be to ensure that it does not become committed to a system that it cannot move on from as needed.

Accessing such platforms generally requires some form of smart phone or a tablet device that is appropriately enabled. This is likely to be a considerable up-front investment, as well as the costs of repairs and replacements. With advancing technologies, it would require regular updating and replacing, committing GoM to operating an obsolete technology or continuing to update. It also requires sufficient budget for data to be submitted in the appropriate time periods.

Essentially, using cellular technologies for data entry would enable real-time (or at least daily) submission of data by the enumerator, rather than the current weekly call that is not always possible.

It is important to note that the use of SMS alerts is partly linked to the need to find a charging mechanism for information. As technology is evolving, an increasing number of users will be able to use phones to access web-based data through active search, rather than receiving information generically requested through alerts.[26] This moves users from passive recipients of information that comes in, to retrieving information when they want it. Alerts and retrieval can be combined, so that the alert advises users that there is new information on the areas that they have specified as being of interest. Whether the provider charges for access to the information is a matter of choice. It would be possible to make the information available at no cost, or to charge a fee for actively accessing information. At this time, providing a web-based platform where users can retrieve data when they want the data appears to offer many advantages and reflects trends in developed countries. This issue needs examination by appropriate technical experts.

4.4.2 Data Management

The use of cellular data entry would imply a shift in resources from data entry centrally to data entry remotely, with the central resource playing a verifying role to check and approve data to show on the system

to external users. The implication is that fewer people would be needed at headquarters for the data entry.

The actual database and platform would be held and managed by the provider, but as it is understood, the rights to the data would remain with MoAFS and/or the partnership, as would be specified in the partnership agreement. Part of the cost of the system would be for renting "cloud" space. Accessing the cloud to enter, amend, analyze, and disseminate would occur through a web-based application requiring additional computing and more substantial Internet access than at present. The release of the headquarters staff from data entry could result in expanded data analysis and dissemination.

4.4.3 Data Dissemination

Dissemination needs to be considered in the light of the information and the user.

The challenge for MoAFS in seeking to target farmers is that AMIS data have lost their currency and value in the time it takes for data collection, entry, and dissemination. If farmers and traders are to be a target group, then they need both real-time collection and real-time dissemination. Using SMS is likely to be a requirement to achieve this for the immediate future. Although radio is a good medium to reach farmers in general, the amount of data to be disseminated daily could make this approach impractical, as it would demand considerable broadcast time and filtering so that data relevant to a locality are broadcast on local radio. Realistically, SMS would be the most effective way of disseminating data to interested farmers, traders and consumers. There are other methods of dissemination, but most of them have not been very effective, such as through the AEDOs and DADOs.

If MoAFS decides not to target users who need real-time information (which would be through a web-based platform), then a simple website is probably the most efficient and effective way to reach the other users, as they want to retrieve relatively large amounts of information over a period of time for compiling analysis, reports, etc. A website would be useful to Malawi-based and internationally based users. The MoAFS website could already do this, if it had the necessary archives and if users could easily navigate to the data they want.

4.4.4 Sector Management Information Systems

The consultants were invited to review a Norwegian initiative that has been utilized in Malawi's health sector, called District Health Information Software 2 (DHIS2). This system appears to be a management information system rather than a market information system. It gathers data from a range of sources and integrates the data to enable management decision-making. This is potentially a valid approach to take for management information, but the DHIS2 is well beyond the scope of what is needed for a market information system, even if it shares some of the features that have been discussed, such as remote entry via cell phones and use of clouds.

The challenge for any management information system is integrating a range of different data sources and types and converting them into useful analysis for use by management and other users. AMIS is more about collecting and disseminating data in a relatively raw and unprocessed form for users' analysis. In that sense, the information on DHIS2 suggests that it is more highly functional and specified than the apparent requirements for AMIS.

It is important to note that these options are items on a technology menu that need to be reviewed by experts. However, it is important that MoAFS and stakeholders make some key choices as to the mandate of AMIS, who it is targeting, and whether and how it will work with other stakeholders before technology options become clearer.

5. Institutional Arrangements

The ToRs requested the consultants to: "Outline institutional adaptations and longer-term investments to implement and maintain the "new" AMIS, for input to the SMP." As noted in the methodology, the input from the consultants is limited to issues that have come out of the review of the AMIS operation, rather than a full institutional review, which will be undertaken by the SMP consultants.

The key issues that arise from the review of AMIS are:

1. Relationship between SU and NSO vis-à-vis survey methodologies, coordination, reporting, and linkages.

2. Relationship between SU and the ADDs/DADOs vis-à-vis oversight of enumerators and supporting resources.

3. Relationship between AESU, the private sector, and development partners vis-à-vis real-time information for trade decisions by farmers and traders.

5.1 MOAFS'S SU AND NSO

Most of the SU and AESU team members are statisticians seconded provided to MoAFS by NSO under the common service arrangement. This should enable a good working relationship and common understanding of issues, particularly around methodologies.

As noted in Section 3.3.1.2, the consultants recommend that MoAFS review the AMIS survey methodology to determine if several of the key features can and should be revised, such as the number of trials and the coverage. NSO could support such a review by providing its expertise on survey methodologies. NSO currently implements market surveys through its economic department to gather data, such as for the consumer price index. NSO recognizes the wide coverage of the AMIS survey and sees opportunities for coordination.

There are potential synergies, if there could be an agreed-upon common data collection methodology. This could allow coordinated collection and reduce duplicative activity, and would make data much more compatible and comparable. One example of different methods is that NSO enumerators buy the produce they are measuring. This approach has methodological advantages, as it is allows the capture of the extra produce that can be given as an incentive to a customer and overcomes trader reluctance; however, it can create other issues. The biggest issue is the considerable cost of purchasing so much produce every week across 72 or even 200 markets, as well as what happens to the produce once purchased. There is a logistical issue of making sure that the funds are available to enumerators every week and are not diverted along the way, and that all spending is properly accounted for. Although buying is a more robust method to get a "market" price, as it can measure actual purchase price,[27] it presents very significant challenges that probably outweigh the benefits.

Some stakeholders suggested that NSO should have greater independence within GoM and that it should have the leading role in the preparation of and methodologies used for agricultural statistics. This issue is beyond the scope of this study.

5.2 SU/AESU AND THE ADDS/DADOS

At present, there are 197 enumerator posts in the field, working in all the ADDs. The enumerators are supposed to receive transport and allowances for their fieldwork through the DADOs. However, the survey found that this was mostly not the case.

Blantyre ADD views the enumerators as being AESU's responsibility. However, it appears that some of the enumerators are drawn into other ADD- and

DADO-related activities. As noted, one enumerator appeared to be also playing a role as an AEDO, while others were asked to undertake other activities in their locality, such as work on the APES.

In addition to supporting resources, this relationship could address issues of basic supervision, with some assistance from locally based officials to ensure that the enumerators at the very least attend markets when they should. There is also the issue that the ADDs and DADOs do not appear to be using the data enumerators submit.

It is recommended that:

AESU clarify the role of its enumerators with the necessary authorities within MoAFS, as well as with the ADDs and DADOs.

5.3 AESU AND ITS PRIVATE-SECTOR AND DEVELOPMENT PARTNERS

As AESU wishes to disseminate data to farmers and traders, then there is considerable scope for a partnership with development partners and the private sector. ACE and M-MLI are projects funded by development partners licensed by Esoko, a commercial entity, to use its platform. The ACE/M-MLI partnership has a data gathering, management, and dissemination technology and system that is operational and of potential interest that could be the subject of a partnership approach.

There is also AHCE, though at this point it does not yet have an operational information system and several aspects still need to be designed. This may present future opportunities for partnership. Also, other private-sector providers may be emerging in due course.

Section 4 highlighted that three broad options for AESU in relation to whether it wishes to provide data to farmers and traders for real-time trade-related decisions. Stakeholders agreed that the more constructive option would be to partner with the private sector to create a more integrated approach.

6. Way Forward

As the SMP is being developed, this would be a good time to review the AMIS methodology for each survey to determine if it can be improved to address quality issues and resource constraints. This review can and should cover whether these are the right surveys to be conducting, whether they cover the right markets and products, and whether the method could be revised to improve efficiency while not significantly affecting quality. Although a common response to resource constraints is to argue for more resources, it is worthwhile to review if the right activities are being undertaken, by the right people, in the right way to achieve the desired results. A highly focused, efficient, and credible AMIS is more likely to yield good results than a system that has reliability questions and operational inefficiencies due to trying to do more than its resources allow.

The main challenge for improving the quality and extending the range of data collected and disseminated, including beyond market-related data, is that of resources, as AESU is already very stretched in meeting AMIS's current data requirements. The issue of confidence in production data is a matter of concern, but beyond the scope of this study. It is an important issue for the SMP team to address, as lack of confidence in one key area of agricultural statistics can spill over into a general undermining of confidence in the use of agricultural statistics for policy, planning, and program decisionmaking.

The collection frequency and product coverage need to fit the purposes (and needs of) the target groups, the resources that are realistically available, and the methodological minimum requirements, rather than ideal requirements. It would make sense to review the methodology for each survey in the light of these issues.

There is little indication that traders utilize AMIS data for trading activity. Instead, they have developed their own methods for collecting price data when they need it, mainly through establishing a network of contacts with other traders (for the bigger traders) and friends (for the smaller traders).

Although price information is important in farmer and trader decisionmaking on where to buy and sell, they also consider the other costs in selling (transport) and the risk of not selling or not buying enough. Their ability to choose particular markets is also constrained by available resources and other factors. For farmers, price is important, but it is not the sole or even most important factor in deciding where to sell. For traders, price is more important, and they would most likely value the AMIS information if it were accurate and real-time.

Farmers who were buying and/or sellers generally accessed a range of sources of information on market prices, rather than only one source. If they used only one source, it was "friends." They actively sought Information through face-to-face discussion and phone contact at the time a transaction was planned. They used and relied more on data from private sources than data from any other source.

AMIS data are used and valued for FNS assessments to identify potential problem areas where prices indicate a significant imbalance between supply and demand, and for purchasing decisionmaking. Many of the interviewees were concerned about data reliability and completeness, and some requested more timely information. The data users undertake further analysis and bring in other data sources, including gathering primary price data. Providing additional and tailored analysis could be an appropriate role for AESU, if it is appropriately resourced.

International bodies, other parts of GoM, and researchers use AMIS data for a range of reporting and monitoring activities. However, they expressed doubts about the quality of the data, even though they are using the data. These stakeholders would like other data to be available and improved, particularly production data, and have an interest in improving

agricultural statistics generally, including initiatives by FAO to standardize the data collection and processing with its international requirements. Ensuring that there is broad confidence in all agricultural statistics is important, as lack of confidence in some statistics, such as APES, undermines confidence in the whole agricultural statistics arena.

Key issues to be addressed are AMIS's mandate, purpose, and primary target groups. While an ideal response might address the full range of uses and users identified, it is clear that this would require considerable additional resources and/or a change of model, as AMIS is not reaching one of its key stated user groups (farmers and traders). As alternative providers of market information are emerging in and around the private sector, it is appropriate to decide whether AMIS will cease to try to address this set of users (since it is not able to assist them in the way it is currently structured), compete with the private sector, or find some means to collaborate with all parties playing to each other's strengths.

How MoAFS moves forward depends on its mandate. The consultants were asked to propose a mandate for the future AMIS, which is proposed for discussion by the Agricultural Statistics Forum:

The mandate of AMIS is to provide the Ministry of Agriculture and Food Security (MoAFS) with accurate and timely market price information for selected agricultural commodities and markets to enable better decisionmaking and monitoring of MoAFS's policies and strategies. AMIS will also inform other ministries and governmental bodies for food and nutrition security (FSN)- and market-related decisions, policies, and strategies. Finally, AMIS will collaborate with nongovernmental bodies to create a constructive partnership to provide real-time market price information to meet the needs of key stakeholders (traders and farmers).

It is possible to envisage some sort of partnership where private sector technology and current data collection is integrated with the AMIS data collection. This would move market information to a real time system that private sector could continue to provide to users at a fee (as appropriate). Data that is no longer current, meaning it has been replaced by a more up to date piece of information for that product/market, could then pass to MoAFS to determine how to utilise and disseminate it. In this model, private sector would get additional data collection points and so have more real-time information to sell, while MoAFS would have access to real time date, more reliably collected that it could then use and/or sell on to FNS and other data users that do not demand real-time data.

The report contains recommendations relevant to each section. These are summarized here for convenience, but readers should review the sections relating to each recommendation so as to determine the context and arguments behind each.

It is recommended:

Mandate:

That the current mandate and target group of AMIS is determined and explicitly stated, so that its design, resourcing, and implementation are aligned with a clear mandate.

Methodology:

That the SU/AESU review the benefits of data collection from markets that are not consolidated into the AMIS and for which data are not disseminated or available to users, with a view to increasing the number of markets on which data are consolidated and disseminated.

That AESU determine if reducing the number of trials to two or even one per day would significantly weaken the robustness of the collection method and the data.

That AESU review whether the workload for each survey and for the five surveys in total is realistic and/or whether it is encouraging enumerators to falsify their results to meet their workload requirement. This should

include consideration of what incentives are necessary to motivate and supervise the enumerators to a good job.

That AESU review whether weekly collection of data is appropriate or whether a less frequent biweekly interval would be sufficient for the purposes for which the data are actually being used, in that farmers do not appear to be making widespread use of the data for market selection and timing decisions.

That the periods for data collection be clarified, to determine if they need to be changed for different locations, or remain standard across the survey. This may depend on the crop profiles of areas.

That AESU review whether the range of products for which data are collected should be narrowed to enable collection of priority products to a higher standard.

That the Livestock Wholesale Market Survey method be thoroughly reviewed to clarify what is intended to be measured and how best to collect the data. If this is live weight of animals being traded, then appropriate equipment is required, along with resourcing to get enumerators to the points of sale as and when sales are taking place. What is being measured at present is wholesale prices for butchery.

That any revisions to the method take account of both the practical difficulties of collection at livestock selling points/markets, usually early in the morning, the limited resources available, so that any collection is feasible.

That stakeholders consider moving to remote data collection for the inputs survey from the headquarters of multi-outlet agro-input dealers, supported by periodic spot checking through the use of resources freed up by not conducting the data as an enumerator survey.

That the farmgate survey method be thoroughly reviewed be to clarify what is intended to be measured and how best to collect the data, bearing in mind that there are many types of "farmgates." If measurement is only of remote markets, then it would be better to change the name from "farmgate" to something like "remote-market/buying point" prices. It would then also be useful to define what is classed as being "remote," so that it includes buying points that fit within a clear set of criteria.

That any revisions to the method take account of the practical difficulties of collection at remote markets, and the limited resources available, so that any collection is feasible.

Field operations:

That AESU clarify the role of the enumerators with the necessary authorities within MoAFS as well as with the ADDs and DADOs.

That AESU re-emphasize the importance of AMIS data to MoAFS officials, so that they may assign enumerators to other duties appropriately.

That a refresher course be undertaken following any revisions to the methodology that might occur following this review.

That induction training be conducted before or at the point of deployment of new enumerators, and that manuals be provided to all enumerators at this time.

That all enumerators be provided with measuring equipment.

FNS stakeholders:

That SU/AESU discuss with its key FSN data users, such as FEWS NET and MVAC, the format and presentation for sharing data and any common analytical tasks that it could undertake that would benefit most users.

That SU/AESU discuss with those who are gathering primary price data, such as WFP, how this activity can be coordinated to achieve the best results for all parties.

MoAFS consider how SU/AESU could be resourced to undertake tailored analysis as a potential revenue source.

Resources:

That additional resources be made available for data retrieval from the field, or an alternative form of data submission and retrieval be used.

That the method of data submission and retrieval by phone and posting data sheets be reviewed to determine more cost-effective, timely, and efficient methods are feasible.

That additional resources be made available for computer work stations, anti-virus protection, and backup facilities.

Data dissemination:

That the MoAFS website be expanded to contain data from all five surveys, and that prior survey data be made available so that users can access the historical archive of data.

That radio be more regularly utilized for data dissemination to farmers.

Public-private partnerships:

That MoAFS discuss with ACE/M-MLI and AHCE the opportunities for collaborating on data collection and dissemination, potentially combining the market coverage of the AMIS enumerators with the technology of the private sector to provide real-time information to traders, farmers, and consumers who want the data. Under this system, MoAFS would have control of the data sets for use by MoAFS, GoM, and other FNS stakeholders.

Kadale Consultants Ltd.
11 Jacaranda Avenue
P.O. Box 2873
Mandala
Blantyre
MALAWI

kadale@africa-online.net

Tel ++ 265 (0) 1 872933
Fax ++ 265 (0) 1 872933
Cell ++ 265 (0) 888 / 0999 832760

Kadale: "A small thing blessed for service."

ANNEX 1. Terms of Reference

The current assignment forms part of the early actions on the Agricultural Market Information System (AMIS), which are implemented as part of the program for Strengthening Evidence-based Decision Making in Malawi's agricultural sector. The lessons learned from the assessment and implementation of technical solutions and capacity building efforts within the AMIS early actions are expected to contribute directly to the transformation of Agricultural Statistics (AgStat) in Malawi, and the development of a Strategic Mater Plan (SMP) for the agricultural sector.

AMIS currently consists of five surveys, conducted on a regular basis: the Field Crops and Meat Products Retail Market Survey (FCMPRMS), the Horticultural Crops Retail Market Survey (HCRMS), the Livestock Wholesale Market Survey (LWMS), the Farmgate Survey, and the Agricultural Input Market Survey (AIMS). Two of these surveys have seasonal frequency. AIMS takes place only two to three times per year, while the Farmgate Survey is carried out only during the harvest season. AMIS is implemented by the Agro-Economic Survey Unit (AESU) of the Ministry of Agriculture and Food Security.

The overall objective of the assessment is to adapt the current AMIS to the current needs of key stakeholders in order to provide relevant information for Agricultural Sector-Wide Approach (ASWAp steering). The assessment is divided into three parts. The first part focuses on the review and revision of the AMIS mandate and purpose. The second part will assess proposed technology options based on the review and revision results. The third part will outline the required institutional adaptations and longer-term investments to implement and maintain the "new" AMIS. This last part will be an especially important input to the SMP.

The specific objectives of part one include:

- *A critical review of the AMIS's original mandate and purpose and its current function;*
- *A review of other market information systems/provides, including but not limited to the Malawi Agricultural Commodity Exchange (MACE), the Agricultural Commodity Exchange (ACE), Auction Holding Ltd.*
- *Consultations with past, present, and potential future users of information provided by the AMIS, including but not limited to departments/units within the MoAFS (Food Security Unit, Trade and Marketing Unit, Senior Management), smallholder farmers, the World Food Programme (WFP), the Department of Disaster Management Affairs (DoDMA)/Malawi Vulnerability Assessment Committee (MVAC), the Famine Early Warning Systems Network (FEWS NET), the Food and Agriculture Organization of the United Nations (FAO), and so on.*
- *Based on the reviews and consultations the development of a proposal for a "new" AMIS that will meet the information requirements of stakeholders in the sector and complement already existing market information systems and identify potential information and communication technology (ICT) solutions to improve the efficiency of AMIS data collection, transfer, analysis, and dissemination.*

The specific objectives of part two will, in part, depend on the recommendations of part one. It is expected that a detailed assessment of the proposed technology option will be carried out by a technology service provider.

In the third part of the AMIS assessment, it is expected that the consultants who undertook parts one and two will work together to establish the required institutional adaptations and longer-term investments to implement and maintain the "new" AMIS.

In correspondence, the ToRs were clarified, through some questions that "may best illustrate what we need to get done":

What is the original mandate and purpose of the AMIS? What are its specific objectives, including who are the intended users of the generated information?

Over the past 3–5 years, to what extent has AMIS achieved its mandate and satisfied its consumers/clients? What are its current technical capabilities? Who uses AMIS data and for what purposes?

Should the AMIS mandate be adapted to shifting priorities expressed in the ASWAp/Malawi Growth and Development Strategy (MGDS) (agricultural diversification, development of the private sector) and changing consumer needs (who are the potential future users of AMIS)?

Are competing/alternative market information systems (e.g., ACE, MACE, FEWS NET) available, and if so, how can synergies be achieved between these and AMIS?

What are the technological options available to better serve the objectives and purpose of AMIS?

The above ToRs can be distilled into some key questions for assessing AMIS:

1. Current situation:
   a. Under what mandate and objectives is AMIS operating?
   b. Who are the key target groups for AMIS information (e.g., GoM policymakers and technicians, farmers, agri-businesses, NGOs/community-based organizations), what are their information needs, and how effective is AMIS at meeting those needs?
   c. What other sources of market information are available, how do stakeholders use these sources, and how do they compare these to AMIS data?
   d. How does AMIS gather and deliver information, and how well does it perform these functions? What constraints does AMIS face in the data gathering and dissemination process? Have these constraints been addressed and, if so, how?
   e. What issues do stakeholders report concerning the quality, timeliness, relevance, and usefulness of AMIS data?

2. Future situation:

   a. What information do the key stakeholders in GoM, farmers, businesses (buyers/processors), and other (potential) users want, in what form (media), when, how often, and, if appropriate, at what cost?
   b. What changes would stakeholders want to improve the usefulness of AMIS?
   c. How should the mandate for the AMIS change to support the ASWAp/MGDS?
   d. What technologies could be utilized to enhance AMIS performance? (Note that this is not a technical review, but stakeholders and the consultants could identify potential technologies for further review.)

ANNEX 2. Individuals Consulted

Name	Position and Organization
Isaac Chirwa	Principal Statistician and AMIS Coordinator, MoAFS
Francis Kalonga	Officer in Charge of AES Unit, MoAFS
Sekani Mfalinya	Data Entry Clerk, AES Unit, MoAFS
Joseph Msika	Data Entry Clerk, AES Unit, MoAFS
Edwin Chimangeni	Data Entry Clerk, AES Unit, MoAFS
Emmanuel Mwanaleza	Statistician, Deputy Coordinator AMIS, MoAFS
E. Mphande	Director of Agriculture Planning, MoAFS
Sam Chikapusa	Deputy Director, Planning, MoAFS
B. Ngauma	Deputy Director, Crop Production, MoAFS
D. Kachingwe	Economist, Trade & Marketing, MoAFS
L. Nkhoma	Planning Supervisor, Blantyre ADD
Randy Sibanda	Planning Supervisor, Blantyre ADD
Neil Orchardson	Technical Advisor, FNSJTF, Tec Sec
Misheck Longwe	Chief Economist, Acting Director of Planning, MoIT
Kettie Msukwa	Economist, MoF
M. O. Kachale	Economist, MoEPD
N. D. Saukila	General Manager, NFRA
Mercy Kanyuka	Deputy Commissioner, NSO
Benjamin Banda	Head of Agriculture Division, NSO
Lawrence. Mapemba	Lecturer, Bunda College of Agriculture
A.K. Edriss	Professor, Bunda College of Agriculture
Mariam Mapila	Postdoctoral fellow IFPRI
Klaus Droppelmann	Senior Program Coordinator, IFPRI
Alick Nkhoma	Assistant Representative (Programme), FAO
Lazarous Gonani	Program Officer & Deputy Director of Programme, WFP
Veronica Geresomo	Deputy Director (M&E), MoEPD
James Bwirani	Project Manager, FEWS NET
Elizabeth Manda	Project Manager, MACE
Rob Turner	Chief of Party, M-MLI
Rachael Sibande	Deputy Chief of Party, M-MLI
Edna Chamgwera	Trade & Facilitation Manager, ACE
Vincent Langdon-Morris	Senior Agriculture Technical Analyst, USAID
Teddie Nakhumwa	Economist, DFID
Olivier Durand	Senior Agriculture Specialist, World Bank
D. Chilima	Manager, AHL Commodity Exchange
Grace Mhango	Vice Chairperson, GTPA
Mphatso Nyekanyeka	Consultant, SMP

ANNEX 3. Sources Consulted

AESU/FNSJTF-TS supervision reports 2008 and 2009.

DAPS, MoAFS, Comprehensive Operational Manual under the Agricultural Market Information System, December 2009.

GTPA paper, "Improving Private Sector Participation in the Grain Trade," June 2005. Paper prepared for the Food Security Joint Task Force Technical Secretariat.

Kadale, Survey Results.

Katengeza et al. (2010). The role of ICT market-based information systems in spatial food market integration: the case of Malawi Agricultural Commodity Exchange.

MVAC, National Food Security Forecast, April 2012 to March 2013.

NSO, *Quarterly Statistical Bulletin*, December 2011.

USAID, *Frontlines*, July/August 2012.

www.acdivoca.org

www.esoko.com

www.fewsnet.org

ANNEX 4. FGD Topic Guide

TOPIC 1—CHOOSING A MARKET

1.1 For those who have come to sell, what other markets could you have gone to? (Probe)

Why did you choose this market and not the other(s) to sell in? (Probe)

What factors are important in choosing a place to sell? (Probe)

1.2 *Repeat same topics for those who are buying (e.g., inputs), if any*.

TOPIC 2—INFORMATION

What information did you have to help you choose which market to sell/buy at? *(Do not prompt about AMIS at this stage, but explore any alternatives they give, leaving AMIS to last if that is given.)*

What information do you most need to make a good decision on where to sell your produce or buy (inputs)?

Where did you get the information that led you to choose to come to this market? *(From whom, what media – probe if radio, SMS, notice boards, other farmers, others (if so who).)*

What would be a good or better source of information? *(Probe issues of what media they have access to – cell phones, offices, radio, agricultural extension staff (government, NGO and/or private), other people…. and which is best for them.)*

When do you get this information? *(NOW?)*

When would be the best time to get the information so you can make a good decision on where to sell/buy? *(Probe timeliness issues.)*

TOPIC 3—PROVIDERS

a. What information have you seen from the Government about prices? *(Probe all sources … Ministry, District, and so on.)*

How did you receive this information? *(Media, timing)*

b. What information have you seen from the NGOs/projects about prices? *(Probe all sources—IDEAA/MACE, and so on.)*

How did you receive this information? *(Media, timing)*

c. What information have you seen from the private sector about prices? *(Probe all sources … small traders, big traders, other buyers.)*

How did you receive this information? *(Media, timing)*

d. *(If not yet discussed, then check what they know about the AMIS surveys published by the Government.)*

■ **THANK PARTICIPANTS FOR THEIR HELP.**

ANNEX 5. Enumerator Interview Questionnaire

ENUMERATOR INTERVIEW – TOPIC GUIDE

Market Name: _____ Date of visit: _____

Introduce the work we are doing:

1. *Review of AMIS and how it can be improved.*
2. *Want to review the issues that enumerators face in doing their work.*
3. *Explain the planned focus group if appropriate for that market.*

1. Enumerator details

Name: _____

Date commenced enumeration in this market: _____

Was the enumerator trained prior to starting work, or some time after starting (if so when), or not at all?

Does the enumerator have the AMIS manual?

How useful was the training *(if applicable)*?

How useful was the manual *(if applicable)*?

2. Method of data collection

a. What data are collected in this market? *(Note there are five surveys.)*

b. When are the data collected? *(Day(s) of week plus frequency – weekly.)*

c. Describe the process you use to collect data for the **Field Crops and Meat Products Retail Market Survey**. *(Probe based on your knowledge of the process, as per the manual. Note any discrepancies and ask for clarification at the end.)*

Pay attention to:

1. *Method used to select the trader for sampling.*
2. *Method used for weighing the product (availability of measuring equipment, scales).*

3. *Number of measurements taken in a day and for what produce.*
4. *How the price is established for the produce weighed.*
5. *How they do the averaging.*

What issues do you face in undertaking the sampling? *(Pay attention to trader selection and willingness to take part, tools.)*

d. Describe the process you use to collect data for the **Farmgate** price survey. *(Probe based on your knowledge of the process, as per the manual. Note any discrepancies and ask for clarification at the end.)*

Probe the same issues as the retail survey, AND especially how they actually get to the "farmgate," but note differences rather than just repeat what is noted earlier.

Probe what data they are getting. Is it the farmer's asking price or the farmer's actual selling price? How do they define "farmgate price"?

What issues do you face in undertaking the sampling? *(Pay attention to trader selection and willingness to take part, tools.)*

e. Describe the process you use to collect data for the **Livestock** price survey. *(Probe based on your knowledge of the process, as per the manual. Note any discrepancies and ask for clarification at the end.)*

Probe the same issues as the retail survey, but note differences rather than just repeat what is noted earlier.

What issues do you face in undertaking the sampling? *(Pay attention to trader selection and willingness to take part, tools.)*

f. Describe the process you use to collect data for the **Horticulture** price survey. *(Probe based on your knowledge of the process, as per the manual. Note any discrepancies and ask for clarification at the end.)*

Probe the same issues as the retail survey, but note differences rather than just repeat what is noted earlier.

What issues do you face in undertaking the sampling? *(Pay attention to trader selection and willingness to take part, tools.)*

g. Describe the process you use to collect data for the **Input** price survey. *(Probe based on your knowledge of the process, as per the manual. Note any discrepancies and ask for clarification at the end.)*

Probe the same issues as the retail survey, but note differences rather than just repeat what is noted earlier.

What issues do you face in undertaking the sampling? *(Pay attention to trader selection and willingness to take part, tools.)*

What issues do you face in gathering data that have not been mentioned?

What issues are there in communicating the information to AMIS?

What issues are there in communicating the information to the ADD?

How could the data collection be improved?

Notes

1. Department of Agricultural Planning Services (2009). A comprehensive operational manual (COM) under the Agricultural Market Information Systems. Ministry of Agriculture and Food Security, Lilongwe. Unpublished.
2. FSNJTF-TS received a one-year extension to the end of 2013 to institutionalize its activities.
3. Previously just the Food Security Joint Taskforce (FSJTF).
4. Funded by a mix of public and development partner sources, such as the Rockefeller Foundation.
5. IDEAA was registered as a company limited by guarantee. It closed when funded ceased.
6. 197 in markets, and 3 at headquarters.
7. The policies of minimum (and maximum) prices, restrictions on domestic trade, and restrictions on imports and exports have their critics, as well as proponents; however, a review of the policy decisions that flow from the use of AMIS data is beyond the scope of this report.
8. This is interpreted to include family, extended family, neighbors and other personal contacts.
9. In this sense, the price is not objectively determined as low; rather, it is low relative to what the farmer wants or expects.
10. Some said they had come a distance of 8–9 kilometers.
11. GTPA paper, "Improving Private Sector Participation in the Grain Trade," June 2005, funded by FNSJTF-TS.
12. Traders were found to have capacity to mobilize certain tonnages, usually related to their available cash. Traders aim to get an economic load to transport to the next level of trader up the chain, starting with a few tons at the village to trading center levels up to 20-metric ton (MT) loads and finally multiple 20-MT loads to meet an open contract with a large trader or buyer.
13. If this were 7 contacts at each level, three levels of traders (7x7x7) means reaching more than 300 traders within a short period of time.
14. This type of behavior means that the prices are not as fixed as they may appear, and may lead to an overestimation of price by the current means of measuring, since the enumerator does not negotiate to buy and so cannot be offered the extra volume. Separately, it was noted in the enumerator survey that when the prices are fixed, the enumerators just record the price and assume all volumes are the same, rather than measure them. They are not taking account of the additions.
15. The National Food Reserve Agency (NFRA) indicated that if it needed to buy commodities, it would consider using AMIS data. However, NFRA's current plans do not necessitate using AMIS data. NFRA is using AMIS data indirectly, as it uses FEWS NET and MVAC reports when discussing issues of maize release.

16. See Section 4 for more details on Esoko.

17. This implies that data would need to be uploaded from the field directly to a database that can be accessed, presumably online.

18. There are currently five vacancies.

19. Some enumerators were the same as those who were doing two trials, but the two groups that deviated did not entirely overlap.

20. The interviewer was accompanied by the head of AESU, which might have made enumerators more guarded in telling the truth where there was a very significant deviation in the method.

21. GTPA (Grain Tarders and Procesors Association) (2005). Improving private sector particiapation in the maize market. Paper prepared for the food security Joint Task force technical secretariat, June

22. These were the latest reports available.

23. Conversion at MK 350:US$1.

24. Esoko is a private, for-profit company, established in Ghana and Mauritius.

25. The actual sampling method was not disclosed in the interview.

26. Essentially an alert is an SMS sent when information that is pre-requested (e.g., "maize prices at Mtonda market") becomes available.

27. This is not necessarily the case, as the enumerator may be able to strike a deal with traders to inflate the prices and share the difference, or simply overstate what has been paid. In the consultant's opinion, the risk of distortion is too great to be sure of getting actual market prices.

International Food Policy Research Institute
Malawi Strategy Support Program
P.O. Box 31666
Lilongwe, Malawi

Tel.: +265-(0)1-771780/789747
Email: ifpri-lilongwe@cgiar.org
www.ifpri.org/book-6186/ourwork/program/malawi-strategy-support-program