Appendix 3

Agricultural Statistics in Mozambique:
Institutional Organization and Performance

by

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ACKNOWLEDGEMENTS

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LIST OF ACRONYMS

AP	*Aviso Previo* (see EWS)
CAP	*Censo Agro-Pecuario* (Agricultural and Livestock Census)
CEPAGRI	Center for the Promotion of Agriculture (previously GPSCA)
CSO	Central Statistical Office (generic term for INE)
CWIQ	Core Welfare Indicator Questionnaires (CWIQ)
DE	*Direcção de Economia* (Directorate of Economics)
DEST	Department of Statistics
DFID	Department for International Development
DHS	Demographic and Health Survey
DNSA	*Direcção Nacional de Serviços Agrícolas* (National Directorate of Agricultural Services)
DP	*Departamento de Politicas* (Policy Department, previously known as Policy Analysis Department DAP)
EU	European Union
EWS	Early Warning System (also known as *Aviso Previo* in Portuguese)
FAO	Food and Agriculture Organization
FBS	Food Balance Sheet
GAV	*Grupo de Avaliação de Vulnerabilidade* (Vulnerability Assessment Group)
GDP	Gross Domestic Product
GOM	Government of Mozambique
GPS	Global Positioning System
GPSCA	*Gabinete de Promoção do Sector Comercial Agrário* (now CEPAGRI)
IAF	*Inquérito aos Agregados Familiares* (household budget/consumption survey)
IFPRI	International Food Policy Research Institute
IIAM	*Instituto de Investigação Agrária de Moçambique* (National Agricultral Research Institute)
INE	*Instituto Nacional de Estatísticas* (National Statistics Institute)
INFOCOM	Information System of the Ministry of Commerce and Industry
IOF	*Inquérito ao Orçamento Familiar* (household budget survey)
MADER	*Ministério da Agricultura e de Desenvolvimento Rural* (Ministry of Agriculture and Rural Development, previous name of MINAG)
MDG	Millennium Development Goals
MINAG	*Ministério da Agricultura* (Ministry of Agriculture)
MINCOM	*Minstério da Industria e Comércio* (Ministry of Industry and Commerce)
MOA	Ministry of Agriculture (generic term for MINAG, MADER)
MPF	*Ministério de Plan e Finanças* (Ministry of Planning and Finance)
NGO	Non-governmental organization
PARPA	*Plano de Acção para a Redução da Pobreza Absoluta* (Action Plan for the Reduction of Absolute Poverty)
PDA	Personal Digital Assistants
PES	*Plano Económico e Social* (Economic and Social Plan)
ProAgri	Agricultural Sector Public Expenditure Program
QUIBB	*Questionário de Indicadores Básicos de Bem-Estar* (same as CWIQ in English)

RGPH	*Recenseamento Geral da População e Habitação* (Population/Housing Census)
SETSAN	*Secretariado Técnico de Segurança Alimentar e Nutrição* (Technical Secretariat for Food Security and Nutrition)
SIDA	Swedish International Development Cooperation Agency
SIMA	*Sistema de Informação de Mercados Agrícolas* (Agricultural Market Information System)
SISTAFE	*Sistema de Administração e Financeira do Estado* (Administrative and Financial Information System of the State)
TIA	*Trabalho do Inquérito Agrícola (rural household production surveys)*
UEM	University of Eduardo Mondlane
USAID	United States Agency for International Development
VAC	Vulnerability Assessment Committee (general term for GAV)
WFP	World Food Programme

Agricultural Statistics in Mozambique

1. INTRODUCTION

This report on agricultural statistics in Mozambique is a desk study that describes how the agricultural statistics system relates to the national statistical system, how agricultural data are collected and analyzed, and how the statistics and information produced are disseminated and used. The growing concern about poverty reduction in Africa, leads us to view *agricultural* statistics broadly, including statistics about the living conditions and total incomes of rural households because such statistics can serve as indicators of how well agricultural productivity growth is being translated into poverty reduction. The focus of the study is the institutional organization of the system (identification of key institutional actors and their assigned responsibilities) and how well the system is meeting the statistical information needs of the Mozambique government and its development partners. The study draws on published and unpublished reports, personal communications with key actors, and the personal experience of the authors.

Section 2 presents a brief overview of Mozambique's national statistical system. Section 3 describes the agricultural statistics system in terms of institutional actors and coordination among actors in data collection activities. Section 4 describes how data are used in terms of analysis and dissemination. Section 5 identifies the gaps, difficulties, and opportunities, and Section 6 draws lessons from Mozambique of general relevance.

2. OVERVIEW OF THE MOZAMBIQUE NATIONAL STATISTICAL SYSTEM

The country gained independence in 1975 with no public statistical system, and then struggled through a prolonged civil war to emerge in 1992 with the Peace Accords. It took several years to rebuild basic infrastructure and establish a central government with effective systems. Relative to other countries covered in this multi-country study, the Government of Mozambique (GOM) and its statistical systems are relatively young. The National Statistics Institute (INE) was established in 1996, with legal responsibility for producing and reporting official statistics for the public sector. The INE was initially under the authority of the Council of Ministers, directly under the Presidency, but in 2005 came under the direction of the Ministry of Planning and Finance. INE is organized into three areas: 1) horizontal functions, 2) economic and finance statistics (including agriculture), and 3) socio-demographic statistics. INE operates with a staff of 388 employees as of 2005, from which 29% are professionals. Of that professional staff, 41% are based in the headquarters office in Maputo and the remaining in Provincial level offices. The 2006 budget allocation was about $1.2 million. INE receives strong support with technical assistance and funds from the Scandinavian countries and other donors, and is involved in efforts to revamp the national accounts system.

When founded in 1996, INE was charged with responsibility for collecting and disseminating all official statistics for the country. In 1998, the INE was allowed to delegate some of the data collection and dissemination responsibilities to the Ministries of Health, Fisheries, and Labour. For agricultural statistics, the Ministry of Agriculture (MOA[1]) was only authorized by legal decrees in 1999 to collect and develop agricultural statistics. Note that prior to 1999, MOA had been collecting agricultural sector data, but did not have a specific mandate. INE remains as the agency responsible for ensuring data quality, consistency and coordination among all the sectors and ministries.

The current master sample frame from INE is based on the National Population and Housing Census (known as the RGPH), which was conducted by INE in 1997. RGPH 1997 covered a range of topics: population in general, fertility, mortality, migration, marital status, households, work force, education, language, nationality, race/origin, religion, physical and mental disability, and housing. As will be discussed more fully later, the master sample frame developed with RGPH 1997 was used for developing the frame for the agricultural census (CAP) which in turn serves as the master sample frame for the agricultural household surveys.

A new Census of the Population was implemented in August 2007. It covers education, fertility, mortality (infant, maternal and adult), the work force, religion, disability, poverty, migration and the distribution of the population, housing, and water and sanitation. A small agricultural section was included under the economic activities to assess the number of households involved in production of a list of agricultural commodities, as well as livestock assets. As recommended in a recent report (Kiregyera et al. 2007), the new Census will serve as the basis for the master sample frame for all other national population-based surveys, including agricultural sector surveys.

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[1] While the Ministry of Agriculture is known as MINAG in Mozambique, to be consistent with the cross-country overview paper, we use MOA in this document.

The INE also has authority to and a mechanism for vetting survey design and survey instruments developed by other institutions such as the MOA, but there is little evidence that they are doing this in a systematic way. Each of the key ministries has developed surveys for their sector, such as the Demographic and Health Surveys (DHS) from the Ministry of Health, and the and Household Budget Surveys, known as IAF (*Inquérito aos Agregados Familiares*). As with MOA, the surveys are conducted in collaboration with INE. Given government budget constraints, funding is usually obtained from donors, who fund the contribution of international agencies such as the US Bureau of the Census and consultants including Macro International.

In 1999, the government and the donors collaborated to develop ProAgri, the National Agricultural Sector Support Program, a comprehensive sector-wide development program. In ProAgri I (1999-2004) and ProAgri II (2005-9), the participating donors placed the majority of the agricultural development funds into a common pool of resources, such that the Mozambican government could then invest those funds according to their development strategy. Agricultural statistics were needed to report investment performance to the donor group of ProAgri to keep the funds flowing. Donors initially included the European Community (EU), the Department for International Development, DFID (United Kingdom), the Swedish International Development Cooperation Agency, SIDA (Sweden), and the United States Agency for International Development (USAID), although the composition has changed with time. While ProAgri I focused on the Institutional Development Component and relied on the Ministry's management information system for budget allocations, personnel data, etc., both ProAgri I and ProAgri II have relied on household surveys.

In addition to ProAgri, in 1999, the government released the preliminary Action Plan for the Reduction of Absolute Poverty (PARPA) for 1999-2000 and then in 2001 released the final PARPA 2001-2005 strategy document (Council of Ministers 2001). The PARPA objectives were incorporated into the annual Economic and Social Plan (known as PES), which is the planning tool for the annual public sector budget for Mozambique, and various indicators are tracked for performance (*República de Moçambique* 2007). Agricultural development, particularly for the smallholder sector, plays a strong role in this action plan. As stated in the 2001 final Strategy document, "the principal objective of rural development is to increase income generating opportunities, especially for the family sector" (Council of Ministers 2001, p.4). Both the PARPA and the PES will be discussed in greater detail in Section 4, Use of Data, given the high importance of these two national planning documents.

The University of Eduardo Mondlane (UEM) participates in some national surveys, as with the 1996 IAF. In 2004, UEM began a new four-year degree program in statistics, from which the first graduates will be finishing in 2008, a potential source for new staff in public institutions. Higher level students at UEM and elsewhere conduct very small scale surveys as well, which must be approved through the INE system, but are not subject to rigorous evaluation unless dealing with human health issues. Students have also used the Rural Household Production Survey (TIA, or *Trabalho do Inquérito Agricola*) and IAF, among other surveys, for their degree research. Non-governmental organizations (NGOs) in Mozambique conduct their own monitoring and evaluation surveys, maintaining records, but these are not integrated into any general framework and are generally not rigorous in sampling strategies.

In 2001, the Technical Secretariat for Food Security and Nutrition (known as SETSAN) was formed as an inter-ministerial body to coordinate information and analysis between agriculture, health and other sectors. It is currently attached to the Ministry of Agriculture and given the mission of coordinating vulnerability assessments and actions across multiple ministries (Agriculture, Health, Commerce and Industry). Within SETSAN, there are various working groups and the Vulnerability Assessment Group (known as the GAV) coordinated the development of a Vulnerability Baseline Survey in 2006 (De Matteis et al. 2006) which will be discussed further below.

One other actor in agricultural statistics is the Ministry of Industry and Commerce (MINCOM). For the past ten years it has worked with Food and Agricultural Organization of the United Nations (FAO) technical assistance to estimate the National Food Balance Sheets (FBS), one of the key tools in food security assessment. While almost all of the information in the Food Balance Sheet is obtained from the Ministry of Agriculture's Early Warning Unit or through customs authorities, MINCOM collects information on manufacturing and stocks that are then used as components of the FBS. As in other countries of the region, the FBS is one of the most circulated uses of agricultural statistics and one that remains controversial for its role in policy making, both for GOM and for donors.

For national poverty assessments and the monitoring and evaluation associated with the PARPA and the Millennium Development Goals, the Ministry of Finance and Planning (MPF) has taken the lead. They develop the IAF household budget surveys, with tech0nical support from the International Food Policy Research Institute (IFPRI) to the Poverty Observatory (MPF/UEM/IFPRI 1998). As with the MOA surveys, INE participated in sample design and survey execution. The most recent IAF was in 2002/2003 and currently the Core Welfare Indicators Questionnaires (CWIQ) (*Questionário de Indicadores Básicos de Bem-Estar*, known as QUIBB in Mozambique) are used to assess consumption and poverty changes. They do not currently have any panel dataset.

3. DATA COLLECTION SYSTEMS: ACTORS AND ACTIVITIES

We now turn to a description of the major agricultural data bases and the roles and relationships among the institutions involved in generating the data. Table 1 lists the data collection systems that are of relevance to the agricultural sector, dividing them into five data categories: production, living conditions, market information, trade, and census. In cases where a survey system provides several types of data, it is listed in the category of its most important contribution, with comments about secondary contributions. The next several paragraphs provide descriptions of the surveys used to collect these five types of data and the institutional arrangements for data collection.

3.1. Production Data

There are four principal sources of agricultural production data: CAP (Agricultural and Livestock Census); TIA (*Trabalho do Inquérito Agricola*), AP (*Aviso Prévio*, early warning system), and data produced by specialized commodity institutes for more industrial crops such as sugar, cashew and cotton. The Ministry of Agriculture is a key actor, with the Directorate of Economics (DE) Department of Statistics (DEST) designing and administering the household level TIA survey that produces the production numbers used in the national accounts for the principal non-industrial crops (maize, sorghum, millet, rice, cassava, beans and groundnuts). DE/DEST also assists INE with the CAP surveys, to be discussed below. The National Directorate of Agriculture in the MOA complements these efforts with their early warning activities and some administrative data collection on livestock. The IAF is primarily a living conditions survey (see next section), but it does provide some information that is used to estimate the value of production that is not well covered by the principal production surveys. INE maintains a database on their website which combines information from the various sources on basic commodity production and livestock numbers, disaggregated to the provincial level. In recent years (2002 to present) TIA data form the basis for agricultural production numbers on this official government site (INE 2007b).

Table 1. Recurrent Survey Systems in Mozambique

RECURRENT SURVEY SYSTEMS

Type	Survey Name	Institutions Involved	Frequency	Survey description (information collected, sample section, dates covered)
Agricultural Production (crops and livestock)	TIA: Trabalho do Inquérito Agricola	MINAG/DE/DP with some INE involvement	periodic; 1993,94,96, 2002,03,05, 06 light	Household- and plot-level production data, with additional information on land area and use, assets, inputs use, demographics, selected food security indicators, use of extension/services, income (2002, 2005), morbidity/mortality (2002, 2003, 2005): Provides estimates of crop production after harvest for use in national accounts and....Sample based on 1999/2000 CAP; from 20 to 94 of 128 districts, depending on year; from 4,300 to 6,400 Households; panel of same hh available for 2002/2005; results representative at provincial and national levels, and for three agro-ecological zones; also representative for each of the three regions (north, center, south)
	CAP:Censo Agro-Pecuario	INE with MinAg/DE/ DPP	1999/2000; projected 2009/2010	Household-level benchmark data on crop production and area, land use, agricultural cropping methods, individual characteristics of smallholders, assets (including livestock holdings and agricultural production assets). Survey sampling based on RGPH listing data for non-urban districts, stratification based on district, province, farm size and representative for provincial and agro-ecological regions; 136 non-urban districts covered.
	EWS/AP: Aviso Previo	MINAG (Nat. Directorate)/ FAO/INAM/ FEWSNET Drawing on SADC AgroMet	1980 to present?	Provides estimates of crop area and yields prior to harvest and assembles other relevant data on factors affecting crop/livestock production. No organizational/collaborative link to TIA. To 1997/98 sampled three districts/province, 24 hh distributed over 6 communities = 72 observations per province; Now only doing rapid appraisals. New system proposed in 2006 (FAO) but not funded adequately for full implementation.
	Commodity Production Statistics	Sugar, Cashew, and Cotton Institutes	Annual	Commodity-based Institutes provide data on their crop areas and production; information is based on product received into processing facilties for all such facilities. In the case of cotton, area estimated based on seed distribution. For other commodities, extrapolation from production to area or in the case of tress crops, into number of trees.

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RECURRENT SURVEY SYSTEMS (continued)

Type	Survey Name	Institutions Involved	Frequency	Survey description (information collected, sample section, dates covered)
Living Conditions, Income, Expenditure	SETSAN Vulner-ability baseline	SETSAN, WFP, FEWSNET, Ministries of Ag, Health, Commerce and Industry	2006 baseline	In early years (2003,2004), small sample surveys in selected areas of country based on crisis identification. 2006 Vulnerability baseline including demographics and education, agricultural production, belongings and welfare, household income, household expenditures, participation in local organizations and social support, food consumption, shocks and strategies, chronic illness and mortality, maternal and child health and nutritional status. Nationally representative sample based on INE-identified sample frame using RGPH 1997, of rural and semi-rural inhabitants, for provincial level representativeness. Proposed as the first in a series of household vulnerability surveys.
	IAF: Inquérito dos	INE with Min Plan/Fin. (GOM + Den,	periodic; 1st=1996/97; most	Expenditure and living condtions data. Urban (4020 hh)/rural (4707 hh) strata; results representative at provincial, regional (N. C. S), and urban/rural levels; ag content varies by year (high in 1996/97, low in 2002/03)
	QUIBB: Question-ário de	INE	Oct 2000 to May 2001	Basic indictors survey covers HH composition, employment or labor allocation by sector, education, access to services (water, energy, etc.); energy uses, . 14,000 hh covered nationally, urbana nd rural.
Market Information	SIMA: Sistema de Informação de Mercados Agricolas	Minag/DE/DAP	Weekly since 1991	27 markets and 25 products (both domestic and imported); producer, consumer, and wholesale prices and available; transport costs for key commodity transport routes/
	CPI surveys	INE	Monthly	Retail prices for the CPI are collected in three urban area: Maputo, Beira and Nampula; basket of goods and weights in CPI estimates are based on IAF, and calculated for the three cities as well as nationally; CPI for Maputo includes 208 products, the CPI for Beira 186 products, and the CPI for Nampula 170 products; monthly data collection.
	INFOCOM	MINCOM	2004 to present	Weekly price information from markets and formal sector establishments in three cities: Maputo, Beira, and Nampula. Supermarket data available for Maputo. 20 Food items are covered: sugar, maze, wheat, rice, beans, groundnuts, eggs, potatoes, onions, edible oil, chicken and fish. Supermarket retail prices collected in Maputo, Beira and Nampula for sugar, maize and wheat flours, rice, edible oil, potatoes, rice, fish and frozen chickens. International prices for maize, wheat, soy, rice, and sorghum (metric ton volumes).

RECURRENT SURVEY SYSTEMS (continued)

Type	Survey Name	Institutions Involved	Frequency	Survey description (information collected, sample section, dates covered)
Trade	Customs Records	Alfandegas (Customs) Office		Officially recorded statistics from the border points and ports.
	Cross-Border Trade	FEWS NET/ WFP	2004 to present	Daily data on quantity of maize, beans, and rice that crosses borders in region; 24 border points of between Mozambique, Zambia, Malawi, Tanzania, and Zimbabwe.
Census	Recense-amento Geral da População e Habitação	INE	1997; 2007	Official national census which serves to develop sampling frames for other surveys. 2007 Census asked household member occupation, age, schooling; household assets, deaths in past 12 months. Agriculture: If active in own farm crop production, fishing; possession of coconut trees, cashew trees,; possession of cattle/cows, goats, sheep, pigs, ducks, chickens
	Arrola-mento (Livestock)	Directorate of Veterinary Services (Ministry of Agriculture)		Listing of Livestock counts conducted at the district level, focused on cattle currently; used to program disease control activities; not done in all districts.

3.1.1. National Census of Agriculture and Livestock (CAP)

In the post-war period, policymakers and analysts recognized the paucity of information about the agricultural sector and designed the CAP to gather information needed to understand rural households and agricultural and livestock production in Mozambique. With a varied set of potential users (including Ministry of Agriculture policymakers and other staff, staff of other Ministries, the Presidency, donors, and researchers), these data are designed to provide a baseline for the agricultural sector. Performance of the agricultural sector is judged on the basis of change from the baseline. As detailed in Kiregyera et al.,

> …the CAP collects comprehensive data from both small and large-scale holdings on the following: household characteristics, holding characteristics, agricultural inputs, crops, fruit trees, livestock, agricultural practices, marketing, storage, membership to associations and agricultural credit. The indicators include land utilization, agricultural practices (e.g. animal traction, irrigation, etc.), agricultural implements and machinery, agricultural labour, storage facilities and extension services, as well as the starting point for some indicators that change more frequently and which are also included in the more frequent TIA. (Kiregyera et al. 2007, pp. 13-14)

The CAP 1999/2000 was conducted by INE in close collaboration with MOA. It was not a full enumeration census, but included a sample of villages within the districts and had a relatively large sample size of 23,000 households.[2] CAP was based on mapping and population numbers of the most recent general population census (*Recenseamento Geral da População e Habitação* or RGPH) of 1997 (Megill 2002a). Two years elapsed between RGPH and CAP, so when the listings were done for CAP, the population numbers had already changed. The CAP used segments of the RGPH designated enumeration areas, but identified the administrative boundaries which contained the selected enumeration areas to determine villages within each district for the sample (Megill 2002a). For an agricultural sample, the CAP sample is more appropriate, according to technical staff (DE 2002), than the RGPH, which is based strictly on mapped enumeration areas from INE. With INE support, MOA used the CAP frame to then develop supplemental sampling frames used for additional agricultural surveys, such as the TIA. CAP data have been used to validate results from these smaller samples, as well as the basis for evaluating change over time. A new CAP is anticipated for 2009/2010. The recent 2007 RGPH data will be used to develop a new master sample for the future agricultural surveys, including TIA.

3.1.2. TIA (Trabalho do Inquérito Agrícola)

Agricultural household sample surveys (known as TIA) have been conducted in Mozambique since 1993 with the main objective to assess smallholder agriculture, including agricultural production, planted area, and livestock herds, as well as respond to the need for poverty assessments and measurement of progress on poverty reduction and economic growth. Anticipated uses of the data include agricultural

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[2] The CAP sampling was based on the frame of the enumeration areas of the RGPH, with all districts classified as rural included and sampling PPS of the segments of the enumeration areas.

policy analysis, poverty analysis, and evaluation of economic growth. More recently, the private sector has also sought information on production areas and quantities, as well as landholdings, in order to develop investment plans. With the CAP showing less than 2% of cultivated land in the hands of large scale commercial farmers, the smallholder focus of the TIA means that it captures the vast majority of people, production, and cultivated land in the country. Attempts have been made to include large scale farming in the TIA, using full listings of large-scale farms and ideally including them with 100% probability in the TIA sampling; however, as detailed by Kiregyera et al. (2007), the listings are not complete and the numbers included are insufficient for analysis. This is an area for improvement. For now, the commodity institutes provide the information on selected commercially cropped commodities, maize being the significant crop outside that system.

Prior to 1996, rural household surveys were limited. Two initial TIA were conducted in 1993 and 1994, but the results are considered unreliable, especially due to the small sample (20 districts in 1993 and 30 districts in 1994, out of 128 districts nationally). In 1996 major methodological improvements were introduced into the TIA survey sampling, with support from USAID and Michigan State University. These improvements increased sample size (3,889 households in 1996) and district coverage (61 of the 128 districts nationally), with the capability to report data at the provincial level and by the three main agro-ecological zones.

Currently, the TIA surveys collect data at the household and community levels on:

- Household size and structure;
- Production, consumption, sales and area planted to all food and cash crops cultivated in the smallholder sector;
- Total farm size, including area in fallow, pasture or under perennial crops;
- Fruit tree stocks and new plantings;
- Prices received by smallholders for marketed production;
- Livestock holdings, consumption and sale;
- Farm implements and machinery used in smallholder agriculture; and
- Inputs used including seed, fertilizer and pesticides as well as manure.

There have been sections added to different TIA in order to cover special topics, such as adult mortality and morbidity, and off-farm income and remittances. The collection of income data has been intensified with the 2002 and 2005 TIA in order to respond to needs for poverty and economic growth analysis.

TIA surveys have been conducted often, but not every year: 1993, 1994, 1996, 2002, 2003, 2005 and a light version in 2006. There was no TIA in 2004 due to the national elections. In general, each year a new sample of households is drawn for the TIA and the sample has been expanded over time, with 94 districts covered in 2005 when 5,122 small-scale and 1,027 medium-scale households were interviewed. A clustered, stratified sample was used, requiring the use of complex survey sampling methods to adjust the estimates and the errors.

Beginning with TIA 2002, the sampling is based on the *Censo Agropecuario* (CAP) conducted between October 2000 and March 2001. As noted previously, the CAP sampling was roughly based on the RGPH of 1997. The TIA 2005 survey data were designed to be representative at the provincial and national levels. The same

households from the 80 districts in TIA 2002 were revisited in 2005, creating the first rural household panel at a national level in Mozambique. There was an attrition rate of 17%, leaving over 4,000 households from the TAI 2002. The TIA 2005 added new households and districts to improve the reliability of the aggregate estimates and ensure continued representativity.

The TIA is known to have some weaknesses which have been partially addressed by increasing the sample size (adding new districts) and improving measurements for items such as root crops and land area. Livestock specialists find that for large animals, the TIA does not seem to give accurate numbers and so analysts are looking for alternatives, including more intensive implementation and use of the district-level livestock surveys (see *arrolamento* census below).

In addition to efforts to reduce the sampling errors, the TIA survey methods have also been changing over time, responding to identified weaknesses and adopting new technology when appropriate. For TIA 2002, the survey instrument was modified to improve land area measurement and crop production measurement. More intensive training and supervising of enumerators also helped to reduce non-sampling errors. Additional improvements in 2005 to the present include the use of Global Positioning Systems (GPS) for land area measurement and the introduction of field-based data entry systems to reduce data entry time and to improve accuracy of data collection and entry. New systems were introduced to deal with intercropped fields, common in smallholder agriculture in Mozambique, with a training video developed to help ensure enumerator understanding of the *bean game* for proportions of land allocated to crops. These improvements contributed to the adoption of TIA data for use in National Accounts, given greater reliability and timeliness.

Funding for the TIA comes from the national government, from a consortium of donors through the PROAGRI mechanism, and from some bilateral funding. Funding delays and uncertainty occur each year, and questions on the need for a full household income and production survey each year have been raised. In response to criticisms about the high cost relative to utility of implementing a full household income and production survey each year, the government implemented a TIA-light in 2006. There will be an evaluation of the usefulness of the TIA light approach. Other ways to streamline the TIA system and lower cost as well as time delays include field based data entry systems and more fully automated data entry programs. Field-based data entry was tried first in a few provinces in 2005 and then adopted in all provinces for 2006.

Recent years of TIA data are available on CD, with the documentation necessary to use them. Researchers, students, and other users can receive the CD at no charge by simply submitting a letter of request to DE. As with most household datasets, the data require statistical and computer skills which implicitly limits access to a relatively small group. With the new statistical program at the University of Eduardo Mondlane in Maputo, it is hoped that an increasing number of Mozambican analysts will be able to use the data. Aggregate TIA data are available on the INE website for production and area statistics, and DE staff is working to develop annual reports based on TIA. Web access to more information and reports is in the DE work plan, however the overall MOA website has yet to function fully, a constraint throughout the Ministry.

3.1.3. National Early Warning System: Conducted by the Ministry of Agriculture,
National Directorate of Agricultural Services (DNSA), Department of Early Warning

The Early Warning System (EWS, also known as *Aviso Previo*) has evolved since
1980, but has remained independent of the newer TIA and CAP data collection
efforts. EWS is based in the National Directorate for Agriculture, (whereas TIA is
based in the Economics Directorate and CAP at INE), and has traditionally benefited
from FAO financial and technical support. The objective of the EWS is to "provide
timely information on the production of principal food crops in the country,
contributing to the completion of the Food Balance Sheets and the determination of
the food and nutritional security situation of the country" (*Departamento de Cultura e
Aviso Previo* 2006, authors' translation). EWS estimates the production, area and
yields for approximately the same set of crops as the TIA: maize, sorghum, millet,
rice, cassava, cowpeas, and beans.[3] The production estimates of the EWS are the basis
for the Annual Food Balance Sheets prepared by the Ministry of Commerce and
Industry in collaboration with FAO. They are also used by the National Disaster
Management Unit to identify need for interventions to ensure food security in
potential disaster zones.

As described by Kiregyera et al. (2007), there are various estimates made by EWS
during the cropping season, with early forecasts around planting period in October-
December, additional forecasts in January, and the Final Forecast prepared during
April and May and available by June. Annex 2 presents the seasonal calendar for
Mozambican agriculture. Timeliness is a key feature of the system, as the final
estimates should be available by June at the latest, in time for annual assessment and
planning purposes.

The early forecasts are based on rainfall predictions and estimates. Currently, the
EWS system uses information from the SADC weather monitoring with AgroMet
(SADC 2007) and the Mozambican National Meteorological Institute. They have
used a water balance model to estimate impact on production, based on calculating the
Water Requirement Satisfaction Index (WRSI). The January estimates are based on
the rainfall modeling combined with revised information on area planted from the
districts, and a selected sampling of farm plots in the districts.

For the final forecast, the system was designed to include a stratified random survey
of smallholder fields throughout the country, selecting a total of 720 farms. The
primary data collected through field work are crop areas and yields (Detry and
Chilengue 2002; Kiregyera et al. 2007). Although there are guidelines for doing this
field work (coverage of three districts in each province, with 24 households randomly
selected over 6 communities yielding approximately 4 households per community for
a total of 72 observations per province), this system has not been fully functional
since 1997/98 due to inadequate funding and human resources (Kiregyera et al. 2007).
Even when the data were collected, only a small percentage was actually entered into
the computers and used in estimates. In 1999/2000, decentralization of funding
associated with PROAGRI resulted in the original data collection system breaking
down entirely. Now, the principal sources of EWS area and yield estimates are rapid
appraisals and projections from previous estimates.

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[3] TIA covers groundnuts rather than cowpeas, but all other crops are the same.

The EWS system was set up with the technical assistance of FAO and with funding from various donors through the years. As indicated above, EWS was not located in the Directorate of Economics, but in a separate directorate and there were no design links with the TIA or other data efforts.[4] The CAP data were used to develop the original sample frame as well as the baseline numbers, from which projections could be made. From 1993/94 through 1998/1999 there were annual training programs associated with EWS, designed to ensure quality and consistency of information, but that training and the supervision involved has been paralyzed by lack of resources since the 1999/2000 season, when major FAO support ended. In September of 2006, the EWS proposed a revised set of activities for collecting reliable information, based on the work of the mid-1990s with some modifications *(Departmento de Cultura e Aviso Prévio* 2006). This proposed new system would cost almost US $200,000 per year including training, monitoring, district level activities, provincial level activities, and supervision of field staff. However, the proposal did not move forward.

As of March 2007, there were 6 staff members at the central level and supervisors at each provincial office who are trained in Early Warning methods, which is considered adequate for the central level, provided skills are maintained. When Kiregyera and colleagues (2007) conducted a review of EWS and other agricultural data systems, they identified major constraints in the system. A key issue stems from decentralization of planning and budgeting that occurred under PROAGRI. With the decentralization of funding and decision-making, the proposed annual provincial training seminars have not occurred and the field activities of EWS have been compromised by lack of resources.

3.1.4. Commodity Institute Statistics

The Sugar, Cotton and Cashew Institutes are parastatal units that produce area and production estimates for the National Accounts, based on information from the private sector processors. In the case of sugar, with institutional reform, the Sugar Institute was incorporated into *Gabinete de Promoção do Sector Comercial Agrário* (GPSCA), and then in 2006 became CEPAGRI, Center for the Promotion of Agriculture, with a broader mandate than just sugar. Both GAPSCA and now CEPAGRI are autonomous agencies of the Ministry of Agriculture. Since sugar production is mostly processed by the four large mills in Mozambique, the CEPAGRI statistic captures that sector reasonably well, although CEPAGRI data systems appear to be less detailed than with the Sugar Institute. These commercial crop statistics are not linked to the MOA statistical systems, and for these commercial crops, the MOA systems may under-record large-scale production. The main users are National Accounts staff and they often need to discuss the discrepancies with MOA. They often use production quantities calculated from trend lines rather than estimates from MOA or the commodity institutes, if there are large discrepancies.

3.1.5. Household Budget Surveys, Inquérito dos Agregados Familiares (IAF) 2002/2003: Conducted by the National Institute of Statistics, with Ministry of Plan and Finance

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[4] The comparability and linkages (and lack thereof) between TIA and EWS estimates and systems will be discussed later in this document.

The principal objective of the IAF is to measure expenditures of households and other socio-economic characteristics of individuals in the households to estimate the incidence of poverty and other human development indicators of households in Mozambique.

The specific objectives of IAF are the following:

a) Provide the basis for re-estimating the basket of consumer goods and services used to establish the Consumer Price Index;
b) Provide the basis for updating the National Accounts;
c) Obtain current information on households concerning their housing, other durable assets, health, employment, education and crime; and
d) Develop national capacity to develop and implement household surveys (INE 2002).

Coverage of agricultural topics varied between IAF 1996/97 and IAF 2002/2003, Both IAF tracked consumption from own production for 19 agricultural and livestock commodities[5]. IAF 1996 also obtained information on land ownership, agricultural production by commodity, possession of livestock and of trees (fruit and cash crops such as copra) by type. In addition, households were asked about the use of purchased agricultural inputs. All of these agriculturally-related questions about production and inputs were dropped in IAF 2002/2003. Instead, questions were posed in an effort to collect information needed to estimate revenue earned from each of the following broad economic sectors: 1) agricultural commodities; 2) wood and charcoal; 3) fish, shrimp and other fisheries products; 4) honey and other wild gathered products; 5) processed foods and beverages; 6) clothing, 7) construction materials (such as bricks); 8) livestock products and 9) artisanal products (baskets, etc.). The details of the type of agricultural commodity or livestock product were not collected in 2002/3.

Anticipated uses of data include monitoring of welfare and poverty trends related to the PARPA and the Millennium Development Goals (MDG). As indicated in Annex Table 1, Mozambican capacity to monitor the MDGs is highly variable. IAF provided the data for the IFPRI-supported poverty and wellbeing analyses done in 1996/97 and then again in 2002/2003. Financing for these surveys came from the GOM and Scandinavian donors (Denmark, Norway and Sweden). There was a QUIBB (Core Welfare Indicators Questionnaire, see below) in 2000/2001, as well which uses a subset of the IAF questions. In 2008/2009, a new Household Budget Survey (*Inquérito ao Orçamento Familiar*, IOF) will be implemented, to replace the IAF as a survey to evaluate welfare and poverty trends.

While there have been two IAF surveys; it is not a household panel survey. IAF 2002/2003, based on a sample frame from the 1997 population census, used a three stage stratified, clustered sampling frame: 1) primary sampling units; 2) enumeration areas and 3) households within the enumeration areas. The 2002/2003 IAF sample was stratified by urban versus rural zones. A total of 8,727 households were interviewed, with 4,020 in urban and 4,707 in rural areas. This sample permits reliable estimates at the national, provincial, residential area (rural versus urban) and

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[5] Commodities are maize, sorghum, millet, rice, fresh cassava, dried cassava, sweet potato, tomato, groundnut, cashews, leaves (cassava, mango, sweet potato, pigeon pea and squash), common beans, pigeon peas, chicken, eggs, and beef.

regional (North, Center, South) levels. The field work was conducted in 26 two-week periods over a 12 month period, with two weeks in each enumeration area. Rather than the TIA single visit to each household, with the IAF survey, each household was visited three times over a ten-day period and each enumerator covered nine rural households (or 12 urban households) in each of the 26 periods during the year. While the rotating sample will increase the households in the tails of the distribution (high income, low income) due to seasonality, it does provide an accurate measure of the population means, enables aggregate assessment of seasonality, and reduces the costs and time for the administration of the survey compared to repeat visit surveys. Recall for each household covers a relatively brief period and may reduce measurement error.

In 2002/2003, three separate survey instruments were used: 1) individual household member data; 2) daily household expenditures; and 3) household assets, expenditures (not daily) and income. Types of data collected include demographic characteristics, consumption expenditures, education, health, employment, housing, poverty indicators, and victimization (crime). Some parts of the data base also contribute to estimates of production for products not well covered by TIA and CAP. For example, wood and charcoal value of sales is recorded in the IAF, and that value is used in national accounts as a contribution to gross domestic produce (GDP). Consumption from own production for vegetables is another area in which the estimates are evaluated for the national accounts. The data have been compared to other national surveys such as TIA, as will be discussed later in this document, a valuable exercise.

3.1.6. Census of Livestock (Arrolamento) and Livestock Services

While livestock numbers can be derived from the TIA, analysis indicates that the TIA sampling frame does not adequately capture large animal stocks, due to their geographic specificity and the relatively small numbers of farmers with larger herds. Thus, the Directorate of Veterinary Services in MOA has retained an administrative data collection system known as the *arrolamento*. As described by Kiregyera et al. (2007), veterinary staff in selected districts with cattle maintains records of services and collect annual headcount data for cattle which the district uses for programming and operations such as disease control. The information is assembled by the Directorate of Veterinary Services. The objective is to understand the spatial distribution of livestock by type, critical for developing the program of activities in public sector veterinary services.

These numbers can then be compared to CAP numbers and total numbers of large animal stocks can be projected for each year, across all districts. Since small animals are more geographically dispersed in the country and more commonly held among smallholder households, the TIA small animal (poultry, goats, etc.) estimates are considered reliable by experts (Kiregyera at al. 2007). With the new RGPH 2007, baseline livestock numbers can be determined with greater accuracy for the nation, and the information will be useful for developing a future TIA sample frame that can more accurately capture the large animal stocks. The new 2007 stock numbers will also assist in assessing the accuracy of the *arrolamento* exercise as an alternative to more investment in the TIA to meet large animal stock information needs.

3.1.7. SETSAN/WFP/FEWS NET Vulnerability Baseline (2006)

SETSAN (Technical Secretariat for Food Security and Nutrition), WFP (World Food Programme), FAO, and FEWS NET combined forces in 2006 to develop a vulnerability base line. Within SETSAN, the Vulnerability Assessment Group (GAV) identified the need for a nationally representative survey on the welfare of Mozambican households that could highlight needs and outcomes regarding food security and nutrition. There have been smaller vulnerability surveys conducted in 2002, 2003, and 2004, but the surveys were conducted only in areas thought to have food insecurity and so are not representative nationally (SETSAN 2005).

The key objective of the 2006 Vulnerability Survey was to develop a nationally representative baseline which could be used in future years to understand the impact of drought, floods, and other potential disasters on household livelihoods, while identifying the key strategies used by households to address crises. As the survey report by De Matteis and others (2006) state, "The SETSAN will solicit approval from the National Institute for Statistics (INE) that baseline data will be validated and integrated as a key national dataset for a variety of activities including poverty monitoring" (p. 8). Thus, the anticipated use of the data is as a baseline for monitoring poverty and movement toward the MDG. The year 2005/2006 was a relatively good year, with a few areas of drought, but no major crises in the country, so it would serve well as a baseline for the most common strategies used by households to ensure their food security and livelihood. This baseline effort was the first under this collaborative partnership.

The baseline study combined anthropometric measurements common with Demographic and Health Surveys, with income, poverty and consumption measures found in IAF surveys. For agriculture, the vulnerability baseline survey collected information on land area (lowland and upland), and total annual production for twelve main crops: maize, rice, sorghum, millet, large groundnuts, small groundnuts, beans, cowpeas, bambara nuts, pigeon peas, common beans, and fresh green beans. For other crops, including cassava, sweet potatoes, Irish potatoes, vegetable crops and cash crops, the survey simply asked if the crop was grown or not. Fruit trees were assessed by category (1-10 trees, 22-50 trees, or more than 50 trees). Households also indicated how many of each type of animal they had at the time of the interview for 10 types of animals, including cattle, goats, pigs, and poultry. The main focus was on food consumption, food access, and anthropometric measurements to look at nutritional status.

The sampling design was developed by INE based on the 1997 Census, and was a clustered stratified design, using urban and rural strata, with all provinces included. There were a total of 320 clusters (of 22 households each), and the final sample included 6763 households in 315 clusters (De Matteis 2006). For the anthropometric data, 4,865 children between 6 and 59 months were included, as well as age, weight and height of their mothers.

The measurements of production for the twelve main crops are based on a simple recall of total production for the year with an indication of the unit. This method for collecting agricultural production data is unlikely to yield accurate estimates for these twelve food crops. For cassava, a critical crop in food security in most of Mozambique, there was no attempt to get area or production numbers, just a simple

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yes/no for cultivation. Given the measurement issues for the all the crops, the production data are unlikely to be used for agricultural analysis. There were other problems in the execution of the baseline, particularly the field use of personal digital assistants (PDAs) and use of separate teams for the anthropometrics and the socio-economic parts of the surveys (De Matteis et al. 2006). A high proportion of the data could not be matched between anthropometric data and the other household data, and there are questions regarding the lumpiness[6] of observed measures in the anthropometric data, such that care must be used to link vulnerability, nutritional status, and agricultural production activities.

While SETSAN is currently based in offices in MOA, this survey was not conducted through the MOA Department of Statistics. Input was sought from them, but the administration of the survey was contracted by SETSAN and partners with Ministry of Health personnel for the anthropometrics and INE staff for the rest of the survey. As mentioned, previous Vulnerability Assessments had been conducted but not on a national scale, only for selected highly vulnerable districts after times of drought or floods. While the need for such a nationally representative baseline exists, the SETSAN Baseline might best be viewed as a learning experience. With the new 2007 RGPH, a new sample with improved data collection could be used for further vulnerability surveys. However, for efficient use of resources, as will be noted, linking vulnerability analysis to other survey efforts, including IAF, TIA, and the DHS, may be the way forward.

3.2. Systems Used to Collect Market Information Data

MOA DE is again the key actor in collecting market information for agricultural products (both domestic and imports) while INE does the CPI surveys and MINCOM provides some supplementary market information on regional and international markets as well as prices for supermarkets and other formal sector selling units.

3.2.1. SIMA: Sistema de Informação de Mercados Agrícolas (SIMA, the Agricultural Market Information System): Conducted by the Ministry of Agriculture, Directorate of Economics, Department of Statistics

The SIMA was established in MOA with multiple objectives. A primary objective is to provide price information to facilitate market transparency and enable farmers and traders to efficiently negotiate. A second objective is to provide a database for policy analysis on the agricultural sector, to be tied into the household surveys, but also for other analysis on price trends, vulnerability, etc. A third objective, linked to the database as well, is to provide a service to the private sector on price trends for commodities.

The primary users of SIMA include MOA policymakers, researchers both within the public sector and elsewhere, donors, food aid authorities, students, and the private

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[6] *Lumpiness* refers to rounded ages for children, with high frequency on the integers; with heights and weights, a tendency to be in integer units around 5 and 10, eg. 15, 20, 25, etc. De Matteis et al. (2006) only briefly mention the problem, but it was demonstrated at a presentation of the results in December 2006.

sector (traders and farmers). A range of diffusion efforts provide information to all these users.

The SIMA has been in operation since 1991 collecting weekly prices on an expanding set of agricultural commodities (both domestic production and imported) and markets.   In 2007, SIMA collected information in 27 markets throughout the country (in the provincial capitals and other selected markets). The prices are collected at producer, wholesale and retail levels. There are 25 products covered, although not all markets and market levels cover all 25 products. Key agricultural products covered by SIMA are maize grain and flours, rice, groundnuts, and several types of beans (see Annex 3 for a full list). As of May 2007, SIMA had produced 618 weekly bulletins, with price tables, analysis and some additional information on transport costs, regional commodity prices and exchange rates. SIMA maintains a database accessible to the public upon request and there are plans to put the SIMA data up on a publicly available website. SIMA has revised data collection systems over time to increase reliability, but the data must be used with care for the quality of products is not always identical between markets (e.g., rice quality is highly variable) and nonstandard units for sales in small quantities introduce potential for imprecise measurement.

SIMA also conducts special studies to understand market dynamics and to complement the database. Each year during the early part of the marketing period, SIMA staff with collaborators from other agencies (such as FEWS NET) travel the main trading routes conducting interviews with traders and farmers. The selection of people is opportunistic, such that the results provide more of a qualitative view of the field perspective on the coming marketing season (SIMA 2007). Given the difficulties with crop forecasting, this research provides a check on the estimates of surpluses or deficits of key commodities.

SIMA data are disseminated in various ways. The weekly bulletin is circulated by email and hard copy, and posted on a website (http://www.sima.minag.org.mz/), and contain prices for the current week and previous week for maize grain and flour, rice, beans, groundnuts at wholesale and retail levels, maize grain and beans at producer level, as well as selected costs of transport between markets, prices in futures markets, and brief analysis of key changes in the markets. Radio broadcasts have been spotty, depending largely on availability of donor funding to pay for the programs. The largest selling national daily newspaper, *Noticias*, prints a SIMA price data table in the weekly Economic Supplement, read by traders and others. SIMA staff also organizes marketing outlook presentations and seminars and appear occasionally in the weekly business and marketing program on national TV.

SIMA price data are used in a variety of others ways, as well. They are compared to prices collected by INE for the estimation of the CPI, filling in gaps where they exist. The rapid appraisals conducted by SIMA staff at the beginning of the marketing season for agricultural commodities contribute to the formation of expectations on the upcoming marketing season. The SIMA data are also used to value commodities in the analysis of TIA data. FEWS NET uses SIMA data when looking at food security trends, both in terms of prices for producers linked to income analysis and prices for consumers linked to livelihoods and food access.

SIMA is a public sector MIS that is functioning efficiently and providing a valuable service. That the media seek SIMA contributions to their programming is one indicator of success, and key to this success is the professionalism and dedication of the SIMA staff. There are key challenges to sustainability of the system within the public sector. Retention of trained, dedicated staff will be discussed below, as it is a broader concern in the public sector. SIMA staff constantly faces constraints to innovation, as the bureaucratic structures are not as flexible as needed. SIMA must respond to the private sector needs rapidly and consistently over time, something that does not necessarily fit into a government Department of Statistics. SIMA has struggled with MOA's lack of reliable cash flow for the day-to-day activities critical to the system, as well as the need to go through a strict hierarchy to plan all activities. The lack of budgetary and administrative autonomy of the SIMA undermines its ability to respond.

3.2.2. INE CPI Surveys

INE collects retail price data for the Consumer Price Index, which is used in National Accounts, GDP estimates and a range of economic applications, for the public and private sector. Currently there is no data collection for a producer price index. The retail price data are collected for 245 articles, including a range of basic consumption goods and services, as identified in the IAF analysis on the basic consumption basket. Fresh produce prices are collected weekly in a total of thirty markets between Maputo, Beira, and Nampula. Prices for less perishable items are collected monthly, and cost of service data collected periodically (unspecified periods) during the year (INE 2007a). The monthly CPI estimates are available on the INE website by city and month since 2004, but not the underlying price series from which they are derived.

3.2.3. Ministry of Industry and Commerce (MINCOM) INFOCOM

MINCOM established the Market and Commercial Sector Information System (*Informação Comercial e de Mercados*, known as INFOCOM) in 1998, under the auspices of an FAO project in MINCOM. The objective of the system is to provide strategic information for private sector market development. The intended users are national policymakers, traders, producers, processors and consumers. INFOCOM focuses on data collection in the formal sector, supermarkets and large stores/warehouses, as well as more information on internationally traded commodities and exchange rates. The INFOCOM staff also develops the Food Balance Sheets, with FAO technical support; FAO technical support was scheduled to end in mid-2007. INFOCOM collects retail price data on a weekly basis in formal sector establishments and supermarkets in the provincial capitals for consumption goods, both domestically produced and imported. The products include sugar, maize grain and flour, wheat flour, rice, beans, groundnuts, Irish potato, onions, edible oil, eggs, frozen whole chickens, and various types of fish. There is some duplication with the SIMA data, since in some cities, public markets are included. Supermarkets are solely collected by INFOCOM. The INFOCOM weekly bulletin also includes price data for selected products on international markets, along with commentary on special events. Some of the INFOCOM weekly bulletins are available on the MINCOM website (www.mic.gov.mz), although new bulletins have not been added to the website since August 2007. Otherwise the bulletin is distributed by email and in hard

copy. The special bulletin with the FBS is the most widely used, especially among donors and government.

3.3. Systems Used to Collect Trade Data

3.3.1. Customs Records

Since 1997, Crown Agents of the United Kingdom has been contracted to work with the Customs Agency to improve information systems, and this has included computerizing border posts and ensuring the use of standardized commodity codes. While the data are not available to the public, they are used in National Accounts and the Food Balance Sheets, as well as other policy uses. Previously, researchers went to the port to collect data from actual port documents, in order to determine the actual amount of food that arrived in the form of food aid on ships. Customs statistics did not always reflect actual quantities, and were sometimes based simply on the projected quantity or the amount for which a permit was issued.

3.3.2. FEWS NET/WFP Cross-border Trade Study for Informal Trade in Selected Commodities

This system began under USAID funding in 2004, based on successful implementation in Kenya and its border areas in Eastern and Central Africa. Given the potential importance of cross-border trade in terms of food supply and incomes from agricultural commodities, FEWS NET and WFP combined efforts to quantify the informal, unregistered trade between countries in southern Africa. The system captures informal trade in maize, rice, beans and also collects price information at the border points. Initially established with twenty border points in the region, as of March 2007, there were 24 border points for data collection between Malawi, Mozambique, South Africa, Zimbabwe, Zambia and Tanzania, of which 15 border points are between Mozambique and its neighbors.

There are many reasons for trade not being registered. For example, trade in small volumes is legally permitted between Mozambique and South Africa, such that individuals can transport a 50 kilogram bag of maize flour or a dozen eggs without any border records. In northern Mozambique, the *bicycle trade* in commodities into Malawi became highly important, as traders learned that they could drive a truck from Mozambican production areas, offload onto bicycles that would cross the border in small loads, and then re-group the maize onto trucks on the Malawi side of the border. This was done to avoid taxation and border permits with larger quantities. FEWS NET maintains the cross-border study reports on its website and distributes them widely through email communication.

In theory these data complement the official trade statistics and can contribute to making the FBS a more accurate assessment of scarcity and surplus. They are currently used with the FBS in Mozambique. In addition to the FBS, the data have been used by NGOs and donors in evaluating trade opportunities and livelihoods. WFP uses the information to help develop its strategy for food aid purchases in Mozambique. FEWSNET uses the information in its assessment of food security threats and early warning, combined with the various MOA production figures.

Regional organizations such as SADC and COMESA use the cross border data to look at trade flows and possible policy implications. SIMA staff also use the cross-border study to understand price dynamics, especially in northern and central Mozambique, where informal trade with Malawi can have major impacts on local prices. The cross-border data system is still a project funded through donors, and has had difficulty in becoming institutionalized in a regional organization or other entity, so its future remains in doubt.

3.4. Periodic/complementary Surveys of Relevance to Agriculture

3.4.1. Directorate of Economics with Michigan State University Special Surveys

The Department of Policy Analysis jointly with the Department of Statistics and the Food Security Project of Michigan State University (MSU), funded by USAID, has implemented several other household surveys to meet specific needs. In 1996, MSU with the University of Arizona and the Ministry of Agriculture conducted the Socio-Economic Survey of the Smallholder Sector in the Province of Nampula (MOA/MSU/UA 1999) to look at agriculture and related aspects of rural household food security. This was an intensive effort following households over 12 months, capturing data on consumption, expenditures, agricultural production and marketing. The survey covered only Nampula Province in the north. There were also surveys on maize traders (1992-4), cotton sector (2000), cashew (1998), micro and small-enterprise (1996, see Benfica 1998), fertilizer use and efficiency, and sustainable nutrition focused on sweet potato in Zambezia Province (2002-5; see Low et al. 2005).

While conducted jointly with the Directorate of Economics, these surveys are not a regular part of the data collection activities of the Economics Directorate. The special surveys are undertaken when an issue is identified by MSU researchers or their counterparts and undertaken with graduate students at MSU (both Mozambican and US students) who used the data collected for their graduate research papers. This research guides the contents of the surveys.

The data collected do not form part of the Ministry of Agriculture (MINAG) agricultural statistics data system, but are retained by MSU researchers for analysis.[7] The outputs of the research, however, are published first in the joint MSU/MINAG publication series, which is used by many researchers and policymakers. These surveys have been extremely useful both for the research output and the survey experience for the Mozambican students and analysts involved, and are considered an integral part of the MSU project.

3.4.2. QUIBB: Questionário de Indicadores Básicos de Bem-Estar (Core Welfare Indicators)

QUIBB was the first step for INE in implementing a strategy to develop an integrated set of household surveys in Mozambique with rational use of the limited resources available to the government. These household surveys are used to evaluate progress

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[7] It is important to note that the panel data of TIA are part of the MINAG systems and available on CD for students and researchers.

on the MDGs and the PARPA, regarding economic growth and poverty reduction. As described by Mattiassen and Roll-Hansen (2007) "the basic idea is to utilize the information in an expenditure survey to identify a smaller set of household variables (indicators) that can be collected annually between two budget surveys" thus lowering the annual costs of monitoring progress. The first QUIBB in 2000/2001 covered almost 14,000 households nationally. It was designed to capture information on household composition, employment, education, and access to services. As such, there is some overlap with data collected in the IAF, but the QUIBB approach was less resource intensive. Thus far the QUIBB has been implemented only once (October 2000 through May 2001); plans for additional surveys have not been publicized. With respect to agriculture, it collected only very general information on labor allocation by sector, finding that approximately 77% of the economically active population dedicated itself to agriculture and the forestry sector as the primary activity (INE 2001).

3.4.3. Administrative Data: SISTAFE

In 2002, the government began investing in an administrative information system for the public sector known as SISTAFE (*Sistema de Administração e Financeira do Estado*) with a goal of making the budgetary process more transparent. While it is not easy to track past public sector spending on the agricultural sector, SISTAFE will enable future work on allocations, which can be compared to performance by sector. Results for each trimester are published and available on the Ministry of Finance website (*Ministério de Finanças, Direcção Nacional de Orçamento* 2007).

The Customs Department, under the Ministry of Finance, collects daily exchange rate information for the US dollar, South African rand and thirty-two other currencies, as well as a dollar/rand conversion rate (*Alfândegas de Moçambique* 2007), and makes the information available on the web.

3.4.4. Non-Governmental Organization (NGO) Monitoring and Evaluation

Increasingly, NGOs conducting emergency or development activities in Mozambique are required to conduct surveys and maintain systematic records on the populations involved in their programs. The surveys are designed to assess program impact, especially production, income, and health indicators. For some of the USAID NGOs, MSU with assistance of analysts from MOA/DE used the TIA data to develop a system of proxy indicators to estimate the income impact of their programs (Walker et al. 2004). The surveys are not always based on systematic sampling methods, but are informative for the populations of interest when conducted systematically.

4. USE OF THE DATA

Mozambique's agricultural data is used for a variety of economic analyses, development planning, and policy purposes. In the previous section we have described the anticipated uses of the different data collection systems in broad terms. In the following paragraphs, we describe how the data are actually used for recurrent annual reports (e.g., national accounts, food balance sheets, PES) and for a variety of agricultural policy analyses capable of contributing to improved agricultural performance, economic growth and poverty reduction. We discuss the analytical capability of the key actors using the data, the dissemination systems in place, and constraints that place limits on realizing the full potential of the data.

4.1. Recurrent Annual Reports

4.1.1. Poverty Reduction Action Plan (PARPA) and the Economic and Social Plan (PES)

The monitoring of the PARPA and the PES are evolving systems, and as of 2007, the PARPA indicators have been included in developing and monitoring the PES. The current system adapts to the information available, and there are efforts to identify gaps in the data collection system and alternatives. The most recent PARPA and PES evaluations mainly used a combination of IAF, EWS, and TIA data, with minor sources filling in a few gaps for the agricultural sector. To understand this, it is best to look at PES 2008.

Looking at PES 2008, performance indicators were set in May-August and published in September 2007 for the coming fiscal year. We find that production and area indicators are established based on the predicted values from the EWS, using regional weather data (*República de Moçambique* 2007). The PES focuses on the following smallholder crops: maize, millet, sorghum, rice, groundnuts, beans, and cassava.   For large-scale commercial agriculture and family sector cash crops, the PES sets goals for cashew nut, coconut, sugarcane, tobacco, tea, cotton, soy, groundnuts, beans, citric fruits, and horticultural crops. The percentage of family sector farmers selling agricultural commodities is also estimated as a goal, by crop. The PES contains indicators for livestock herds and livestock products (cows' milk, eggs, etc.) as well as forest products. Stemming from the political drive to implement a Green Revolution in Mozambique, there are indicators for varietal adoption, use of new technological practices for productivity improvements and for soil conservation, expansion in irrigated area, in addition to adoption of improved planting materials and improved handling of germplasm. Specific goals of improved seed production are established by crop and by province, along with highly specific goals for animal protection, including vaccination programs.

Monitoring progress on the PARPA relies heavily on the national household budget surveys (IAF), using the 1996 IAF and poverty analysis as a baseline. However, the national agricultural surveys (CAP and TIA), also contribute to analysis of progress with the PARPA for rural households, especially the TIA surveys with income components in 2002 and 2005. The use of consumption/expenditure data (as in the IAF) rather than production and income data (as in TIA) for poverty assessments is a

debate in the literature (Boughton et al. 2006). Mozambique fortunately has both types of large sample data sets, as well as a panel dataset with TIA, and so can use them to evaluate different estimates, although only the TIA data are easily available to researchers and students. While the differences are controversial, the debate is valuable (Hanlon 2008).

4.1.2. National Accounts: Ag Sector Components of GDP

Various sources of agricultural production data are used to develop estimates of agricultural GDP because there is no single survey or system of surveys that covers all the agricultural production activities in the primary sector. The National Accounts staff, located in INE, is responsible for developing the estimates using the available information and their knowledge of the agricultural sector. The annual GDP results are released in July of the following year, and so data availability for estimates will influence the data being used.

EWS data were used until 2000/2001 for maize, rice, beans, groundnuts, millet, sorghum, cassava and other tubers (commodities covered in the EWS). Between 2000/2001 and 2004, the EWS data were not used directly but rather were adjusted based on trends and other insights by the National Accounts staff. They did not have confidence in the EWS data of the period. By 2004, when TIA data were available earlier in the year, the National Accounts system adopted them as the standard for all annual crops, with the exception of fruits and horticultural commodities. National Accounts staff members still take time to look at trends and other indicators that may mean adjustments, when they are unsure about the information from TIA or have information from other sources. The horticultural commodities and fruits pose special challenges for the national accounts staff. Both sets of commodities are mostly consumed on farm and harvested in small quantities, and TIA data collection may underestimate production using annual recall, although improvements are made with each TIA. The IAF short-term recall system on home consumption of production may more accurately capture the totals for fruits and vegetables. National accounts staff compares the estimates of production for fruits and vegetables based on TIA production numbers and also those imputed from IAF consumption numbers and use their own judgment and past information to determine the production estimates to use. Note that coconut production estimated from the TIA is also considered problematic (under-estimated), from the National Accounts point of view, and industry estimates are obtained to adjust the production numbers.

For commodities not presently covered (or not adequately covered) by TIA, the National Accounts staff relies on the commodity institutes for the production information, including the Sugar Institute, Cashew Institute, and the Cotton Institute. Another gap is in forest and forest-related products, which are generally not covered under the TIA. In the most recent IAF, household sales of forestry products (wood and charcoal jointly) were valued, and that was used for the national accounts. When there is not an IAF (as in 2005 and 2006), earlier estimates from IAF are extrapolated.

Some commodities (such as rice and large animal livestock) are based in limited, geographically-concentrated areas, such that the sample selection of the TIA and IAF will not be able to accurately estimate production, unless sampling methods specifically address these commodities by increasing sample size in these areas

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(Megill 2002a). Megill demonstrated the very wide confidence intervals for these estimates and in a recent USAID report the authors made a plea: "The National Statistics Institute should make a concerted effort to improve the accuracy and reliability of the National accounts data on agriculture." (USAID 2004, p.230).

4.1.3. Food Balance Sheets (FBS)

The FBS are developed by the MINCOM National Trade Directorate, by the staff of INFOCOM in collaboration with the staff of the EWS. This arrangement arises from the FAO technical assistance to both INFOCOM and EWS, for the FAO is the international agency that has developed the FBS approach. The objective of the FBS is to identify possible difficulties in meeting human food consumption needs in the coming year, as estimated during the harvest. To accomplish this, the FBS evaluates annual production and stocks and compares the total available for human consumption to estimates of quantities needed for human consumption. The main users of the FBS are the national policymakers formulating food aid, trade, and other policies, and the international donors making decisions on food aid, local purchases of stocks. Private sector users might also seek the information as an input into decisions on import/export or intra-market trade.

As mentioned, the FBS in Mozambique evaluates production and projected total supplies of cereals, tubers, beans and groundnuts. The cereals included are maize, rice, wheat, sorghum and millet. For each of these commodities they use the EWS production estimates. Consumption is not measured, but rather estimated based on an average consumption amount multiplied by the population. Trade numbers are for the formal sector (official trade statistics) and the informal trade, based on estimates from the cross-border studies. The FBS is estimated first for each of the three geographical regions (North, Center and South) and then nationally. The results are published annually, but we know of no attempt to update the FBS *ex post* with potentially more accurate data.

4.2. Other Uses and Reporting

4.2.1. Policy Analysis: MOA Directorate of Economics, Department of Policy (DP, Formerly DAP)

Formed in the early 1990s within the Directorate of Economics, DP (then known as the Department of Policy Analysis or DAP) began developing research and providing analysis of key policy issues. The TIA and SIMA data were a major input in the analyses, and the technical assistance of Michigan State University in training analysts and supporting improvements in methodology combined with investments in Ministry personnel to ensure the research inputs. Since TIA and SIMA were also based in the Directorate of Economics and receiving technical support from MSU, linkages were established between statisticians and agricultural analysts on a regular basis. DP analysts participate in the TIA each year, better equipping them for TIA analysis, but also enabling them to contribute to TIA development. For some issues, special surveys were conducted as with the cotton area survey discussed earlier. A list of the outputs of DE, especially DP, are available at the MSU website for the MSU/MOA collaborative research (found at http://www.aec.msu.edu/fs2/mozambique/index.htm),

and the range of topics can be viewed. There are over 60 research reports, 50 policy syntheses (known as Flash), as well as student theses and other research publications. With MSU technical assistance, the TIA data are now available each year on a CD, with complete documentation.

Since 1991, a core team of policy analysts has been recruited and trained by MSU for DP, with in-service training of recent university graduates and with formal graduate training at MSU and elsewhere, including several MS and PhD level analysts in agricultural economics. Unfortunately, MOA has had difficulty retaining trained staff, as they leave for other jobs in Mozambique, reflecting the high demand for such analysts elsewhere in the economy and the difficulties with MOA staff incentives and working environment.[8] There are two key consequences of this: 1) the quality of the data collection is not assessed through use and thus problems/improvements are not necessarily identified; and 2) demand for the results is limited by lack of knowledge of the power of the available datasets to answer key questions. DP analysts are generally limited to meeting short term demands of the Ministry, a firefighting mode, leaving little time for developing research products with a broader development perspective.

4.2.2. *Use of SIMA and TIA Data by other Analysts*

The TIA and SIMA data are increasingly used by researchers in the Universities and elsewhere. Recent work by MSU researchers with analysts at the National Agricultural Research Institute (*Instituto de Investigação Agrária de Moçambique*, IIAM) used the TIA data with SIMA prices to evaluate agricultural research priority setting in the light of poverty reduction objectives (Walker et al. 2006). World Bank researchers used the TIA data in their analysis of poverty trends in Mozambique (World Bank 2007).

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[8] Two of these trainees are World Bank/Mozambique staff members as of 2007.

5. GAPS, DIFFICULTIES AND OPPORTUNITIES

The combination of efforts in Mozambique provides a wealth of information, but it is not without gaps and difficulties, some of which have been cited earlier in this document. Kiregyera at al. (2007) provide the most recent summary of the challenges with recommendations on the way forward, although they confine themselves to the narrow range of agricultural statistics, rather than the broader range needed for PARPA, PES, and MDG assessments. It was in 1999 that the donors and the government of Mozambique agreed to establish and fund the Agricultural Sector Public Expenditure Program (PROAGRI), a program that would have strong impacts on agricultural data collection systems and analysis, due to the information needs and performance measurement. Combining this with the PARPA and later PES indicators, the system has been challenged while at the same time, received greater attention and resources. In this section we will include and extend the Kiregyera et al. 2007 assessment with a view to these wider considerations.

Related to the institutional design of the various systems is the disconnect between the EWS in the National Directorate of Agriculture and the other data collection efforts of the Department of Statistics in the Economics Directorate, both within MOA. Kiregyera et al. (2007) provide an excellent diagnostic of the difficulties and confusion that this combination has caused. As they demonstrate for 2005, the differences in production and area estimates at the provincial level for main food crops reaches as high as 48% for the main crop, maize, in the highest producing province (Zambezia), and overall for 2005, EWS estimated 1268 thousand tons compared to 942 thousand tons estimated through TIA. For such an important crop for food security, this range is a problem. Given the lack of transparency in the EWS numbers, TIA numbers are considered more reliable. Ideally, EWS numbers would be estimated with greater transparency, used in the period before TIA numbers are available, and then final production numbers would be based on TIA, with adjustments for special cases. At the very least, as recommended by Kiregyera et al. (2007), EWS and TIA efforts should be housed in the same unit in MOA, and they should complement each other.

Timeliness is often cited as the reason for using the EWS data as the national production statistics in the national accounts and the PES. However, at the National Accounts office, they rejected using the more timely EWS indicating that the numbers were not credible, and beginning in 2004, they preferred to use the TIA estimates, with adjustments and additional information. The delays in getting TIA data did not prevent them from being useful, but certainly faster availability would be a plus. Data systems are in place for field based data entry and more automated data entry and cleaning, but if statistical and analytical capacity in MOA is not reinforced, those systems can easily break down.

Livestock data, especially cattle data, and selected agricultural production data in the TIA large sample survey system have problems due to geographic specificity in production and relatively few households with cattle or selected crops. Megill (2002b) has made recommendations to enhance the reliability of TIA estimates through changes in survey sampling, but additional improvements may be needed to fully address the problems for estimates of large animals and fruits and vegetables. Continued analysis using both consumption and production/income data are needed to determine the reliability of estimates and develop new systems for data collection.

To ensure and improve agricultural statistics, analysis provides the checks on data quality and confirmation on usefulness. The lack of analysis of the agricultural statistics means that potential data issues do not arise and systems cannot be improved. In addition, the relative lack of demand for policy analysis means that the data that exist are under-utilized, an efficiency loss of potentially high magnitude given the costs involved. Earlier analytical work within MOA's DE has demonstrated the value of agricultural statistics, as with the analysis of the impacts of open borders for maize trade (Tschirley et al. 2005) and the analysis on the tobacco tax (Benfica et al. 2004), in both cases responding to policy needs. The combination of both statistical capacity (DEST) (with TIA and SIMA efforts) and analysis (DP) in the Directorate of Economics (DE) in MOA facilitated data enhancements, corrections and analysis.

Recent debates on poverty measurements have highlighted the need to use both production/income data and consumption/expenditure data to measure poverty and poverty dynamics (Hanlon 2007, Hanlon 2008, and Arndt 2008). With the first large household-level panel data set for Mozambique, MOA is leading the curve on data collection, but now needs to invest in analysis. USAID continues to support efforts on policy analysis with the MSU project, and PROAGRI donors support greater analysis. MOA with a new director in DE and a new Minister have the potential to develop human resources for agricultural policy analysis. Support for agricultural sector policy analysis in the Ministry of Planning and Development will also contribute to using the wealth of currently available agricultural sector data to understand the dynamics of this critical sector in the Mozambican economy.

Current technical assistance through donor projects is often not used in training new professional staff. There is a delicate balancing act for foreign technical assistance, as it tries to ensure training of local professional staff at the same time that it works with local analysts to use the data. Without direct technical assistance participation in the activities, the quality of the data may be compromised when there are too few national staff members to conduct the work. There are two difficulties. First, when the technical assistance partners leave, there are too few national staff members to complete the work. Secondly, given the existing stock of data, now is a key period to invest in training and analysis, demonstrating the value of the data collection effort. Technical assistance should focus on the analytical side, but the Ministries will need to recruit and retain new national staff.

With the push for decentralization of government decision-making and budgetary allocations, there are two key difficulties. First, local administrators need statistics at the district level. Currently the TIA agricultural statistics are collected to be representative at the provincial and agro-ecological zone levels (separately) but not down to district levels. The sample size would need to be at least doubled to meet the district level needs for the most basic statistics, and it is not clear where the additional funds would come from. Even if the statistics were developed down to district level, large investments in district level analytical capacity are needed to exploit such data, something that will take years. Secondly, decentralizing agricultural statistics data collection responsibilities and budgets even down to the provincial level (including budgetary authority at the provincial level) was found to be mistake, due to delays and other problems in implementation that threaten the national validity of the TIA as a whole (Kiregyera et al. 2007). As of 2007, the TIA will once again be afforded a national level budget for coordination and execution.

In Mozambique, the government has made substantial investments in the TIA and other data collection efforts. However, as for most of the public sector budget in Mozambique, funding for the efforts comes from donors. The PROAGRI consortium of donors, along with some bilateral funding, has contributed to the relative abundance of agricultural statistics, but funding delays and uncertainty occur each year. Questions on the need for a full household income and production survey each year have been raised. MOA is working to reduce the costs of annual data collection with the TIA light, but these surveys are still costly in Mozambique, costing more than $100 per household in 2006 (Kiregyera et al. 2007).

In the area of market information, SIMA demonstrates that a public system can be responsive and efficient in providing a range of services to both public and private sectors. SIMA started as a project with MOA and Michigan State University, with heavy involvement of expatriate analysts. Given the resources over 10 years, it has been fully institutionalized and works fully funded and operated by the government. The initial project years gave it the reliable systems and staff development that enabled the transition to occur. In other cases, public MIS have collapsed after the reduction of expatriate resources. Yes, with almost 700 continuous weekly bulletins over more than 15 years, SIMA has become recognized regionally as a valuable example of MIS development. However, SIMA staff recognizes the need to innovate and adapt to increasing demands from the private sector as agents respond to new market opportunities and new information and communication technologies. Innovations tend to be stifled within the large bureaucratic environment in MOA, and the need for greater autonomy in budget and activities is evident. SIMA also suffers from the difficulties of providing staff incentives in the public sector, as noted below.

Public sector staffing remains a key constraint to development of data systems and analysis. MOA suffers from a lack of trained professional staff, a consequence of low professional salaries and challenging working conditions (late salary payments, problematic access to resources to conduct the work, lack of MOA recognition of the importance of the work, among other factors). Retention of capable staff is difficult until the professional cadre are recognized and rewarded.

6. LESSONS OF RELEVANCE FOR AGRICULTURAL STATISTICS SYSTEMS ELSEWHERE IN AFRICA

There are several areas in which the Mozambican experience provides lessons for agricultural statistics systems elsewhere. Here we will address both the positive experiences, such as SIMA, combined statistical/analytical capacity within a single unit. Methodological improvements, and the more difficult experiences as with staff retention and the development of crop forecasting systems.

With SIMA, MOA demonstrates that a publicly-based MIS with skilled staff and a minimum of resources can operate and provide services. Starting from a project base and evolving into a Mozambican national system takes medium to long term commitments from those who fund the system, as well as those who guide the system. In the case of SIMA, it was fully institutionalized after about twelve years of external support, although the shift occurred gradually during the twelve year period. However, in the increasingly dynamic environment of markets and technology, innovation and response to user needs require greater autonomy over the longer run. A government Department of Statistics may not be able to sustain the effort needed, without strong political support and vision.

The Ministry of Agriculture in Mozambique has developed skills and experience in the design, implementation and analysis of agricultural statistics. It demonstrated how agricultural surveys are improved when the Analytical Unit is based within the same overall unit (Directorate of Economics) as the Statistical Unit. (The EWS suffers from being isolated in another unit of MOA.) That interplay has been successful in integrating new design and implementation aspects. The relationship also facilitates the incorporation of selected new topics into the surveys.

The lack of staff retention however has weakened that linkage, both on the survey side and on the analytical side. Without the investment in analysis, MOA and others cannot capitalize on investments in methodological improvements. Methodological and technological improvements worth implementing in other environments include the use of GPS and field-based data entry, both of which have made valuable contributions to data timeliness and quality. The experience with PDAs, however, was less favorable and highlights the care needed with technological improvements. Areas still needing improvements include livestock and commercial farmers, as is true for other countries in the region.

Mozambican policymakers recently invested with donors in assessing crop forecasts, acknowledging it as an area of problems within the agricultural statistical system. Different administrative departments are responsible for related aspects of agricultural statistics, as is the case with DEST and EWS. This is an inefficient use of scarce skilled labor and resources. One of the problems may arise from the nature of technical assistance. FAO technical assistance focused on the National Directorate for Agriculture with its Early Warning Unit and leadership of SETSAN, thus the emphasis on EWS and on the SETSAN Vulnerability Assessment. USAID with Michigan State University was involved in policy analysis with the Directorate of Economics and hence the capacity was developed there for the household surveys. The TIA and EWS staff members did not coordinate or discuss the increasing differences in their estimates until the 2005 disconnect captured the attention of

policymakers and donors alike. In 2005, the differences in production estimates from the two systems resulted in confusing messages to policymakers, duplication of efforts, and sometimes misguided efforts. Both national policymakers and foreign technical assistance failed to make the needed linkages in the systems.

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Annex 1. Seasonal Calendar of Agricultural Activities
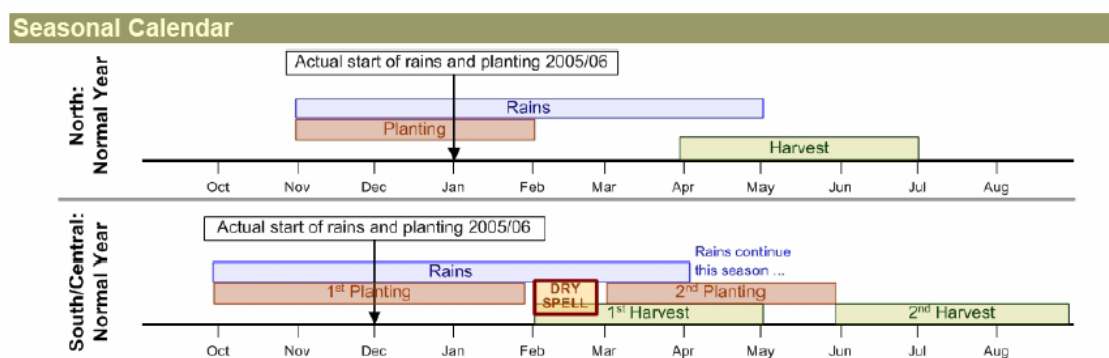
Source: FEWSNET, Mozambique Food Security Update, April 2006.

Annex 2. Mozambican Capacity to Monitor and Evaluate MDGs

Table 1.2   Capacity to monitor and evaluate the MDGs

OBJECTIVE	EXISTING CAPACITY FOR				
	Gathering data	Statistical follow-up	Statistical analysis	Integration of statistics into policies	Assessment of annual progress required
Extreme Poverty	Strong	Strong	Fair	Fair	Fair
Hunger	Fair	Fair	Fair	Weak	Weak
Universal Primary Education	Strong	Fair	Fair	Fair	Fair
Gender Equality	Fair	Strong	Strong	Weak	Weak
Child Mortality	Strong	Strong	Strong	Fair	Fair
Maternal Health	Fair	Fair	Fair	Weak	Weak
HIV and AIDS	Fair	Fair	Fair	Fair	Fair
Malaria and other Diseases	Fair	Weak	Fair	Fair	Fair
Environmental Sustainability	Weak	Weak	Weak	Weak	Weak

Source UN & GoM (2005). Relatório sobre os Objectivos de Desenvolvimento do Milénio (Report on the Millennium Development Goals)

Source United Nations Development Programme (UNDP). 2006. Mozambique National Human Development Report 2005: Human Development to 2015, Reaching for the Millennium Development Goals. Maputo: UNDP, p.9.

Annex 3. SIMA Products

List of SIMA products
Code

1	White maize grain- national
2	White maize grain- donated
3	White maize grain- imported
4	White maize flour - w/o germ, imported
5	White maize flour - w/o germ, national
6	White maize flour - w/o germ, "grits"
7	White maize flour - with germ
8	Yellow maize grain
9	Yellow maize flour -w/o germ, imported
10	Yellow maize flour - w/o germ, processed
11	Yellow maize flour - w/o germ, national
12	Yellow maize flour - w/o germ, "grits"
13	Yellow maize flour - with germ
14	Cassava flour
15	Wheat flour- national
16	Wheat flour- imported
17	Cow peas
18	Common beans
19	Pigeon peas
20	Rice - ordinary
21	Rice – parboiled
24	Edible oil - bulk – national
25	Edible oil - bulk – imported
26	Groundnuts – small
27	Groundnuts – large
28	Cassava - dried chips
29	Cassava – fresh
32	Millet
33	Sorghum
34	Sunflower seeds
35	Sesame seeds
37	Cashew nuts
40	Brown sugar- national
41	Brown sugar- imported
50	White maize flour - w/o germ, national Second quality
51	White maize flour – First Quality w/o germ, national
120	Paddy rice
126	Groundnuts- small, unshelled
127	Groundnuts- large, unshelled
180	Common beans, imported