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Strengthening Mozambican Capacity for Agricultural Productivity Growth, Policy Analysis, and Poverty Reduction

Annual Project Narrative Report - FY09 (2008/09)
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**Annual Project Narrative Report FY09
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Strengthening Mozambican Capacity for Agricultural Productivity Growth, Policy Analysis and Poverty Reduction

Introduction

The main challenge facing the government in the 2008/09 cropping season and in the medium term is how to increase productivity and production to enhance Mozambique's food security in the face of volatile domestic and international food prices. The mechanisms for the implementation of the government's three-year Action Plan for Food Production (known by its Portuguese acronym: PAPA) are still not well defined. While the government initially contemplated the introduction of productivity-enhancing technology packages involving both improved seeds and chemical fertilizers, the fertilizer component had to be dropped since the expected donor support did not come through. As a consequence, the pilot fertilizer and seed voucher program was also shelved. The action plan was also limited by the lack of direction to bring about changes in market access for the food products covered by the plan. With colleagues in the Directorate of Economics (DE) of the Ministry of Agriculture (MINAG) and the Institute for Agricultural Research of Mozambique (IIAM), MSU continued to play an important role in informing policy decisions to promote profitable value chains and public investment decisions that will induce productivity increases under the market-led economy.

As the country prepares for a national election at the end of October 2009, the government has moved fairly slowly on the policy front. At its Annual Regional Policy Dialogue, the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) awarded the president of Mozambique the 2009 Food Security Policy Leadership Award for spearheading the country's green revolution. The Green Revolution Strategy, PAPA and Food Security and Nutrition Strategy (SEN II) were cited in support of the award. Many of the objectives in the Green Revolution Strategy and PAPA have been seen before in the Poverty Reduction Strategy and in PROAGRI policy documents and are reflected in the Strategic Plan for the Development of the Agriculture Sector (PEDSA) in preparation. Key challenges for the government are to prioritize investments and then develop the operational means to fulfill the objectives of these strategies simultaneously guaranteeing articulation with regional and continental initiatives, especially the Comprehensive Africa Agriculture Development Program (CAADP) process.

Discussions on 2009/2010 cropping year and initiatives related to PAPA have continued. The Food and Agriculture Organization of the United Nations (FAO) under the European Union (EU) Food Facility have specific programs with inputs including subsidies, and there are other donor initiatives to provide inputs, mechanization with tractors, and other services. Some silos have been constructed under PAPA. Although not specifically directed to PAPA, a seven year program for promotion of rural markets (PROMER) on the Nacala Corridor was launched in mid August. The program is co-financed by the government of Mozambique, the International Fund for Agricultural Development (IFAD) and the Alliance for a Green Revolution in Africa (AGRA).

For agricultural statistics, a major international conference was held in Maputo. The International Statistics Institute (ISI) Satellite Meeting on Agricultural Statistics, with FAO, was held in August in Maputo and convened specialists throughout Sub-Saharan Africa. Mozambique participation was strong and MSU staff also participated. This conference was

able to bring to the forefront the strengths and weaknesses of existing systems and the lessons that can be learned from experiences across Africa and elsewhere.

The bridge over the Zambezi River was inaugurated in August and should result in greater market integration between the north, center, and south of the country. Evaluating the market impact of the bridge will be important in the future, as it may change agricultural marketing dynamics and offer new opportunities for the private sector.

This report covering FY09 (October, 2008 – September, 2009) is organized by project objective and the corresponding activities as stated in the project work plan for this fiscal year.

Objective 1: To assist MINAG in building institutional capacity to raise smallholder productivity and income through improved technology, markets and policies

1.1 Strategic Plan for Agricultural Sector (PEDSA) and for IIAM

The Strategic Plan for Development of the Agricultural Sector (PEDSA) is yet to be concluded. The draft document has been widely presented and received many contributions. A revised draft document was presented to the technical meeting of PROAGRI and to the Coordinating Council. The objective of the presentation was to get input from the stakeholders to be used to finalize the document. The earlier draft has been revised to include recommendations from the Coordinating Council and PROAGRI working group. The key feature introduced in the revision, is the alignment of the plan with the CAADP pillars. Discussions are also on-going on how to package an operational/investment plan to be compatible with CAADP compact. MSU staff participated in various meeting in which the document was discussed but are not involved directly in its finalization. The Director of DE has requested that MSU help MINAG in the preparation of the operational plan once the base document is concluded.

Gilead Mlay was heavily involved in the finalization of the draft document of IIAM's strategic plan which was presented in a one-day workshop on Making Science and Technology Work for Agriculture at The Joaquim Chissano Conference Centre, Maputo on the 28th of November of 2008. The workshop was one of the activities during the Annual General Meeting of the Consultative Group for International Agricultural Research (CGIAR). The presentation was very timely for IIAM, providing an excellent opportunity to get contributions from people with wide experience in agricultural research management and planning. IIAM also benefited from the presence of the Mozambican Minister of Science and Technology and the Minister of Agriculture, whose support is important. Campus backstop Boughton also reviewed the draft strategic plan and emphasized the need to revise the investment plan in light of the strategic plan recommendations, and identified conservation as a key gap in light of the importance of rain fed agriculture.

Progress has been made with IIAM's Strategic Plan for Research. The revised draft of the IIAM strategic plan was circulated to key stakeholders for additional comments. The MSU in-country Director participated in the revision of the strategic plan. A two-day consultation meeting was held with the CGIAR Centers on May 18-19, 2009 and discussion focused on the strategic themes of the plan. Dr. Mlay participated in preparatory meetings and subsequent meetings for the revision of the plan. The main task to follow after the revision of

the general strategic document is the preparation of the investment plans which will form part of the package to be submitted to the government for approval.

The presentation of IIAM's strategic plan for approval by the government has been delayed until after elections. While additional revisions are being done, the key task now is the preparation of the investment plan which will form part of the package to be submitted to the government for approval and MSU staff will be contributing.

1.2 The three-year action plan for food production (PAPA)

MSU continued to provide technical input for the preparation of technical fact sheets ("*fichas técnicas*"). The technical working group is composed of staff from DE, IIAM, Directorate of Agricultural Services (DNSA) of MINAG and the Faculty of Agronomy and Forestry Engineering (FAEF) of Eduardo Mondlane University (UEM). Draft technical fact sheets have been compiled from secondary data based on the methodology previously developed with support from project staff. They provide information on crop calendar, input use, and a budget by season, agro-ecological zone and level of use of yield enhancing inputs (low, medium, higher) and under rain-fed and irrigation and cover the following crops: maize, sorghum, rice, wheat, peanuts, soybeans, beans, cowpeas, sesame, sunflower, sweet potatoes, irish potatoes, cassava, tomato, cabbage, onion, and cotton. The work was done by a team of agronomists led by Dr Manuel Amame, the Director of the Directorate of Agronomy and Natural Resources of IIAM.

The Center for Socio-Economic Studies (CESE) of IIAM in collaboration with the Directorate of Economics (DE), the Directorate of Extension, and FAEF will carry out limited data collection to validate some of the coefficients (labor, use of animal traction and tractor power) and to collect price data. The project in-country team will backstop CESE and DE to prepare a guide to be used in the validation of the technical fact sheets. A database is being created to facilitate the revision of data and parameters (e.g., prices) such that new sheets can be produced automatically. This process is being led by Dr. Marcos Freire.

Primary data collection to fill information gaps and to validate technical coefficients for the preparation of the technical sheets did not take place during FY9 as funds were not yet available through the government budget. It was decided to consolidate the work already done based on secondary data and extend this work to crops which were not yet covered. As soon as funds are available, focus groups interviews involving leaders of the commodity programs will take place to review and complete the missing technical coefficients.

The technical fact sheets are considered important for implementation of PAPA because they provide necessary technical recommendations on input use and implementation of crop calendar. In addition, they provide information for assessing farm level profitability based on expected prices for inputs and outputs and yield.

Gilead Mlay and Duncan Boughton participated in a one-day national wheat meeting to discuss the plan for the development of wheat value chain. The meeting was attended by processing companies, seed suppliers, staff from IIAM, UEM, Ministry of Commerce and MINAG and was chaired by the Minister of Agriculture. The meeting reviewed the performance in 2008/9 and the following were noted:

- Although improved seed (Nduna variety from Zimbabwe) was made available through government distribution, yields were low. The beneficiaries were expected to pay back the seed in kind after harvest but no mechanism was instituted to guarantee compliance;
- Only one private milling company (MEREC) was purchasing wheat grain from Manica, Rotanda and Tsangano for 8MT per kg. Buyers from Malawi are paying an equivalent of 10 MT/kg. The purchases by MEREC were very low compared to what was promised as available quantities;
- According to MEREC, local purchase is unprofitable at 10 MT/kg due to high transport costs resulting from poor state of the roads;
- While the government will continue to promote wheat production, profitability will be a key consideration. Farmers are free to sell to Malawi or elsewhere, seeking the more profitable market. Government will promote small-scale mills in proximity to production areas;
- There is a need to explore other models to support smallholder production that would be less dependent on government.

1.3 Human resource development in MINAG-DE and IIAM-CESE

The project has been supporting capacity building in the Departments of Statistics and Policy Analysis (TIA and SIMA). In both departments, in-service training has been hampered by difficulties the Directorate has in contracting new staff. In both departments, candidates have been interviewed and the Directorate has finalized the paperwork to initiate the contracting process. The principal stumbling block is the long process it takes (up to a year) to have the contracts approved by the Administrative Tribunal. During this period MINAG cannot admit them since the effective date of employment is the date the contracts are signed by the Administrative Tribunal. The experience has been that, by the time approval is received from the Administrative Tribunal, most if not all the good candidates are lost to the private sector or NGOs who are able to contract immediately. MSU through the project has provided internship to three new technical staff (1 for SIMA and 2 for Statistics). The allowance paid to the interns was slightly below salary they will receive when they are employed by MINAG. Discussions are on going with the International Food Policy Research Institute (IFPRI) and the World Food Program (WFP) for possible additional support to other candidates in the process of being contracted by MINAG-DE. One SIMA staff is currently being supported by Rockefeller Foundation project.

Discussions have been held with the Mozambique Strategic Analysis and Knowledge Support System (Moz-SAKSS) team leader and the Director of DE to have a common institutional approach to address the human resource situation in DE in relation to hiring, training and retention. It is expected that the project and Moz-SAKSS will coordinate the capacity building activities to maximize on the synergies.

In-service training

The two new SIMA staff underwent intensive on the job training, participating in production of Quente-Quente and participated in the Windshield Survey. The TIA intern received in-

service training under the guidance of Ellen Payongayong and is also involved in preparatory work for the Agricultural and Livestock Census to be conducted later this calendar year.

CESE socio-economists in Maputo and at the Nampula Zonal Research Center were trained in the use of focus group interviews to collect additional field data for the enterprise budgets. Gilead Mlay prepared general documents outlining the steps to be followed to carry out enterprise profitability studies (“*Análise da Rentabilidade de Culturas Alimentares e Industriais: Procedimentos a serem seguidos*”). Raul Pitoro prepared a guide for primary data collection and carried out the training for the CESE socio-economists in Maputo and Nampula.

Gilead Mlay and Raul Pitoro continued to backstop the CESE socio-economists in the implementation of the maize, cassava, cashew and poultry (broilers) profitability studies. The study on commercial broiler production in Maputo shows that the competitiveness of domestic production hinges on reducing feed costs as they account for more than 68% of the variable costs. Day old chicks account for about 20% of the variable costs. Policies to promote efficient local production of raw materials for rations (eg soya beans) and development of industry for animal feeds will contribute in making local broiler industry competitive. We are currently working to have greater involvement of UEM on analytical issues and training to ensure sustainability in those aspects.

Gilead Mlay continued to work with the CESE staff in Maputo to develop their value chain research proposals initiated during the value chain training (presented below).

Value chain training

In collaboration with the Pulse CRSP (Dry Grain Pulses Collaborative Research Support Program) and IIAM, the MSU project organized and offered a course in value chain analysis for staff of IIAM and Directorate of Economics of MINAG, March 5-13, 2009. The course was divided in two modules. Training was coordinated by Cynthia Donovan while Gilead Mlay and Helder Zavale collaborated with her in preparing and conducting the training. Higinio Marrule from TechnoServe, Jose Bombe from SNV Holland, and Manuel Filipe from the International Livestock Research Institute (ILRI) contributed very valuable case studies.

The general objective of the first module was to provide basic knowledge and skills to enable the participants to exploit the value chain framework in the process of technology development and transfer and in agricultural development activities. This module lasted two days. The target group for Module I included technical directors, heads of research in Zonal Research Centers and researchers from IIAM, heads of department, analysts and planners from the Directorate of Economics. Module I was attended by 34 participants among whom 15 were women. The program for this module together with the list of participants is presented in Appendices 1a and 1b. Reviews of the module indicated high satisfaction with the materials and presentations.

The general objective of the Module II was to provide more in-depth knowledge and skills about value chains to participants to enable them to implement value chain studies. This module was restricted to researchers and analysts from IIAM and the Directorate of Economics involved in implementing studies and analysis to inform decision making and was conducted over five days. To ensure that the knowledge and skills gained from the course will be used after the course, participants initiated the preparation of proposals, determined jointly with the Department heads to ensure linkage with current priorities. The following

value chains were selected – rice, cassava, Irish potatoes, beef cattle, animal feed, charcoal, and maize. This module was attended by 15 participants among whom 7 were women. The program for this module is presented in Appendix 1c. Participants are continuing to work and develop this research, with revised proposals.

Graduate training

Alda Tomo successfully defended her MS thesis and finalized her MS thesis edits, including additional simulations. Tomo returned to Mozambique with MS degree to resume her post with IIAM/CESE. Another CESE analyst, Isabel Siteo, continued with MS coursework in Australia with funding from the Australian government.

Ana Lidia Gungulo attended a four week English course in Durban, South Africa to prepare to the TOEFL examination. Ana Lidia Gungulo started her pre-MS training at the University of Pretoria, under funding from the Pulse CRSP. This is a one year program which involves taking advanced undergraduate courses in economic theory, agricultural economics, statistics and English. Upon successful conclusion of the program, she will be admitted into the MS program in Agricultural Economics at the University of Pretoria. Her training will take longer than anticipated under the Pulse CRSP, and additional funds will be sought from other sources, assuming good progress in her studies. Her training is considered a high priority for IIAM/CESE staffing, to complement the other training efforts. Her research will focus on value chain of common beans in Mozambique.

Objective 2: To strengthen the capacity of IIAM and MINAG to identify and disseminate profitable agricultural technologies

2.1 Evaluation of the impact of vaccination against New Castle Disease in Central and Southern Mozambique

Alda Tomo's Masters Thesis "[Economic Impact of Newcastle Disease Control in Village Chickens: A Case Study in Mozambique](http://www.aec.msu.edu/fs2/mozambique/iiam/rr_1e.pdf)" was finalized and made available on the website. This study indicates high farm-level financial returns to Newcastle Disease control programs, especially for those households with flocks of 10 chickens or greater. Tomo's analysis also demonstrates high potential economic returns to expanding vaccination efforts. Her survey results are based on the experience with Newcastle I-2 vaccine rollout programs in southern Mozambique, and the field work enabled her to modify existing programming on returns, adjusting them to the reality of Mozambican village chicken production. This work is the first CESE effort with ex ante research impact analysis for the livestock sector and follows on the work with cassava (http://www.aec.msu.edu/fs2/mozambique/iiam/rr_1e.pdf), and Bt cotton (http://www.aec.msu.edu/fs2/mozambique/iiam/rr_5e.pdf). The initial study by Walker et al on research priorities for income and poverty reduction (http://www.aec.msu.edu/fs2/mozambique/iiam/rr_3e.pdf) suggested that increases in chicken production could significantly contribute to poverty reduction in rural areas, and Tomo's research points to a way to achieve productivity gains. Appendix 2 presents the abstract of Tomo's thesis. Tomo is developing outreach on the research on Newcastle disease control.

2.2 Profitability studies

Profitability studies were initiated for maize in Boane and for cotton and cashew in Nampula. The studies are being conducted by CESE socio-economists under supervision by project staff. Fieldwork and analysis have been completed for the maize study in Boane. The synthesis draft on maize profitability in Boane has been revised by the CESE socio-economists and extended to include maize intercropping with cowpeas under rain-fed conditions. Data collection for the cotton and cashew studies has been concluded and analysis and report write-up are underway.

Cassava is one of the target crops for the government, and there are various activities at IIAM. MSU staff assisted the Roots and Tubers team at IIAM to complete economic analysis for the cassava manual being produced, in addition to helping design the implementation of a new FAO cassava research project in Zambezia Province. Additional work with profitability includes support to research design for the STABEX project on cotton and cashew in Nampula, and analysis of the data collected by CESE analysts on maize profitability research.

2.3 Evaluation of the potential impact of Bt cotton

Raul Pitoro presented a paper titled “Can Bt Technology Reduce Poverty among African Cotton Growers? An Ex Ante Analysis of the Private and Social Profitability of Bt Cotton Seed in Mozambique” at the 27th Conference of the International Association of Agricultural Economists held in Beijing on 16-22 August, 2009. The paper is available as [IIAM Research Report 5e](#). The transgenic Bt cotton varieties have built-in resistance to bollworm, a devastating insect pest, yet only South African producers are currently using them. This working paper presents a detailed review of the experience of other countries who have adopted Bt cotton, and then an economic ‘experiment’ to estimate the expected profitability of cotton production based on farm-level cotton pest control and crop management data. Where bollworm is present, Bt cotton outside Mozambique has generally shown significant yield and profitability gains for farmers who adopt the technology.

Based on current management practices, costs, and cotton prices for Mozambican cotton producers, the technology is not profitable for farmers. With yield gains, cotton prices closer to those in neighboring countries, and health costs savings due to lower exposure to pesticides, the technology quickly becomes profitable for farmers. The economic analysis of the introduction of cotton at an aggregate level indicates that it would be a very positive investment, with a net present value (NPV) of US\$18 million and an internal rate of return (IRR) of 25% even at a seed cost of US\$50 per hectare. The returns are lower for every year of delay in adoption of the technology. The next step is field testing of varieties to see what yields could be in the Mozambican context, however, there are still regulatory blocks as the inter-ministerial National Biosafety Working Group has taken no concrete action to facilitate testing of Bt cotton varieties since it was established in 2001.

2.4 Diagnostic study to identify constraints and opportunities for beans/cowpeas production and marketing in Mozambique.

SIMA staff first visited the production zones for beans in May/June 2008, along with the major maize production zones. They revisited the research areas in October, 2008, as was

previously planned. A draft flash (Flash no 52P) has been produced and is currently under review. The main conclusions from the study are:

- 2008/09 season was less favorable than the previous season as manifested by high producer prices for a range of commodities, including beans. Marketing started earlier than in previous years particularly for maize, beans and groundnuts. The lack of crop forecasting information on agricultural production for the 2008/09 was a noted source of confusion for traders in planning their activities;
- While the radio was the principal means for dissemination of price information for farmers in the TIA analysis, for this year cell phones turned out to be the most widely used means to obtain price information for the traders, many of whom migrant from one zone to another. This tendency indicates the potential reaching the private sector if the market information can be effectively linked to mobile phones;
- Traders pointed out the value of 24-hour automatic tellers in banks and recommended the establishment of financial services in area of high production potential in order to reduce transaction costs;
- Where roads and bridges have been improved there are signs of improved market opportunities, especially when linked with cell phone access. However, many zones are still difficult to access. Improvement of transport infrastructure, especially rural roads, is necessary in order to reduce marketing costs.

2.5 Other activities

A second draft of the working paper on financial profitability of chemical control of odium in cashew nuts has been completed and circulated for final comments. The working paper has been prepared by Raul Pitoro, Feliciano Mazuze and Rosalina Mahanzule. The publication of the working paper has been delayed pending a discussion of the comments presented by INCAJU. Gilead Mlay was involved in review the first draft.

Objective 3: To strengthen the capacity of the Directorate of Economics to provide supportive policy environment and market information

3.1 Analysis of Public Expenditure for the Agricultural Sector (AgPER)

Campus backstop Boughton worked with Helder Zavale and Gilead Mlay on the outline and analyses. Since the World Bank (WB) was engaged in similar exercise, it was necessary for the Regional Strategic Analysis and Knowledge Support System (Re-SAKSS), WB and MSU to work on the modalities of producing the final report to be presented to MINAG. Effort was directed to harmonizing the data and results in the work being undertaken by the MSU team, in collaboration with Re-SAKSS, and that being undertaken by the WB consultant. It was agreed that a joint report would be delivered to the Government of Mozambique and the individual reports would serve as background papers.

The draft AgPER Report was submitted to the Government of Mozambique on the 30th of June for comments. MSU's contribution to the draft report focused on agricultural research and provincial expenditure. Among the key results obtained include the following:

- a) Although intensity of agriculture expenditure, measured as percentage of agricultural GDP, is comparable or higher than that of some countries in Sub-Saharan Africa (2002 figures), the agricultural productivity in Mozambique is lower than in these countries;
- b) The investment expenditure for agricultural research has continued to be low averaging about 110 million MZM without a consistent upward trend in real terms between 2002 and 2007. The investment expenditure as percentage of agricultural GDP averaged about 0.35% per year between 2003 and 2007.

Looking at provincial expenditure from MINAG, it is not clear what criteria are used in fund allocation. The agriculture spending per unit of GDP, per rural capita and per holding in the northern and central provinces is lower than in the southern provinces, with the exception of Niassa (see graphs in appendix 3).

The official release of the AgPER Report continues to be delayed while the World Bank and MINAG negotiate modifications to the final document. MINAG has requested that we delay release of our background paper to the report until the issues are settled.

3.2 Profitability and comparative economic advantage of wheat production in Mozambique

The objective is to document the costs of subsidizing wheat production for different purposes (export versus import substitution) and in different production systems to enable MINAG to evaluate in a more objective way how to allocate limited scarce resources between competing ends. Basic enterprise budgets for smallholder wheat production under current production technologies have been produced for Rotanda, Manica and Tsangano. The enterprise budgets for competing crops are still pending. The preliminary analysis points to the lack of competitiveness and if farmers are to make a profit, subsidies are necessary. The main question is whether the allocation of scarce resource to subsidize wheat production is the best option. This question will be answered after the completion of the crop budgets for competing crops. Break-even yield as indicated by the preliminary results range from about 1.5 ton/ha in Tsangano to about 2 ton/ha in Manica. In all three cases the import parity price is below the price at the millers in Beira, meaning that in the absence of government subsidy to the millers, there will be no incentive to purchase locally produced wheat.

3.3 Measuring the impact of private and public assets on crop incomes in rural Mozambique, 2002-2005

In his continuing efforts to contribute to policy dialogue based on empirical results, David Mather has finalized a working paper [“Measuring the impact of public and private assets on household crop income in rural Mozambique: 2002-2005”](#). This working paper looks more carefully at the extent to which private assets and public investments contribute to crop incomes. The private assets include production investments, such as animal traction and irrigation, while the public assets include a range of investments, such as market price information and extension efforts. The TIA panel survey of 2002-2005 follows the same households in time to gauge impacts.

The abstract of the working paper is in Appendix 4 of this report. Using strong empirical methods and panel data, Mather demonstrates the high returns to greater land area, use of animal traction, diversification into cash crops (especially tobacco and cotton), access to market price information, and access to extension agents.

3.4 Maize marketing research

During July, Duncan Boughton and David Tschirley traveled to Mozambique under joint funding from the USAID/Mozambique mission and the Bill & Melinda Gates Foundation. The overall purpose of the trip was to work with local staff at the Departments of Economics and Policy Analysis and SIMA to better understand the evolving structure and performance of the maize supply chain. The work on this trip focused on the center (Manica and Sofala provinces) and to some extent the south, though the overall work will also include the north and its linkages with Malawi. Sofia Manusse of Department of Policy Analysis (DAP) and Helder Zavale of UEM/MSU traveled with Drs. Boughton and Tschirley. Specific activities carried out were:

- a) Focus group interviews of maize assembly traders and farmers in selected about 10 assembly markets of the center of the country (in and around the Beira/corridor) that focused on mode and scale of operation, marketing costs, perceptions of how marketing has improved or deteriorated over the past five years, and other information;
- b) Interviews with millers and feed manufacturers to establish the universe of such operators, scale of operation of each and of the sector as a whole, maize procurement strategies, and likely future growth. A major objective of these interviews was to shed light on the reasons for Mozambique's extraordinarily high maize meal prices compared to neighbors in the region, a phenomenon highlighted but only partially explained in previous MSU/DE work on this topic;
- c) Interviews with large-scale traders of maize and other grains (rice, wheat) regarding their activities. A key focus in these interviews was in understanding why, when Mozambique has no formal trade barriers for either import or export of maize grain, domestic prices of maize have on several occasions risen well above import parity levels (even including the effect of the VAT) for non-trivial periods of time;
- d) Interviews with officials in MINAG, Ministry of Trade, TechnoServe, and others involved in the maize supply chain to generate further insight regarding the structure and performance of the system.

The key finding of the work was that the center of the country is experiencing a boom in formal sector demand for maize (and other crops) that is having a major impact on the prices that farmers receive and the ease with which they are able to sell. The new formal sector buyers are primarily the maize milling firm DECA and the integrated feed manufacturer/poultry producer Abilio Antunez. V&M Trading and Export Marketing also continue to be active in the region, as they have been for at least a decade. While informal traders have long been present even in remote villages, the purchasing power brought by these new formal sector buyers, and the volumes that they are trying to mobilize from local production (over 60,000 metric tons of maize from Manica and Sofala provinces last year and this year), using a dense network of buying points, has turned maize into a very attractive

cash crop for many farmers. The worldwide price boom, resulting in quite high import parity prices for maize grain in central Mozambique, has accentuated this effect. As a result of improved prices and ease of sale, focus group farmers were showing keen interest in accessing better seeds and fertilizer, and a stated willingness to pay cash for these inputs as long as they were available.

3.5 Market outlook survey

The 2009 annual market outlook survey (known as the “windshield survey”) was conducted by the SIMA staff with participation of Cynthia Donovan in April and May 2009. Last year’s annual survey was widely used by government and donors and additional fieldwork was carried out at the request of WFP in the last calendar quarter of 2008. This market survey took place in late March and early April when products from the 2008/2009 cropping year were starting to be harvested, but before the major marketing season. Even so, private sector agents such as DECA in the center were already beginning to buy maize. In the south, both maize grain and maize flour from South Africa were in evidence. The survey found that traders expect higher production and marketing than last year (2008/2009 marketing year). Generally prices were going down, as expectations of a good harvest resulted in selling of remaining stocks, although the cost of a basic basket of goods remained high, especially in the south. A more in-depth analysis was carried out and a draft flash has been prepared in both English and Portuguese. The main outreach of this work has been with WFP and other agencies.

3.6 Food Price Flash

SIMA staff collaborated with the Famine Early Warning Systems Network (FEWS NET) and MSU to develop Flash 50P analyzing food price trends in Mozambique, given the previous months of high food prices. The analysis showed that some local prices have not declined as rapidly as they did in world markets and there still may be a need to take actions to ameliorate the consequences of high food prices. Low income households have consumption flexibility, shifting between rice, maize, and wheat products, in accordance with prices. When all those commodities demonstrate high prices, they face severe constraints, although the north uses cassava as a low cost staple. Recommendations include investments in raising local production and productivity for basic food staples, as well as evaluating the potential for using safety nets to assist the poorest households. Additional analysis of regional prices, including Mozambique, was conducted by MSU staff, as can be found in both a [Working Paper](#) and a recent [presentation](#) addressing the question of whether staple foods are becoming more expensive in the region.

3.7 Backstopping of SIMA

Cynthia Donovan continued to provide technical backstopping to SIMA, primarily focusing on the price analysis and reporting for the Windshield Survey. SIMA staff members have regularly produced the weekly market information bulletin Quente-Quente and during this period editions 691-729 were published. Beginning with the July 8, 2008 bulletin, the Nampula provincial market information system became less active, producing only one bulletin. Full information is available on SIMA website <http://www.sima.minag.org.mz>.

Donovan is also working with SIMA staff to evaluate options for using cell phones to improve system data collection efficiency, with later work on information diffusion improvements. Servitel, a local ICT firm, and SIMA have been discussing a possible partnership for SIMA data collection and diffusion, and SIMA is exploring funding alternatives with WFP, ADRA and others.

Earlier TIA results presented in working paper 66 demonstrate that price information has a significant, positive effect on income (see <http://www.aec.msu.edu/fs2/mozambique/wps66.pdf>). However, recent analysis of TIA 2006 and TIA 2007 show a declining trend in access to price information mainly due to lack of human and financial resources for dissemination at provincial level. While public resources to SIMA are limited, there are ever-greater demands on SIMA expertise and data. The Purchase for Progress (P4P) of WFP is just one example of the new demands on the system. The need to revitalize the existing provincial SIMA and strengthen the dissemination of market information to support marketing and production decisions cannot be overemphasized.

3.8 Outreach and promotion of policy debates

Project staff participated in seminars and workshops and in collaboration with partners from MINAG and IIAM, made presentations based on on-going policy analysis work using TIA data. Appendix 5 contains a printout of the website <http://www.aec.msu.edu/fs2/mozambique/index.htm> and all presentations can be found there.

Recognizing the need to stimulate discussions on policy issues and build DE's capacity to provide technical advice the Project in-country Director prepared a proposal for the Director of DE on organizing bi-weekly seminars with a training component for DE staff. The first seminar served as a basis to identify a series of topics of on issue considered relevant to the Ministry. The MSU country Director made a conceptual presentation on agricultural intensification to provide some basis to analyze the Plan of Action for Food Production. Subsequent sessions have suffered from scheduling conflicts.

Helder Zavale collaborated with the World Bank (WB) consultant and Adriano Chamusso of DE to prepare a presentation of the preliminary results of the Public Agriculture Expenditure Review. Gilead Mlay and Duncan Boughton provided input on the presentation, which was delivered at the PROAGRI technical meeting on March 12, 2009 by Adriano Chamusso. Mlay and Zavale participated in the meeting and contributed in answering questions from participants. In his concluding remarks, the Minister of Agriculture touched on two key points, namely the low agriculture spending per GDP in the provinces with high agriculture potential and the relatively high agriculture spending per GDP for Mozambique compared to other countries in the region whose agricultural productivity is higher. He expressed serious concern for the stagnation of agriculture productivity while spending on agriculture in real terms shows a positive trend.

Gilead Mlay participated in a three-day National Meeting for Planning (28-30 April 2009), organized by the Directorate of Economics. The meeting brought together senior staff from MINAG and Provincial Directorates of Agriculture (DPA's) involved in planning, budgeting monitoring and evaluation. The principal objective of the meeting was to review performance of MINAG and the agricultural sector in 2008, and initiate the process for the preparation of the plan of activities and budget for 2010. Gilead Mlay made a [presentation](#) on the TIA data,

designed to enhance awareness of the participants at both provincial and national levels on the usefulness of TIA data in monitoring sector performance, planning and policy analysis.

The preliminary results on competitiveness of small holder wheat production were presented to the Directorate of Agricultural Services of MINAG. The presentation was motivated by the concern about purchase of 2008/09 crop by millers given that millers are reluctant to pay the minimum price of MT 10/kg. The presentation clarified two key points, namely a) profitability at both farm and mill levels is a key incentive for participation in production and commercialization of locally produced wheat and b) productivity is very low and at minimum yields of at least 1.5 metric tons per hectare are necessary which will not be achieved without use of fertilizers.

In addition, the following presentations were given by project staff:

- a) [*Análise Comparativa de Competitividade do Sector Algodoeiro em Africa: Pontos fortes e fracos da cadeia de valor do sub-sector algodoeiro em Moçambique.*](#) Raul Pitoro with support from D. Boughton, D. Tschirley and G. Mlay. Presented at the Annual Cotton Meeting held in Nampula, 28th October 2008.
- b) [*Comentários dos ToRs de Estudos Socioeconómicos do IIAM: Estudo de Fugas no Sub-sector Algodoeiro Moçambicano.*](#) Raul Pitoro, D. Boughton e G. Mlay. Presented at the Annual Cotton meeting held in Nampula, 28th October 2008.
- c) [*Food Prices Swings: the Case of Mozambique.*](#) Helder Zavale with collaboration with SIMA staff and MSU faculty Donovan and Mlay. Presented at the workshop on policies for the effective management of food price swings in African countries organized by FAO held in Maputo, 23-24 June 2009. The presentation, based on earlier analysis of food price trends for staples, addresses the question of whether staple foods are becoming more expensive in the region.

Objective 4: To institutionalize the capacity to provide information for monitoring and evaluation of agricultural sector performance within MINAG

4.1 TIA 2007

The 2007 TIA results were presentation to the USAID mission in Maputo by staff from the Department of Statistics (DEST) of MINAG in collaboration with project staff. The presentation is available on the project website at http://www.aec.msu.edu/fs2/mozambique/policypres/TIA2007_Dissemination.pdf.

4.2 Implementation of TIA 2008

This year's TIA used a new sampling methodology that used the most recent population census as a base, which Ellen Payongayong helped to coordinate with David Megill (MINAG consultant from the US Bureau of the Census), National Institute of Statistics (INE) and MINAG. With the new sampling, she needed to give additional training on geo-referencing data.

Field data collection for TIA 2008 was completed very late (in mid-February) because of late release of funds and vehicle shortages. The late completion of field work coupled with pulling out of TIA key technical staff to help with the Agriculture and Livestock Census (CAP) have compromised timely release of TIA 2008 results. Ellen Payongayong worked with DEST in processing TIA data, and worked with David Megill on preliminary weights. She also supported DEST staff in the presentation of the preliminary TIA 2008 results. The TIA 2008 weights will need to be calibrated against the General Population Census 2007 frame. This work is expected to be concluded in the next quarter with input from David Megill.

The release of final TIA 2008 results was also delayed due to the delay in conclusion of data entry of the 2007 Population and Housing Census. The Population and Housing Census results are required to correct the TIA weights for the number of households doing agricultural work. Preliminary estimates used the listing rather than the full Census results. Ellen Payongayong has been working with INE on this issue, along with DEST colleagues.

The compilation of data and documentation for TIA for the period 2002-2008 into one compact database continued during this period, albeit at a slow pace. INE requested that key DEST staff be seconded to them for the 2009/2010 CAP. For us, this is a recognition that DEST staff are now seen by INE as capable and competent, with skills that contribute to the CAP. Ellen Payongayong has also provided backstopping for the MINAG staff involved in the CAP in the areas of methodology and data capture as part of her capacity building work.

Ellen Payongayong also assisted DEST staff to prepare an Agricultural Statistics Book summarizing the main results for the period 2002-2008 and she provided input into the presentation of preliminary results of TIA 2008. Both the book and the preliminary TIA 2008 results were presented in the MINAG National Planning meeting in Namaacha, from 28th to 30th of April, 2009. The annual planning meeting is organized by the Directorate of Economics of MINAG and brings together senior staff from MINAG and Provinces in charge of planning and budgeting. Payongayong worked with MINAG/DEST staff on the preparation of the Statistical Yearbook for 2008, as well as assistance to the development of presentations for the provincial MINAG staff and others.

4.3 Agricultural and Livestock Census (Censo AgroPecuário – CAP) 2009/2010

The National Institute of Statistics (INE) is currently developing all aspects of the implementation of the CAP later this calendar year and through August 2010. Ellen Payongayong is working with INE staff and seconded MINAG staff as well as INE staff to help ensure the quality of the field work on agricultural production and other aspects. The sample is expected to be at least 35,000 households and will be statistically representative down to the district level. Payongayong is also providing some technical assistance to INE with the upcoming Household Budget Survey.

4.4 Livestock Data Systems

After the recent workshop on Agricultural Statistics, there is momentum in Mozambique to move forward with changes to the current institutional design for agricultural statistics. Livestock, particularly large animal subsector, is not well captured with the TIA. The National Directorate of Veterinary Services collects some information through their records,

but it is not complete. The 2007 Population and Housing Census also collected information on animal stocks. Payongayong joined her colleagues to look at the various sources to assist in developing a new Master Plan for Agricultural and Livestock Statistics.

4.5 Advice to MINAG on data collection options for district level planning and monitoring needs

INE is coordinating the activity for all sectors and MINAG is represented by DE. The role of project staff will be to advise DE.

4.6 Support to MINAG to collect data for the impact evaluation of MCC land and farmer income support projects

Under an agreement between Millennium Challenge Account (MCA) and MINAG, the Department of Statistics will be responsible for data collection in support of impact evaluation of the land and farmer income support projects under the Millennium Challenge Corporation (MCC) Mozambique compact. Being the first experience for both MCA and MINAG to implement such an activity that satisfies the technical requirement for the survey and accounting of MCC, it was necessary for project staff to support the process. Ellen Payongayong played a key role in helping the two parties overcome technical and administrative difficulties.

Objective 5: To assist USAID-Mozambique and partners to measure program impacts

For the PVO program impact surveys, Ellen Payongayong trained staff and monitored the implementation of the surveys. She also organized the data entry for those surveys. The completed surveys have been received for all of the cooperating sponsors and data processing has been initiated. Analysis for the INCPROX was conducted and results are expected to be released in the coming fiscal year. The involvement of Dr Payongayong in supervision of survey and subsequent data entry and processing for the MCC farmer income support project placed additional demand on her limited time, delaying the release of results of the INCPROX. Payongayong's analysis shows that the median total income (unweighted) at current USD is 35% higher for participants in PVO programs than for nonparticipants. The rough dollar estimates are \$650 total annual household income for participants and \$480 for non-participants.

Additional activities of MSU staff in Mozambique under Food Security Group

As part of our efforts to diversify funding sources and collaborate with a broader range of agents, we have Mozambique-related work with the Millennium Project, including MSU staff Ellen Payongayong and Raul Pitoro, who were funded under MCC grant monies to provide technical support to MINAG in data collection and analysis in support of impact evaluation of the land and farmer income support projects under the MCC Mozambique Compact. Data collection for the Farmer Income Support Project (FISP) started in late March and was concluded in the early May. Data entry was concluded during this period and data processing was initiated. FISP uses TIA data, providing an example of how special surveys can be combined with TIA efforts to get greater use out of TIA.

The GISAMA project, funded through the Bill & Melinda Gates Foundation, also has activities in Mozambique, with maize, cassava, and horticultural market development. SIMA and IIAM/CESE are involved in the field research, and it is yet another way to engage the young professionals in new research activities and training. Initial appraisal of horticultural markets was conducted and price collection begun in three markets in Maputo.

Under World Vision, Donovan, Zavale and Tschirley conducted an assessment of the experience with Title II monetization programs, including work in Nampula and extensive private sector interviews. The report draft was circulated for comments.

Appendix 1: Value chain training

Appendix 1a Program for the first module of the value chain training course

Dia	Horário	Conteúdos	Facilitador
5 de Março	9:00 - 10:00	<p>Abertura do curso</p> <p>Discurso de boas vindas ao curso</p> <p>Apresentação dos objectivos do curso (justificação e os objectivos gerais para o curso inteiro) e do programa</p>	IIAM/CESE
	10:15 - 10:30	Café	
	10:30-12:00	<p>A moldura de cadeia de valor</p> <p>Os objectivos da moldura de cadeia de valor</p> <p>O conceito de cadeia de valor – qual é o seu significado?</p> <p>Actividades primárias e de apoio numa cadeia de valor</p> <p>Cadeia de valor dentro do sistema económico em vez numa empresa</p> <p>Os elementos que constituem o ambiente favorável para o desenvolvimento de cadeia de valor</p> <p>Esboço geral de análise de cadeia de valor: ligação com análise de sub-sector, ligação com análise input-output e rentabilidade numa empresa.</p>	MSU
	12:00 - 12:30	Os critérios para a selecção de uma cadeia de valor	IIAM/MSU
	12:30 - 13:30	Almoço	
	13:30 - 14:00	Mapeamento dum subsector e depois para a cadeia de valor	
	14:00 - 15:00	<p>Mapeamento numa cadeia de valor</p> <p>Estudo de caso de banana</p>	SNV
	15:00 - 16:00	<p>Mapeamento numa cadeia de valor (cont.)</p> <p>Trabalho em grupo de mapeamento</p>	

6 de Março	8:30 - 9:00	Mercado para pecuarios	ILRI
	9:00 - 10: 00	Apresentação dos trabalhos de mapeamento	Technoserve
	10:00-11:00	Identificação de constrangimentos e oportunidades numa cadeia de valor, usando mapeamento Estudo de caso de galinhas nacionais	
	11:00 - 11:15	Cafe	IIAM/MSU
	11:15 - 11:30	Aspectos institucionais para a organização numa cadeia de valor Mercado vs balanceado vs direccionada vs hierática	
	11:30 - 12:15	Identificação de constrangimentos e oportunidades numa cadeia de valor Na produção, no processamento, na comercialização, no financiamento, nas políticas do sector	MSU
	12:15 - 13:00	Identificação de constrangimentos e oportunidades numa cadeia de valor Trabalho em grupo	
	13:00 - 14:00	Almoço	
	14:00 - 14:50	Trabalho em grupo (continuação)	
	14:50 - 15:40	Apresentação dos trabalhos em grupos	
15:40-16:00	Encerramento	IIAM/CESE	

Appendix 1b: Participants list

No	Participant	Institution	Email
1	Calisto Bias	IIAM-Director General	calisto.bias@gmail.com
2	Oscar Chichongue	IIAM-Northwest Zonal Center (CESE)	ochichongue@gmail.com
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11	Mabota, Anabela	MINAG-DE-SIMA	a_mabota@yahoo.com.br
12	Paulo, Antonio	MINAG-DE-SIMA	
13	Nhantumbo, Olinda	MINAG-DE-Dept of Planning	
14	Amane, Manuel	IIAM-DARN, Director	mivamane@gmail.com
15	Paula Pimentel	IIAM-DFDFTT	ppimentel@tdm.co.mz
16	Cristiano da Conceição	IIAM-DPAF – Dept of Planning	
17	Macome, Eulalia	MINAG-DE/Dept of. Policy Analysis (Head)	eulaliamacome@yahoo.co.uk
18	Benedito, Tinga	IIAM-DCA	beneditotinga@yahoo.com.br
19	Anabela Zacarias	IIAM-DARN: Head Roots and Tubers Program	
20	Olga Faftine	IIAM-DCA : Large Ruminants Programs	faftine@yahoo.com
21	Luísa Meque	IIAM-DCA: Small Ruminants Program	inandele@yahoo.com
22	Belmira Mata	IIAM-DCA: Vaccines Program	bmata@yahoo.co.uk
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24	Suzie Aline	IIAM-DARN –Soil Conservation Program	suziealine@hotmail.com
25	Anabela Manhica	IIAM-DFDFTT – Dept of Technology Transfer	bellamanhica@yahoo.co.uk
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28	Marcos Langa	IIAM-DARN- Rice Program	marcoslanga@yahoo.com
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30	António Chamuene	IIAM- Northeast Zonal Center	chamuene@hotmail.com
31	Cheila Martins	IIAM-DARN: Roots & Tubers Program	cheilamartins@yahoo.com.br
32	Sofia Manussa	MINAG-DE: Dept of Policy Analysis	smanussa@hotmail.com
33	Elias Toscano Sitóe	MINAG	etsitoe@yahoo.com.br

Appendix 1c: Program for module 2 of the value chain training course

Data	Horas	Tema
9 de Março	8:30 – 9:00	Introdução do Modulo 2
		Apresentação do programa para o módulo 2
		Expectativa dos participantes
	9:00 -10:15	Identificação das cadeias de valores
	10:15-10:30	Café
	10:30-12:30	Identificação das cadeias de valores: Trabalho em grupos
	12:30-13:30	Almoço
10 de Março	13:30-15:30	Identificação das cadeias de valores :Apresentação de trabalhos em grupos
	8:30-9:00	Mapeamento dos actores, funções e relações
	9:00 - 10:15	Trabalho em grupo e individual de mapeamento de cadeias de valores
	10:15-10:30	Café
	10:30 – 11:30	Métodos para análise duma cadeia de valor
	11:30-12:30	Margens e valor adicionado
	12:30-13:30	Almoço
11 de Março	13:30-15:15	Trabalho individual sobre mapeamento
	8:30-9:15	Orientações para preparação de protocolos para estudos de cadeia de valor
	9:15-10:15	Identificação de constrangimentos e oportunidades duma cadeia de valor
	10:15-10:30	Café
	10:30 -12:30	Identificação de soluções para melhorar uma cadeia de valor
	12:30-13:30	Almoço
12 de Março	13:00-15:30	Tempo livre para atender assunto social
	8:00 – 15:30	Preparação de protocolos e pesquisa no internet para documentos relevantes
13 de Março	8:30 -11:30	Apresentação dos protocolos
	11:30-12:30	Discussão sobre os protocolos e as actividades de formação
	12:30-13:00	Avaliação do módulo e encerramento do curso
	14:45-15:15	Avaliação do módulo e encerramento do curso
	14:00 -11:15	Encontro com os técnicos do CESE

Appendix 2: Abstract of Tomo's Masters thesis

ECONOMIC IMPACT OF NEWCASTLE DISEASE CONTROL IN VILLAGE CHICKEN: A CASE STUDY IN MOZAMBIQUE

By

Alda Armindo Tomo

ABSTRACT

Newcastle disease (ND) is the main constraint for village chicken production in Mozambique, and chicken vaccination is the only effective way to control ND. The I-2 vaccine has been locally produced since 1999, and it is suitable for small farmers, but it is only used in some parts of the country, with very low levels of adoption. Vaccine availability is the key bottleneck for increased adoption. The current level of vaccine production is under the installed capacity, indicating potential for expansion of a vaccination program; but, it is necessary to evaluate the economic viability of the program and the feasibility of its expansion. This research evaluates the financial viability of the vaccination program at farm level, as well as the economic viability of the program in Chibuto District and all the districts the program is implemented. Also, the sensitivity of the profitability measures to ND incidence, chicken price reduction and adoption ceiling levels is evaluated. A simulation program VIPOSIM with parameters adapted to the Mozambican case is used to simulate the benefits of vaccination at farm level, while benefit-cost analysis is used to evaluate the profitability of the program. For households with flocks above 10 chickens, the vaccination is shown to be profitable, even for low levels of ND infection. Production and extension of I-2 vaccine has positive returns; and, expansion of the program to new areas should be explored and strategies put in place to speed up the adoption in areas already covered. When planning expansion of the program, areas with high incidence of ND should be prioritized.

Appendix 3: Provincial expenditure intensity

Figure 1 Agricultural expenditure per rural capita and per holding in MZN

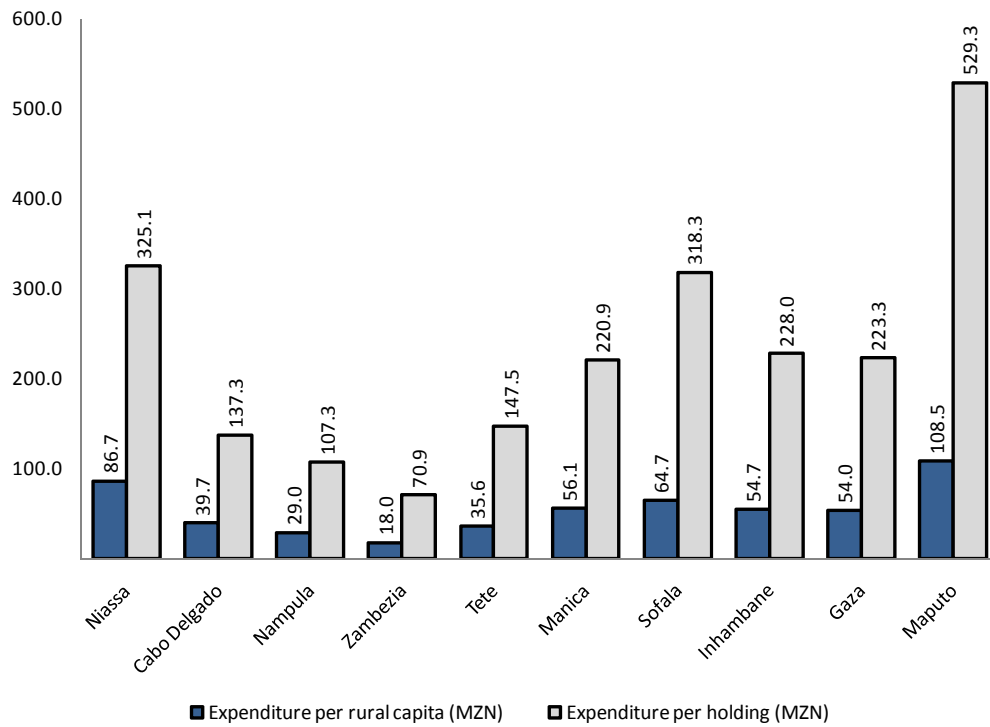
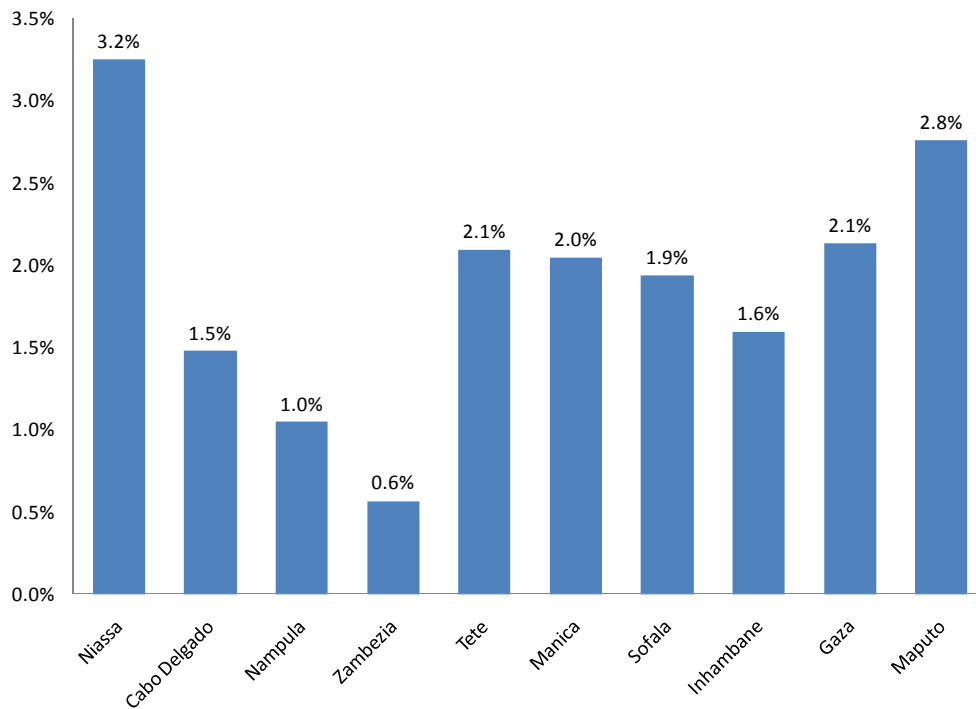


Figure 2 Agricultural expenditure as percentage of agricultural GDP



Appendix 4: Executive Summary of Research Report 67e

MEASURING THE IMPACT OF PUBLIC AND PRIVATE ASSETS ON HOUSEHOLD CROP INCOME IN RURAL MOZAMBIQUE, 2002-2005

EXECUTIVE SUMMARY

Crop income is the predominant source of income for most rural Mozambican households, accounting for 73% of rural household income on average in 2002, and greater than 80% of the total income of the poorest 40% of rural households. While the Government of Mozambique recognizes the need to improve agricultural productivity, there is little empirical evidence to date suggesting what mix of public and private investments would best foster improved agricultural productivity in rural Mozambique. This paper aims to better understand the determinants of household crop income in rural Mozambique, by using the TIA panel household survey of 2002-2005 to measure the impact of various private and public assets on crop income. We build upon Walker et al.'s (2004) analysis of TIA02 crop income by utilizing the econometric advantages of panel econometrics to obtain improved estimates of the impact of various private and public assets on crop income. Our principal focus is to measure the effect on total household net crop income of factors which are assumed to have a positive effect on crop productivity and profitability, including: private assets such as landholding; household use of improved inputs (fertilizer, animal traction) and diversification into tobacco or cotton; and access to public goods such as extension advice, market price information, and farm association membership.

While our analysis focuses on a few specific private and public assets, we control for many additional household and spatial factors which may affect household crop income, including drought, flood, and crop disease shocks. Although we do not find significant effects on crop income from village-level flood and crop disease shocks, we find that an additional *day of drought* during the principal growing season results in an average 5.5% loss in crop income in the south, and a 1.9% loss in crop income in the north. These results highlight the extreme sensitivity of crop income to weather shocks, and thus the potential value of: a) widespread promotion of smallholder access to low-cost methods of irrigation and/or conservation farming techniques to reduce the impact of drought – in contrast to the recent emphasis of heavy investment in formal perimeter irrigation schemes, which benefit only a very small proportion of the smallholder population; and b) investment in development and dissemination of drought-tolerant maize varieties as well as varietal improvement in traditionally drought-resistant crops such as cassava and sweet potato.

We find large significant effects of increased landholding on crop income, as a 5% increase in *total landholding* significantly increases crop income by 2.1% in the north, 2.8% in the center and 1.5% in the south. An important constraint to increased landholding could be the low use of animal traction in the center, and virtual non-existence of it in the north (attributed to trypanosomiasis spread by the tsetse fly). We investigate the determinants of landholding using regression analysis and find that adoption of animal traction use increases total landholding by 13.8% in the center and 18.5% in the south.

We also find that *animal traction use* significantly increases crop income by 33% in the center. Given that the crop income regression controls for total landholding separately, the return to animal traction use is likely due to improved soil productivity. The evidence of significant, large positive effects of animal traction use on both productivity (in the center) and total landholding

(in the center and south) suggest that promotion of animal traction use could lead to increased crop income both through increased landholding and improved productivity. Public investment could potentially increase adoption of animal traction in the north by alleviating disease constraints to animal traction via medicinal subsidies and/or eradication of the tsetse fly. Because oxen ownership represents a high investment cost, support for rural financial services might help to address household financial constraints to financing traction rental. Given the lack of tradition of maintaining oxen in these areas, livestock extension could also play a valuable role in promoting oxen ownership or rental. While cost-benefit studies may be required to evaluate the expected ex ante rate of return to some of these investments, the high farm-level benefits which we find from animal traction use suggest that such investments could have large aggregate returns, and could help foster the emergence of more commercial farmers.

Diversification into cotton or tobacco resulted in very large and significant increases in total net household crop income. Central households which grew tobacco had 55% higher crop income than that of non-growers, while crop income among cotton growers was 194% higher than that of non-growers. Northern cotton growers had 33% higher crop income relative to non-growers; the effect of growing tobacco in the north was positive but not significant. While these crops have historically offered high returns, the option of growing such crops is only available for households which live within a reasonable distance from concession areas, and previous research has suggested that there appear to be landholding thresholds below which household participation is unlikely. Thus, tobacco and cotton are unfortunately not a panacea for widespread poverty reduction among smallholders due to these existing barriers to participation. It should also be noted that our evidence of relatively high returns to production of these crops should not detract attention from opportunities to improve the performance of Mozambique's tobacco and cotton subsectors. Such opportunities for cotton include improving farm level profitability of cotton production via adoption of Bt cotton, combined with efforts to improve farmgate cotton prices through entry of new cotton firms, investments in ginning efficiency, and improved road infrastructure. Since the recent departure of a major tobacco company, tobacco growers have reported abuse of quality grading by the buying agents of the remaining tobacco company. Opportunities for tobacco may therefore involve efforts to promote the entry of other tobacco exporting companies, which may help ensure consistency in quality grading (by providing some measure of competition), and should expand the number of household with potential access to growing this highly remunerative crop.

We also find evidence that some *non-farm income* sources may reinforce and multiply growth in the agricultural sector. Fishing/charcoal resource extraction activities have a significant positive association with crop income in the north and center (24% and 40%), while high-return medium-small enterprise activities such as trading and construction are associated with 20% higher crop income in the north. It is important to note that it is not possible to claim that these activities have a causal effect on crop income, as these activities may be undertaken in response to (or simultaneously with) the household's crop production that season. On the other hand, skilled nonfarm income in the center appears to compete for family labor, as it has a rather large and significant negative association (-30%) with crop income. What is surprising about these results is while non-farm income opportunities are most viable in southern Mozambique – where crop potential is limited and demand for labor from South Africa is a reality – there are no significant associations between non-farm income sources and crop income in that region. This suggests that non-farm income is not reinvested into agriculture in the south. Although we find a significant association between some non-farm income sources and crop income in the center and north, policymakers should bear in mind that the types of non-farm activities available in the center/north are largely dependent upon growth in agriculture.

We find that *household receipt of market price information* significantly increased crop income by 23% in the center and 31% in the south. There are several potential policy implications from

these results. First, considering the size of these farm-level benefits of market information, and the widespread receipt of market price information (MPI) by rural households (40% of rural households in 2005), it is likely that the rate of return to Agricultural Market Information System of Mozambique (SIMA) investments to date is quite large, and would justify the restoration of SIMA funding to previous (higher) levels. Second, these results suggest that there would also be large returns to investments which increase household access to market price information. Given that radio is the predominant and lowest-cost (per household) method of dissemination price information (74% of households receiving price information received it via radio), there appear to be at least three ways to increase household-level access to MPI via radio broadcasts.

One means to do this would be to expand radio coverage to areas previously not served (19% of households live in villages which do not report receiving SIMA radio broadcasts). However, the number of households which live in villages which receive MPI, yet did not personally receive MPI in 2005 (32% of households) is actually larger than the total number of households living outside these areas (20% of the rural population). Thus, it would appear that the principal constraint to increased household access to MPI is not necessarily a lack of radio coverage in rural Mozambique. Low frequency of broadcasts may explain why we observe that 45% of households which own a radio (and live in a village which receives price information via radio) said that they did not receive MPI. Thus, within areas already receiving radio coverage, another option to increase the number of household which receive MPI would be to increase the number of SIMA broadcasts in a given area of the country, using existing radio stations.

Another potential constraint to increased household use of MPI may be related to the appropriateness of the content of the SIMA price information relative to the marketing needs of farmers in specific areas of rural Mozambique. For example, SIMA could possibly deliver price information in local languages, and report on all the major crops on a provincial basis. In addition, SIMA could perhaps add some analytical content to their messages, such as price forecasts and trends, or potential markets and transport costs. Addressing these types of constraints would require additional investments to set up provincial SIMA units (SIMAPS) that collect, analyze and disseminate more province-specific market information on a broader range of products than the national SIMA – which are specifically targeted to the needs of the radio audience in that province.

Because some extension advice may only result in improved productivity over time, we created extension variables to measure the possibility that an extension visit has an immediate impact on crop income (that season) or an impact which is realized over time. We also constructed separate extension variables for tobacco/cotton growers because of the advantage those growers have in terms of net returns as well as access to credit, fertilizer, etc. With respect to non-tobacco/cotton growers, we find no significant effects of *the number of cumulative extension visits* on crop income in any region, but we find that households in the south which received an extension visit in 2002 had 81% higher crop income in 2005 than other households (although this result in the south is not robust to the inclusion of outlying observations). The results from these two extension variables suggest that extension messages do not improve a household's crop income in the year in which the visit is made, but that, in the south, this advice led to an increase crop income over time. One policy implication of these results is that caution may be warranted prior to substantial increases in extension funding without a better understanding of what kinds of extension are working well and which are not, and why impacts are only found over time (and only in the south).

With respect to tobacco/cotton growers, we find that an increase in the *number of cumulative extension visits* improves crop income by 41% in the north, while the effect of an extension visit in 2002 over time is significant and leads to an 82% increase in crop income over time in the center. A policy implication from these tobacco/cotton extension results is that it is possible for

extension advice to result in higher crop income in both the year of receipt and over time. This extension effect for tobacco/cotton farmers might derive from higher returns to their cash crops, or it could be that these farmers are better able to implement extension recommendations due to better input access. Further investigation is therefore needed to discover to what extent the tobacco/cotton extension result is driven by increases in tobacco/cotton income versus increases in income from other crops.

We find that *farm association membership* is associated with a nearly-significant 22% increase in crop income in the north, yet had no significant effects elsewhere. A policy implication of this result is that caution may be warranted prior to substantial increases in funding to assist farm associations, without a better understanding of why associations in the north have had a nearly-significant effect on crop incomes, while those in the center and south have not.

In order to measure the effect of market access on crop income, we use road density and village remoteness as proxies of market access. Because these variables are only observed in 2002, they drop out of our panel regression model, thus we run a separate regression (pooled ordinary least squares (OLS)) to measure the effect of these variables on crop income. Given the methodological shortcomings of these road variables as well as the conflicting results from them, we consider the results on these market access variables to be inconclusive.

Finally, this study suggests ways to improve the effectiveness of the TIA survey to serve as an instrument to monitor the contribution of the agricultural sector to poverty reduction. These include collecting additional information on: agricultural technology use; the specific activities of farm associations in each village; the nature of extension advice received by households and the organizational affiliation of the extensionist; and market access, preferably based on the satellite coordinates of interviewed communities, overlaid with a grid of roads in a geographic information system (GIS).

Appendix 5: Cumulative Research and Outreach Related Outputs



Strengthening Mozambique's Capacity for Agricultural Policy Analysis, Productivity, Growth and Poverty Reduction

Projecto de Apoio ao Fortalecimento da Capacidade em Análise de Políticas, Produtividade Agrícola, Crescimento Económico e Redução da Pobreza em Moçambique



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Project Overview

MSU has worked with the Ministry of Agriculture (MINAG) in Mozambique since 1991 to increase MINAG's capacity to formulate and implement facilitative agricultural sector policies, strategies, and institutional reforms. Since 2004, assistance has also been provided to the National Agricultural Research Institute (IIAM). The twin goals of the current project are to expand the availability of appropriate crop, livestock and natural-resource management technologies for smallholder farmers, and to accelerate the uptake of those technologies by strengthening policy institutions and market information services. The project seeks to achieve this goal through formal and on-the-job training in the identification of priority policy issues, collection and timely analysis of relevant information, and prompt dissemination of actionable results to managers and policy makers.

- [Current/Recent Outreach](#)
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 - [2005/06](#) (CDIE Reference number PD-ACI-959)
 - [2004/05](#) (CDIE Reference number PD-ACI-958)
- Cumulative Project Output Reports: ([2006/07](#), [2005/06](#), [2004/05](#))
- [Prior Project Fact Sheet](#): summarizes project approach and output up to Sept 2004.
- [Capacity Building Accomplishments](#)
- [Contact Information](#): in-country personnel, U.S. based backstop and collaborative institutions.
- Quick Links - Mozambique on the Food Security and Food Policy Information Portal for Africa-FSIP ([English](#) and [Portuguese](#))
- Quick Links - Building Professional Skills-FSIP ([English](#) and [Portuguese](#))

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- [Are Staple Foods Becoming More Expensive for Urban Consumers in Eastern and Southern Africa? Trends in Food Prices, Marketing Margins, and Wage Rates in Kenya, Malawi, Mozambique, and Zambia](#). Nicole Mason, T.S. Jayne, Cynthia Donovan, and Antony Chapoto. IDWP 98. June 2009.
- RP66: [Household Income and Assets in Rural Mozambique, 2002-2005: Can Pro-Poor Growth Be Sustained?](#) David Mather, Benedito Cunguara, and Duncan Boughton. December 2008.

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Policy Presentations: in collaboration with its partners in MINAG, IIAM and USAID/Mocambique, MSU maintains an active policy outreach program. In addition to presentations by project personnel, MSU has assisted MINAG and IIAM leadership in preparing presentations for both local and international policy fora. [Top](#)

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- [Análise Comparativa da Competitividade do Subsector Algodoeiro em África. Pontos fortes e fracos da Cadeia de Valores do Subsector Algodoeiro Moçambicano](#). Raúl Pitoro, com apoio de Duncan Boughton, David Tschirley, e Gilead Mlay. Apresentação na Reunião Annual de Algodão. Nampula, Outubro de 2008.
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- [Food Prices Swings: the Case of Mozambique](#). Helder Zavale, Anabela Mabote, Antonio Paulo, Cynthia Donovan and Gilead Mlay. Presented at the FAO Workshop on: Policies for the Effective Management of Food Prices Swings in African Countries, held in Maputo, June 23-24, 2009.
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- Workshop on Ex-Ante 'Best Bet' Technologies Assessment in Research/Extension Context. Namaacha, Mozambique. June 20-24, 2007.
- Workshop on the Transfer of Agricultural Technology, held 6-7 March 2007, Nampula, Mozambique.

Theses Reprints: [Top](#)

- Tomo, Alda Armindo. [Economic Impact of Newcastle Disease Control in Village Chickens: A Case Study in Mozambique](#). M. Sc. Thesis. 2009.*
- Cunguara, Benedito Armando. [Pathways Out of Poverty in Rural Mozambique](#). M.Sc. Thesis. 2008. (2 MB)*
- Benfica, Rui M.S. [An Analysis of Income Poverty Effects in Cash Cropping Economies in Rural Mozambique: Blending Econometric and Economy-Wide Models](#). PhD Dissertation. 2006. (1 MB)*

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- [Market Participation by Rural Households in a Low-Income Country: An Asset-Based Approach Applied to Mozambique](#). Duncan Boughton, David Mather, Christopher B. Barrett, Rui Benfica, Danilo Abdula, David Tschirley and Benedito Cunguara. *Faith and Economics* Vol 50, Fall 2007: 64-101.
- Mather, David, and Cynthia Donovan. 2007. The Impacts of Prime-age Adult Mortality on Rural Household Income, Assets, and Poverty in Mozambique. Report for World Bank/Mozambique.

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MSU has assisted MINAG since 1991 in implementing an Agricultural Market Information System (SIMA). SIMA produces weekly (Quente-Quente) and monthly bulletins (Boletím Mensal). You'll find domestic prices of 25 products in 27 producer, wholesale, and retail markets throughout the country, plus regional and international prices of selected commodities, and market commentary.

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2009

- Pitoro, Raul, Walker, T., Tschirley, D., Swinton, S., Boughton, D. and de Marrule, H. [Can Bt Technology Reduce Poverty Among African Cotton Growers? An Ex Ante Analysis of the Private and Social Profitability of Bt Cotton Seed in Mozambique.](#) Contributed Paper prepared for presentation at the International Association of Agricultural Economists' Conference, Beijing, China, August 16-22, 2009.

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Food Security III Cooperative Agreement between US Agency for International Development, EGAT/AG Bureau cooperating closely with Africa/SD Bureau, and MSU Department of Agricultural Economics.

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Introduction

Since 1991, FSP has carried-out or assisted in a large number of household surveys in Mozambique. These surveys have ranged from geographically focused studies designed to address specific policy issues, to assistance to Ministry of Agriculture and Rural Development in its National Agricultural Survey. Below are brief descriptions of each survey, links to downloadable questionnaires, and links to Research Reports which provide methodological background or research results from the surveys. Many of the downloadable questionnaires are "synthetic questionnaires". These are based on the original, but are redesigned to reflect the final structure of the SPSS/Windows data files. If the questionnaire is an original, and not a synthetic version, that is indicated in parentheses.

2005 National Agricultural Household Survey (TIA05)

- Village/Community Questionnaire ([English](#), Portuguese)
- Small and Medium Farms: Panel Households ([English](#), Portuguese)
- Small and Medium Farms: New Households ([English](#), [Portuguese](#))

2003 National Agricultural Household Survey (TIA03)

- Village/Community Questionnaire ([English](#), [Portuguese](#))
- Small and Medium Farms - with Field Measurements ([English](#), [Portuguese](#))
- [Pequenas E Médias Explorações - Sem Medição](#)
- [Grandes Explorações](#)

2002 National Agricultural Household Survey (TIA02)

During 2002 the project is working intensively in support of MADER's national agricultural household survey, referred to as TIA02. Field work is scheduled to be launched in July 2002 and completed during October. A total of over 4,000 households will be interviewed. Final questionnaires are now available.

- [Household Questionnaire](#)
- [Community Questionnaire](#)

Agricultural Market Information System (SIMA)

Since 1991, MSU has assisted MADER in implementing an Agricultural Market Information System (SIMA). This system produces weekly (Quente-Quente) and monthly (Boletim Mensal) bulletins with domestic prices of 25 products in 27 producer, wholesale, and retail markets throughout the country. The bulletins also include regional and international prices of selected commodities, and market commentary.

- [Questionnaires](#)
- [SIMA Web site](#) - Full set of SIMA and SIMA Provincial (SIMAP) Publications and presentations.

2000/01 Cotton Monitoring Surveys

In October 2000, Mozambique embarked on a phased liberalization of its cotton sector, and the Ministry of Agriculture and Rural Development's Policy Analysis Department was charged with monitoring this process and recommending follow-on reforms. As part of the monitoring process, FSP assisted the Policy Analysis Department in conducting a survey of cotton growers in Nampula province during December, 2000.

Questionnaires

- [Household Level](#): this questionnaire is based in the income proxy methodology developed from the 1998 Income Survey, and will allow the calculation of estimates for each household of income from 10 different sources. (original in Portuguese)
- [Grower Level](#): this questionnaire focuses on the cotton growing practices and experience of the grower. (original in Portuguese)

1998 Income Survey

In 1998, FSP worked with USAID-funded NGOs to conduct a survey of households in NGO target areas. The stratified cluster sample design covered 490 households, each of whom was visited twice during the year. The primary purpose of the survey was to develop income proxy models for use by NGOs in impact monitoring.

Questionnaires

- [Round 1](#) (June 1998; original in Portuguese)
- [Round 2](#) (November 1998; original in Portuguese)

Research Reports: See [#38](#) for more detail on research methods, and for the income proxy models developed on the basis of these data.

1996 National Agricultural Survey (TIA96)

FSP assisted MADER in carrying out this national rural household survey. The stratified cluster sample design covered 3,851 households in all 10 provinces of the country. FSP added a microenterprise module to this survey, covering all sampled households in the provinces of Nampula, Zambezia, Manica, and Sofala.

Questionnaires

- [Main Questionnaire](#)
- MSE Module
 - [Rural, Part I](#) (translated original)
 - [Rural, Part II](#) (translated original)
 - [Rural, Closed Enterprises](#) (translated original)
 - [Urban](#) (translated original)

Reports

- [Lessons Learned](#)
- Documentation and selected results: [text of the report](#), and [statistical tables](#).

Small-Holder Cash Cropping, Food Cropping and Food Security in Northern Mozambique

This survey was carried out over five rounds in 1994 and 1995. It focused on three "Joint Venture Companies" operating cotton outgrower schemes with smallholders in Nampula and Cabo Delgado provinces in northern Mozambique. The objective of the research was to examine the effects of alternative technological packages and institutional arrangements for cotton on smallholder incomes and food security. The stratified cluster sample covered 472 households, with modules on agricultural production, field level agricultural activities (including labor hiring), off-farm wage and microenterprise activities, expenditure, and 24-hour recall food consumption.

Questionnaires

- [Agriculture, Demography, Employment and Expenditure](#)
- [Household Level Questions](#)
- [24-hour Recall Consumption](#)
- [Maize Milling Module](#)
- [Land Conflict Module](#) (done in collaboration with Land Tenure Center, U. of Wisconsin)

Research Reports: See [#21](#) for details on research methods; [#25](#) for selected research results.

Socio-economic Survey of the Smallholder Sector in Three Districts of

Nampula Province, 1991

This survey covered 343 households in the districts of Ribaué, Monapo and Angoche, Nampula province. It examined the food security strategies that households had adopted under the extremely difficult circumstances created by civil war and degradation of infrastructure.

- [Original Questionnaire](#)
- Related Research Reports: See Research Reports [3](#) and [3P](#) (Portuguese) for more detail on research design. For research results, see Research Reports [4](#), [4P](#), [5](#), [5P](#), and [6](#)