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Agricultural and Food Security Policy Analysis in Central America: Assessing Local Institutional Capacity, Data Availability, and Outcomes

By

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David Tschirley, Luis Flores, and David Mather
Michigan State University Food Security Group

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EXECUTIVE SUMMARY

Performance of the agricultural sector in developing countries is fundamental to ensuring robust and equitable economic growth and broad-based food security. Yet donor support to agricultural development in developing countries has declined continuously for 30 years. This same period saw dramatic deterioration in developing countries' institutional capacity to provide services to their agricultural sectors. These trends may now be changing, due in part to the global food price crisis of 2007 and 2008 and concerns that it unleashed about the world's ability to feed its poorest inhabitants. This paper reports on the results of a two week trip to Guatemala and Nicaragua made by Michigan State University's Food Security Group. The purpose of the trip was to assess two aspects that form the foundation for applied agricultural and food security policy analysis and outreach: (a) the organizations involved in research and outreach on these topics, and (b) existing data sets and processes for continued generation of data sets useful in such analysis and outreach. The team also explored the extent to which policy makers and designers of public programs solicit empirical data and analysis for the design and implementation of local food security programs and policies.

While in the region, the team held in-briefings and out-briefings with USAID missions in each country, made two field visits in Guatemala and one in Nicaragua, and met with over 20 individuals across 16 institutions in Guatemala and with over 20 individuals across 14 institutions in Nicaragua.

The paper reaches five basic conclusions. First, Guatemala and Nicaragua both have better than average data for applied analysis of agricultural and food security policy. Though suffering from problems typical of statistical institutes throughout the developing world, INE in Guatemala and INIDE in Nicaragua have generated what we expect to be reasonably good LSMS data for two recent years. Common strengths across these surveys include well designed and quite comprehensive questionnaires, more than adequate sample sizes, high ratios of supervisors to enumerators in data collection, and good understanding of the challenges involved in these activities by the individuals in charge. In addition, both LSMS-type surveys have larger and better-designed agricultural sections than is often found in an expenditure survey. Both countries collect agricultural commodity price data at least weekly from markets around the country. We know that these price data series have few gaps, and we expect that data quality will be acceptable for the types of uses to which it would be put. Household survey data and market price data are the basic data needed to generate better empirical understanding of a range of food security issues in each country, and could be complemented with additional focused data collection built around specific analytical questions.

Our second finding is that each country has research institutions with some degree of sustainability, some demonstrated track record attracting outside funding and collaborators, a commitment to good research and active outreach, and great interest in improving their capacity. IDIES and IARNA with Universidad Rafael Landívar in Guatemala, and Nitlapan with Universidad de Centroamérica and the agricultural economics program at Universidad Autónoma de Nicaragua-Managua in Nicaragua stand out in this regard. Yet all of these organizations are dominated by analysts trained at the M.S. level (very few Ph.D.s), some struggle to fund the research they wish to do, and none of them has so far been successful integrating students into their research and outreach activities. In other words, both countries have institutions that are already doing good and relevant work but whom could benefit greatly from increased training and from resources for collaborative research and outreach.

Third, a key challenge in both countries is building demand in public agencies for these analyses. Lack of civil service reform has combined with inadequate tax revenue to result in low funding, low salaries, inadequate operating budgets, and high turnover of personnel. These conditions make it difficult for the public sector to generate sustained demand for objective information and analysis. Yet there are areas that have been less affected by these problems, and in nearly all cases one can find committed and motivated people doing the best work they can under the circumstances and anxious to be able to do more. We believe that, across a range of public sector organizations, meaningful progress can be made by building research and outreach capacity in other institutions (preferably universities) and pursuing a process of flexible engagement with government in circumstances and with agencies (and specific personnel within those agencies) judged to be able to benefit from the engagement. This kind of university-public sector collaboration is a hallmark of effective policy analysis and outreach processes in many countries, and we believe it would pay high dividends in these countries as well.

Fourth, great value remains to be generated from existing household level data sets. Specifically, we believe that these data sets could be used to generate substantially greater insight regarding the distributional effects of a range of policies and programs. This is especially true in Nicaragua, where the Encuesta Nacional de Hogares sobre Medición de Niveles de Vida (ENMV) to our knowledge has been greatly under-exploited. The capacity to extract as much information as possible from data sets such as ENMV and ENCOVI (Guatemala's living conditions survey) is important, as government and research institutions in both countries are quite interested in customized territorial development policies and the strengthening of municipality-level development planning.

We identify two such potential analyses. First, what are the distributional effects of the existing structure of support to agriculture in both countries? Various studies show the overwhelming importance of (a) price distortions driven by trade controls and (b) price subsidies through direct fiscal support (for example on fertilizer in Guatemala) in overall support to the agricultural sector. Studies also document the limited investment in public goods in Guatemala, a problem likely also seen in Nicaragua. No studies that we have seen quantify the distributional implications of these policies – who wins, who loses, and how much? ENCOVI in Guatemala and ENMV in Nicaragua could be used to generate a detailed, disaggregated answer to this question, with major implications for policy. Annex B provides a brief note on analytical approaches to assessing the distributional consequences of agricultural policies.

A second analysis is specific to Guatemala: what has been the effect of the boom in export horticulture on poverty in the altiplano? USAID has for many years supported this sector, and it has been a major success, including for smallholder farmers. Yet the boom has reached only the southern portion of the altiplano, which enjoys the best infrastructure and market access, leaving the historically more isolated and poorest areas in the north and northwest relatively untouched. In the southern areas where the boom has occurred, which farmers have been able to participate directly in the export boom and what has been the impact on their standard of living?; which farmers have benefited from increased demand for labor driven by export production, and how has this affected their livelihoods?; how have both of these affected farmers' crop mix and their productivity in staple grains? High quality research on this topic, quite possible with existing data and in collaboration with local researchers, would help USAID to explicitly bridge its focus over the past decade on non-traditional agricultural exports into the new era of emphasis on broader agricultural productivity, food security, and poverty reduction.

Our fifth and final finding is that both countries urgently need to put into place well designed impact assessments for the plethora of special projects that have been launched in recent years. Mi Familia Progresa and Mi Comunidad Produce in Guatemala, the various components of Hambre Cero in Nicaragua, all have obvious potential positive and negative effects that need to be understood in order to improve them over time and to design second generation projects that are better targeted and have larger positive impacts. Most such analyses would require dedicated data collection focused on beneficiaries and non-beneficiaries – ENCOVI and ENMV may be able to play complementary but not central roles.

The paper closes by outlining an approach to collaborative research and outreach that we believe would contribute to three objectives: quickly enhancing the empirical content of the policy debate in each country, building sustainable local capacity for enhanced applied policy research and outreach, and strengthening the linkages between government and applied research organizations that are central to good policy making. We also identify the most promising public sector and research organizations in which to invest as part of this approach.

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LIST OF ACRONYMS

Acronym	Spanish (translation of English acronyms when applicable)	English (translation of Spanish acronyms when applicable)
AGEXPORT	Asociación Guatemalteca de Exportadores	Guatemalan Exporters Association
ADM	Compañía Archer Daniels Midland	Archer Daniels Midland Company
AFRE	Departamento de Economia Agrícola, Alimentar y de Recursos Naturales de la Universidad Estatal de Michigan	MSU Department of Agricultural, Food, and Resource Economics
AMA CRSP	Bienes y Acceso al Mercado – Proyecto de Apoyo a la Investigación Colaborativa	Assets and Market Access Collaborative Research Support Project
APEN	Asociación de Productores y Exportadores de Nicaragua	Nicaraguan Association of Producers and Exporters
ASIES	Asociación de Investigación y Estudios Sociales	Association for Research on Social Sciences
CGE	modelos de Equilibrio General Calculable	Computable General Equilibrium models
CIEN	Centro de Investigaciones Económicas Nacionales	National Economic Research Center
CINET	Centro de Investigaciones Económicas e Tecnológicas	Economic and Technological Research Center
CINPE	Centro Internacional de la Política Ecónomica para el Desarrollo Sostenible	International Centre in Economic Policy for Sustainable Development
CLACSO	Consejo Latinoamericano de Ciencias Sociales	Latin American Social Sciences Council
CONASAN	Consejo Nacional de Seguridad Alimentaria y Nutrición	National Council for Food Security and Nutrition
CRS	Catholic Relief Services	Catholic Relief Services
CRSP	Proyecto de Apoyo a la Investigación Colaborativa	Collaborative Research Support Project
DHS	Encuestas de Demografía y Salud	Demographic and Health Surveys
ECOSUR	Colegio de la Frontera Sur	Southern Border Research Center
EGAT	Oficina para el Crecimiento Económico, la Agricultura y el Comercio de la USAID	Economic Growth, Agriculture, and Trade Bureau of USAID
EIGH	Encuesta de Ingresos y Gastos de los Hogares	Household Income and Expense Survey
EMIF	Encuesta de Migración Internacional de la Frontera Norte	Northern Border International Migration Survey
ENA	Encuesta Nacional Agropecuaria	National Agriculture Survey
ENCOVI	Encuesta Nacional de Condiciones de Vida	Spanish for Living Standards Measurement Survey
ENDESA	Encuesta Nicaragüense de Demografía y	Nicaraguan Demography and

Acronym	Spanish (translation of English acronyms when applicable)	English (translation of Spanish acronyms when applicable)
	Salud	Health Survey
ENEI	Encuesta Nacional de Empleos e Ingresos	Household Employment and Income Survey
ENIGFAM	Encuesta Nacional de Ingresos y Gastos Familiares	National Survey of Family Income and Expenses
ENMV	Encuesta Nacional de Hogares sobre Medición de Nivel de Vida	LSMS equivalent
ENSMI	Encuesta Nacional de Salud Materno-Infantil	National Survey of Mother-Infant Health
FAO	Organización para la Agricultura y la Alimentación de las Naciones Unidas	Food and Agriculture Organization of the United Nations
FAO/PESA	Organización de las Naciones Unidas para la Agricultura y la Alimentación	Food and Agriculture Organization of the United Nations/Special Program for Food Security
FIDEG	Fundación Internacional para el Desafío Económico Global	International Foundation for the Global Economic Challenge
FLACSO	Faculdad Latinoamericana de Ciencias Sociales	Latin American Social Sciences Faculty
FSG	Grupo de Seguridad Alimentaria de la Universidad Estatal de Michigan	Michigan State University's Food Security Group
FUNIDES	Fundación Nicaraguense para el Desarrollo Económico y Social	Nicaraguan Foundation for Economic and Social Development
GHFSI	Iniciativa Global sobre el Hambre e la Seguridad Alimentaria	Global Hunger and Food Security Initiative
IARNA	Instituto de Agricultura, Recursos Naturales y Ambiente	Institute of Agriculture, Natural Resources and the Environment
ICEFI	Instituto Centroamericano de Estudios Fiscales	Central-American Institute of Fiscal Studies
ICT	Tecnologias de Información y Comunicación	Information and Communication Technologies
IDB	Banco Interamericano de Desarrollo	Inter-American Development Bank
IDIES	Instituto de Investigaciones Económicas y Sociales	Economic and Social Research institute
IFPRI	Centro Internacional de Investigación sobre la Política Alimentária	International Food Policy Research Institute
IICA	Instituto Interamericano de Cooperación para la Agricultura	Interamerican Institute for Agricultural Cooperation
INCAP	Instituto de Nutrición de Centro América y Panamá	Central-America and Panama Institute of Nutrition
INE	Instituto Nacional de Estadística de Guatemala	Guatemalan National Statistics Institute

Acronym	Spanish (translation of English acronyms when applicable)	English (translation of Spanish acronyms when applicable)
INEC	Instituto Na Estadísticas cional de Estadísticas y Censos	Nicaragua Statistics Institute (now INIDE)
INETER	Instituto Nacional de Estudios Territoriales	Nicaragua Territorial Studies
NIDE	Instituto Nacional de Investigaciones de Desarrollo	National Institute of Development Research
IPC/CPI	Indice de Precios al Consumidor	Consumer Price Index
LSMS	Equivalente a ENCOVI en español	Living Standards Measurement Survey
MAGA	Ministerio de Agricultura, Ganadería, y Alimentación	Guatemalan Ministry of Agriculture, Food and Livestock
MAGFOR	Ministerio Agropecuario y Forestal de Nicaragua	Nicaraguan Ministry of Agriculture and Forestry
MCC	Corporación Reto del Milénio	Millennium Challenge Corporation
MECOVI	Projecto para Mejoramiento de las Encuestas de Condiciones de Vida	Improving Living Conditions Surveys project
MFEWS	Sistema Mesoamericano de Alerta en Seguridad Alimentaria	Mesoamerican Food Security Early Warning System
MINEDUC	Ministerio de Educación	Ministry of Education
MSU	Universidad Estatal de Michigan	Michigan State University
NASA	Administración Nacional Aeronautica de los Estados Unidos de America	National Aeronautics and Space Administration (USA)
NBI	Necesidades Básicas Insatisfechas	Unsatisfied basic needs
NGOs	Organizaciones no-gubernamentales	Non Governmental Organizations
NOAA-CPC	Centro de Previsión Climática de la Administración Nacional Oceanica y Atmosférica de los Estados Unidos de America	National Oceanic and Atmospheric Administration Climate Prediction Center
OIMA	Organización de Información de Mercados de las Américas	Market Information Systems Organization of the Americas
PDIS	Proyecto de Diálogo para la Inversión Social (Guatemal)	Guatemala's Dialogue Project for Social Investment
PFID-F&V	Socios para el Desarrollo de la Industria Alimentaria – Frutas y Vegetales	Partnership for Food Industry Development – Fruits and Vegetables
PPA	Programa Productivo y Alimentario	The Hambre Cero Program
PRESANCA	Programa Regional de Seguridad Alimentaria y Nutricional para Centroamérica	Central American Regional Program for Food and Nutritional Security
RUTA	Unidad Regional para Asistencia Técnica	Regional Unit for Technical Assistance
SEGEPLAN	Secretaría de Planificación y Programación de	Guatemala General Planning Secretariat of the Office of the

Acronym	Spanish (translation of English acronyms when applicable)	English (translation of Spanish acronyms when applicable)
	la Presidencia de la República	President
SEN	Sistema de Estadística Nacional	National Statistics System
SESAN	Secretaria de Seguridad Alimentaria y Nutricional (Guatemala)	Guatemala Secretariat for Food Security and Nutrition
SIAGROFOR	Sistema de Información Agropecuario y Forestal	Agriculture and Forestry Information System
SIGSA	Sistema de Información Gerencial de Salud (Guatemala)	Health Management Information System (Guatemala)
SINASAN	Sistema Nacional de Seguridad Alimentaria y Nutricional (Guatemala)	National System for Food Security and Nutrition (Guatemala
SINPET	Sistema Nacional de Planificacion Estrategica	Nacional Strategic Planning System
SIPMA	Sistema de Información de Precios y Mercado	Market Price System
SSAN	seguridad y soberanía alimentaria nacional	National food security and sovereignty
UCA	Universidad Centroamericana de Nicaragua	Central American University of Nicaragua
UNAN	Universidad Nacional Autonoma de Nicaragua-Managua	National Autonomous University of Nicaragua - Managua
UNIFEM	Fondo de Naciones Unidas para la Mujer	United Nations Development Fund for Women
UPIE	Unidad de Políticas e Información Estratégica del MAGA	MAGA's Policy and Strategic Information Unit
URL	Universidad Rafael Landívar	Rafael Landívar University
USAID	Agencia para el Desarrollo Internacional de los Estados Unidos de América	United States Agency for International Development
USDA	Departamento de Agricultura de los Estados Unidos	United States Department of Agriculture
USGS	Encuesta Geológica de Estados Unidos	United States Geological Survey
VISAN	Vice Ministerio de Seguridad Alimentaria y Nutricional	Vice-Ministry of Agriculture on Food Security and Nutrition
WB	Banco Mundial	World Bank

1. INTRODUCTION

Performance of the agricultural sector in developing countries is fundamental to ensuring robust and equitable economic growth and broad-based food security. Yet after several decades of strong support to agriculture in developing countries, the share of agriculture in total aid to these countries fell from a peak of 20% in 1980 to 15% in 1990, and then plummeted to 4% in 2006. Trends in USAID development assistance have been similar, with assistance to agriculture in Central- and South America especially hard hit. Perhaps more importantly, governments in the region have seen a deterioration of their institutional capacity to monitor and assess their agricultural sectors, design appropriate programs, and deliver the public goods needed to stimulate sustained and broad-based growth[1]. Meanwhile, the poorest geographic areas in the region, particularly Guatemala, Honduras, and Nicaragua, have grown more prone to food security crises due to a variety of climatic and socio-economic factors.

The explosion in international commodity prices during 2008 and part of 2009 was a wake-up call to donor and recipient countries alike regarding the importance of agriculture. Within Central America, the food price crisis strengthened what was already an emerging focus on food security problems, spurring a plethora of new initiatives focused on the poor and food insecure. Within USAID, the new Global Hunger and Food Security Initiative (GHFSI) brightens the prospects for a renewed focus on equitable agricultural growth as the fundamental basis for broad-based prosperity and food security. Realizing this promise requires a conducive policy environment and appropriate investments throughout the supply chain, from farm to consumer. And in a modern economy, good policy making and investment planning require a constant flow of information about rural households, the evolving rural economies in which they operate, the urban economies (domestic, regional, and international) they trade with, and the supply chains that the rural and urban economies.

Yet the institutional deterioration referred to above reflects sharply reduced support to the systems needed to generate this kind of data and information. As a result, the region sees very little of the ongoing, empirically based analysis of agricultural and broader food security policy that is needed in rapidly changing economies. Government programs in Central America, for example, are discussed often in the media but little is known about the data and decision making processes that went into their design and implementation. Current programs such as Hambre Cero in Nicaragua and Mi Familia Progresa in Guatemala emulate successful approaches from abroad (e.g., Brazil, Mexico), but little is known about how well they have been adapted to local conditions, nor about provisions for routine monitoring of performance and eventual impact evaluation. Both are crucial for this renewed focus on food security to have measurable impacts and to be sustained for the long-run.

[1] Trends in total fiscal expenditures on agriculture have been positive in some countries over the past 25 years, but two characteristics of this expenditure, common to all countries, are of great concern. First, increasing shares of this expenditure have come primarily through special programs that may perform well for some period, but then decline when project funding disappears; meanwhile, line ministries have often lost their most qualified personnel to these projects. More fundamentally, legislation regarding civil service has typically not been updated, making it very difficult to build and maintain capacity. Second, large shares of expenditure in agriculture have gone to subsidies, or what are often now referred to as private goods, rather than public goods. Much literature shows that these subsidies tend to be captured in very large measure by the largest farmers and companies, with negative effects on consumers (many of them small farmers unable to produce all they need to eat) and little effect on overall agricultural growth and poverty reduction.

In response to this situation, Michigan State University's Food Security Group (FSG)[2] organized a two week trip to the region with the purpose of assessing two aspects that form the foundation for applied agricultural and food security policy analysis and outreach: (a) the organizations, either resident or actively working in the region, that are involved in research and outreach on these topics, and (b) existing data sets and processes for continued generation of data sets useful in such analysis and outreach. The team also attempted to identify the extent to which policy makers and designers of public programs actively solicit empirical data and analysis as a basis for the design and implementation of local food security programs and policies. Prior to departure, the team conducted web-based reviews of (a) existing institutions involved in agricultural and food security policy analysis, and (b) data sets generated by the countries' statistical organization, including downloading and review of all available questionnaires from these surveys. To the extent possible, the team made key contacts and set-up interviews prior to their departure, drawing on contacts and knowledge from previous work in the region.

The foundation for these activities was FSG's long experience in agricultural and food security policy analysis and outreach in Africa. This background was complemented by MSU's recent intensive work on agricultural supply chains in Central America, with one of the current MSU team members being a central player in that work[3].

The team arrived in Guatemala on Sunday, 17 January, proceeded to Nicaragua on Friday, 22 January, and returned to Guatemala on Thursday, 28 January, before returning to Michigan on Tuesday, 2 February[4]. While in the region, the team held in-briefings and out-briefings with USAID missions in each country, made two field visits in Guatemala and one in Nicaragua, and met with over 20 individuals across 16 institutions in Guatemala and with over 20 individuals across 14 institutions in Nicaragua.

The two field visits in Guatemala were to the village of Huité in the department of Zacapa and to Cooperativa Tecum'uman in aldea Caquixajay, near Tecpán in the department of Chimaltenango. Huité lies in the so-called Corredor Seco of Guatemala, which has been one focus of food security concerns in recent years. There the team met with the mayor, who has been quite active in local food security initiatives, interviewed workers and the work crew supervisors on a large-scale melon export operation, and also interviewed the manager of a melon packing plant. Cooperativa Tecum'uman is one of the cooperatives of smallholder farmers supported by AGEXPORT to strengthen its position in the fresh produce export industry. Dr. Tschirley accompanied Mr. Carlos Urizar of AGEXPORT on this visit, during which they interviewed four of the cooperative's leaders and visited fields planted to fresh beans for export. In Nicaragua, the team was accompanied by Tomás Membreño of MCC to Leon, on the Pacific coast, where they interviewed the leader of a woman's cooperative involved in intensified production of plantain.

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[2] FSG refers to the faculty and staff implementing applied research and capacity building under the USAID Food Security III Cooperative Agreement and a family of related grants from a wide range of funding organizations. FSG's institutional home is the Department of Agricultural, Food, and Resource Economics (AFRE) at MSU.

[3] See http://aec msu.edu/fs2/index htm for a continually updated compendium of MSU/FSG's work in Africa. MSU's work in Central America has been carried out by other units within or associated with AFRE. Key among these are the Pulses CRSP and the Partnership for Food Industry Development – Fruits and Vegetables (PFID-F&V). Team members for the current work were Dr. David Tschirley, Dr. David Mather, and Dr. Luis Flores.

[4] The team intended also to visit Honduras, but political circumstances made this impossible during the chosen time period.

The report proceeds as follows. The next section presents what we were able to learn regarding agricultural and food security policy research capacity in the two countries. Section 3 does the same for data availability, while section 4 speaks to the level of demand within the public sector for objective information and analysis. Section 5 concludes with a summary of key conclusions, suggestions regarding key research that could be done largely with existing data sets, and an outline of an approach to collaborative research and outreach that we believe would enhance the empirical content of the policy debate in each country, help build sustainable local capacity for enhanced applied policy research and outreach, and strengthen the linkages between government and applied research organizations that are central to good policy making.

2. CAPACITY FOR APPLIED AGRICULTURAL AND FOOD SECURITY POLICY RESEARCH AND OUTREACH

2.1. Guatemala

The principal socio-economic research organizations in Guatemala are both within Universidad Rafael Landivar: the Instituto de Investigaciones Económicas y Sociales (IDIES) and the Instituto de Agricultura, Recursos Naturales y Ambiente (IARNA). Other organizations that produce analytical output and that are covered in this report are the Faculdad Latinoamericana de Ciencias Sociales (FLACSO), and MFEWS. We did not visit Universidad San Carlos or other universities in Guatemala. We did, however, enquire with various contacts regarding their involvement in agricultural and food security policy research, and we visited each university's web site looking for research output. Both our interviews with other contacts and our perusal of the web sites suggest that these universities have little if any footprint in this area.

2.1.1. Instituto de Investigaciones Económicas y Sociales (IDIES)

Summary: IDIES (**http://www.url.edu.gt/PortalURL/Principal_01.aspx?s=56)** is one of eleven institutes within the Universidad Rafael Landívar (URL), the Jesuit university in Guatemala[5], five of which have active research programs. From a food security perspective, its key strength is in sophisticated use of household data to conduct broad-based rural poverty analysis. They have expertise in rural micro-enterprise and micro-finance, and have recently begun a series of value chain studies, also in the context of their broad-based poverty research. The IDIES Director has strong links to government, having been director of SEGEPLAN on at least two separate occasions. The institute has a record of attracting outside funding and collaborators. Key areas that could be strengthened include post-graduate training (IDIES has only one Ph.D. on staff) and attracting graduate students from URL into their research program, as a means to broaden the base of applied food security research capacity in the country. IDIES has strong publication output, but could strengthen its output of short, focused policy briefs oriented to capturing the attention of key policy makers. Our perception is that they are highly interested in further outside collaboration.

Discussion: The team held two meetings with IDIES personnel: one in the home of its Director, Mr. Miguel von Hoegen, and another at the IDIES offices with Mr. von Hoegen and Mr. Wilson Romero who leads IDIES's research program; during this second meeting we had the opportunity to meet numerous IDIES researchers and speak briefly with them about the research they are involved in.

IDIES's current team consists of eight researchers, three research coordinators, and one project administrator paid by University funds, four administrative staff paid by IDIES core funds, and five other technical staff paid on project funds. While we do not know to what extent University funds imply stable long-term employment, it was clear to us in the interviews that URL is committed to IDIES and other institutes for purposes of increasing research output and also attracting grant funding.

[5] The other two that we are aware of are IARNA, discussed below, and the newly formed Instituto de Ciencias de Salud.

The institute has a track record of attracting outside funding and collaborators. Currently they work with RIMISP, based in Chile, and IFPRI on the project Programa Dinámicas Territoriales Rurales, with UNIFEM on research related to microenterprise development for poor women, and have been approached by World Bank to conduct an impact evaluation of Mi Familia Progresa. They also have an on-going twenty year relationship with the Konrad Adenauer Foundation in Germany.

A key research program currently underway as part of the Programa Dinámicas Territoriales Rurales, and involving several researchers, makes intensive use of ENCOVI data from 2000 and 2006, ENIGFAM data from 1998, and population census data from 1994 and 2002 (see chapter 3 for discussion of these data bases). Using poverty mapping techniques, IDIES has mapped the country by rate and direction of change in several poverty indicators between 2000 and 2006. They then focused on areas that have shown greatest progress (the southeast, Guatemala City and environs, and some areas of the southwest), using the ENCOVI and census data to characterize what they can about these areas, and then designing intensive qualitative/quantitative follow-up studies to more fully explore the reasons for success (Romero and Zapil 2009). These follow-up studies are currently underway. This effort has all the hallmarks of high quality, relevant applied analysis of potentially great use to policy makers.

2.1.2. Instituto de Agricultura, Recursos Naturales y Ambiente (IARNA)

Summary: IARNA (**http://www.url.edu.gt/PortalURL/Principal_01.aspx?s=51**), like IDIES, is part of Universidad Rafael Landívar (URL), the Jesuit University in Guatemala. Historically, its strength is in the environmental area, where it has established clear intellectual leadership and has spearheaded the systematic collection and publication of critical environmental data. More recently, the institute has expanded its work into rural development and food security, based in part on collaboration with John Mellor, a pioneer in research about the role of agriculture in economic development. IARNA has a record of outside collaboration, does policy relevant research, and actively reaches out to government but has been somewhat frustrated with the lack of response. Key areas that could be strengthened mirror those for IDIES: more post-graduate training to M.S. and Ph.D. level, methods to attract graduate students from URL into their research program, and more use of focused policy briefs oriented to capturing the attention of key policy makers. Like IDIES, our perception is that IARNA is highly interested in further outside collaboration.

Discussion: The team held one meeting with IARNA's Director (Juventino Galvez) in the IARNA offices. The institute's current team consists of seven research staff paid by URL, one of them with Ph.D. and six with M.S. degrees, and 12 staff contracted short-term through project funding. This latter number varies depending on the number of projects the institute has in its portfolio. Like IDIES, IARNA appears to benefit greatly from its home in URL, with more stable funding than they otherwise could have to maintain dedicated staff.

IARNA has a relatively strong record of outside collaboration. One such collaboration has occurred over several years with John Mellor, currently with Abt Associates. This work has focused on laying out conceptual bases for the role of smallholder agriculture in equitable economic growth, in identifying conceptually what types of investments are likely to be most conducive to spurring such growth, and in quantitative modeling of the impacts of selected

road infrastructural investments on growth (IARNA 2009). Geographically, this work targeted the western altiplano, the most indigenous and poorest area of the country. IARNA has made good use of ENCOVI and ENA data as part of this work.

Other international collaboration has been with three Dutch Universities (Wageningen, Tilburg, and Utrecht), and with the Centro Internacional de la Política Economica para el Desarrollo Sostenible (CINPE) of the Universidad Nacional de Costa Rica. The institute does, however turn down work, suggesting both a reliable level of funding from URL and outside sources and a willingness to make choices about where to focus its resources. Most recently, IARNA turned down a contract for an assessment of ProRural, due to concerns about the program's orientation and political connections.

2.1.3. Faculdad Latinoamericana de Ciencias Sociales (FLACSO)

Summary: FLACSO (http://www.flacso.org/) is an international organization emphasizing research, teaching, and outreach on a wide range of socio-economic topics. Its research strength has been in social and political sciences and environment/natural resources, with recent strong work on international migration. Late in 2009 the organization sponsored a large seminar focused primarily on a wide range of topics related to food security; to our knowledge it was FLACSO's first significant entrance into the area of food security analysis. FLACSO does not appear to be a major user of data from ENCOVI or other household level data sets of INE. Teaching is in short-duration modules without ongoing training programs in established academic areas.

Discussion: FLACSO's Guatemala office is a large operation, with 60 total staff, 80% of them either academic or in project implementation, and 30% of them on long-term fixed contracts. Teaching is done through modules of 32-48 hours of instruction, with the thematic focus based on the interest of funding organizations. The modules are programmed based on the availability of dedicated funding . FLACSO offers no on-going graduate degree training in, for example, agricultural economics.

FLACSO maintains a broad and varied portfolio of research on socio-economics, ethnic studies, and environment. Of special potential interest for food security is FLACSO's leading role in the Guatemala portion of an on-going survey of international migration (Northern Border International Migration Survey - EMIF), previously run by Colegio de la Frontera Sur (ECOSUR) in México. The survey has been done for seven consecutive years, and FLACSO currently has two full-time researchers working on the Guatemala portion of the survey.

In November 2009, FLACSO held a seminar entitled International Seminar: Integrated Rural Development Options with an Emphasis on Food Security. The seminar was well attended and sponsored by a dozen organizations including FAO.

As an international organization, FLACSO has agreements with Universities in Mexico (Universidad Autonoma Xoximilco), Spain (Universidad de Barcelona (estudios de ecologia turística), CLACSO (Consejo Latinoamericano de Ciencias Sociales), Chile (Universidad Austral), and the Netherlands (Wageningen).

2.1.4. MFEWS

The Mesoamerican Famine Early Warning System (MFEWS) is a USAID-funded activity that collaborates with international, regional, and national partners to provide monthly food security updates. Its reports are based on price data from the Unidad de Políticas e Información Estratégica (UPIE, a unit within Ministério de Agricultura, Ganaderia y Alimentacón - MAGA), early warning information regarding rainfall and crop conditions developed in collaboration with their international partners NOAA-CPC, USGS, USDA, and NASA. As this list suggests, MFEWS analyzes a wide range of data from agro-climatic conditions to markets, remittances, and livelihoods in terms of its impacts on livelihoods and markets to identify potential threats to food security. Its reports are regularly looked to as among the most timely and informative information regarding crop conditions and likely food security problems. MFEWS works closely with MAGA (especially UPIE) and other public sector offices such as Operaciones Rurales and the office of the Vice-Ministry of Agriculture on Food Security and Nutrition (VISAN).

MFEWS's leader in Guatemala shares the idea that important improvements are necessary in public sector capacity, particularly on improving municipal-level information on crop production and prices. They do indicate that the quality of price data from UPIE is relatively good and quite useful for their purposes. As a donor funded project working outside any public sector organization, however, MFEWS cannot be looked to for expanding institutional capacity within Guatemala for food security analysis.

2.1.5. Other Organizations Involved in Research

The Director of IDIES mentioned several organizations as doing serious work in Guatemala but with whom the MSU team was unable to meet:

- ASIES – Asociación de Investigación y Estudios Sociales (http://www.asies.org.gt/)
- CIEN – Centro de Investigaciones Económicas Nacionales (http://www.cien.org.gt/)
- ICEFI – Instituto Centroamericano de Estudios Fiscales (http://www.icefi.org/index.php?option=com_content&view=frontpage&Itemid=75)

We also note that INCAP – Instituto de Nutrición de Centroamérica y Panamá (http://www.sica.int/incap/incap_breve.aspx?IdEnt=29) – has in the past done a great deal of work on food security from a nutrition perspective. Its output over the past three- to four years has been substantially less than in the past.

2.2. Nicaragua

Several organizations in Nicaragua show capacity for some level of policy relevant analysis. Key among these is Nitlapan, a research institute linked to Universidad de Centroamerica, the Jesuit university in Nicaragua. Nitlapan has a substantial portfolio of research efforts to go with its even larger set of development projects. Universidad Nacional Autonoma de Nicaragua-Managua (UNAN) also has some research capacity, past experience, and great interest in increasing their engagement with this type of work. FUNIDES (Fundación Nicaraguense para el Desarrollo Económico y Social) is an independent think tank that produces excellent output oriented primarily towards macro-economic and fiscal issues.

Finally, IICA has a long history of agricultural sector analysis and maintains some capacity for this in Nicaragua. The MSU team met with all these organizations. We were unable to meet with FIDEG (Fundación Internacional para el Desafío Económico Global), an independent think tank developed by FLACSO with funding from the Ford Foundation; FIDEG is oriented more towards social issues and saw a substantial drop-off in its analytical output since 2008. If USAID/Nicaragua is interested in building sustainable local capacity for applied policy analysis and outreach, we suggest that they seriously investigate possibilities with Nitlapan and UNAN; the decision between these two would require further discussion with each, with the essential trade-off being more experience and trained personnel but risk of overextension at Nitlapan, vs. some experience and great interest at UNAN but less of a track record in this type of analysis.

2.2.1. Nitlapan

Summary: Nitlapan is a large organization primarily oriented towards implementing development projects but also with a substantial and wide ranging portfolio of socio-economic research. They are the only local organization that we spoke with that has made direct use of the INIDE data sets, especially ENMV. Part of the Jesuit affiliated Universidad Centroamericana (UCA), Nitlapan benefits from the institutional stability of that parent organization. They appear to be frequently consulted by policy makers in Nicaragua though it was not possible for us to ascertain their level of influence on policy and program design. Nitlapan has the strongest record of any organization we saw in Nicaragua in attracting outside funding and collaborators. Perhaps the key concern regarding Nitlapan is whether their success in attracting work will lead to a loss of focus on key food security issues. Like IDIES and IARNA in Guatemala, Nitlapan could be strengthened through further graduate training at M.S. and Ph.D. levels, and through greater output of short policy briefs tailored to policy makers

Discussion: The MSU team met with Francisco Perez, head of the research in Nitlapan. The institute has 170 staff, 149 of them working in development projects and 21 in research. Of the 21, five are principal researchers leading research in value chains and poverty, micro-finance and development, access to land, natural resource management, and sectoral and macroeconomic policy. These five principal researchers all have M.S. degrees economics, development studies, and anthropology. Two other researchers linked to Nitlapan are current Ph.D. candidates. The Director General of Nitlapan has a Ph.D. in Economics from Oxford, UK. Nitlapan's personnel is quite stable, reflecting the intitutional stability of UCA.

We learned of two current outside collaborations. Like IDIES in Guatemala, Nitlapan is the lead Nicaraguan partner in RIMISP's study of territorial development in various Latin American countries. RIMISP is known for high quality research, making this collaboration a strong point for Nitlapan. It is in this context (and perhaps others) that Nitlapan makes use of INIDE's ENMV data. The institute is also working with Dr. Thomas Reardon of Michigan State University, through the USAID -funded Assets and Market Access Collaborative Research Support Project (AMA CRSP) , conducting systematic supply chain studies for selected basic grains and fresh produce in Nicaragua.

2.2.2. Universidad Nacional Autonoma de Nicaragua-Managua (UNAN)

We held two meetings with three faculty members from UNAN linked to CINET (including the Director of CINET), a research center focusing on technology and agricultural innovation. CINET has three center staff (one Ph.D.) and twenty two associate staff, eleven of them faculty in Agricultural Economics. Staff and associates from the center have experience in application of the Policy Analysis Matrix (an analytical framework based on social accounting matrix principles), CGE modeling, and analysis of sectoral protection measures. Outside collaboration has been with IFPRI assessing Nicaragua's food system, and with Dutch assistance to build an agricultural economics M.S. program, which continues to this day. Most recent research has been on innovation systems in Nicaragua and on the use of ICT in the transition towards virtual universities and innovative teaching and learning. On the latter topic, CINET organized a workshop in Nicaragua in collaboration with Aalborg University in Denmark and The Technical University of Denmark.

UNAN-CINET has several characteristics that could make it a good target for capacity building investment. Its staff has relevant training and experience, familiarity with household data analysis techniques, and great eagerness to rebuild capacity in this area. They also have access to a pool of M.S. students eager to be involved in applied research and outreach. Given that UNAN is a state university, we were concerned about the center's ability to be fully independent in their choice of research topics and in publishing results regardless of what they might imply about government programs. In posing the question to two people outside UNAN, they observed that UNAN's funding level (as a share of the national budget) is constitutionally mandated, which provides a measure of protection for intellectual freedom. The staff we met with at CINET stated forcefully that they have always had full freedom in choosing research partners and topics, and in reporting results as they see fit.

2.2 3. Other Organizations

FUNIDES is an independent think tank partially funded by USAID. It produces several types of analytical publications. Coyuntura Económica is a quarterly review of current economic conditions based in part on its own regular survey of economic confidence among consumers and firms, with additional short analyses of topical policy issues. Recent issues have had articles on economic (not specifically agricultural) competitiveness, review of proposed tax legislation, and regional economic outlook. FUNIDES experienced difficulties for several recent years, having rebounded over the past two years under new leadership. In our view, FUNIDES produces useful analysis that is much needed in Nicaragua, and it is likely deserving of continued support. In a low income economy, however, and with no strong institutional home like UCA or UNAN, its sustainability will always be a struggle.

IICA was spoken of very positively by several individuals that we interviewed, specifically for their role in "coordinating agricultural policy" in the country. They collaborate actively with RUTA, which has produced a series of quite informative assessments on a range of issues of relevance to the agricultural sector. Diana Saavedra of IICA has been a co-author on a chapter on Nicaragua in *Distortions to Agricultural Incentives in Latin America* (Berthelon, Kruger, and Saavedra 2008), which is the best assessment we have yet found of agricultural policy in the country and its likely incidence on different types of rural residents and urban consumers.

3. DATA AVAILABILITY

In this section, we discuss data currently available for agricultural and food security policy analysis in each country, gaps in available data, and processes and organizational capacity currently in place to continue to generate this data. A large amount of data can potentially be collected for use in monitoring of food security and in analysis of policies and programs that affect food security. We therefore proceed by first briefly reviewing the concept of food security and identifying the broad types of data that are most valuable for monitoring and analysis. We then organize the chapter by country, presenting an inventory of available data in each along with our assessment of its likely quality and usefulness.

3.1. Conceptual Framework

USAID's definition of food security identifies three essential elements: food availability, food access, and food utilization. In each, one can distinguish between data needed for monitoring and data needed for analysis and impact evaluation. Monitoring involves identifying indicators of overall food security and its three elements, deciding how to measure them, and tracking those measures over time. Good monitoring is crucial for examining programs during implementation, assessing whether they are contributing to desired progress, and making changes during the project life. Monitoring data thus needs to be collected with some frequency and processed rapidly. Analysis involves asking and answering questions regarding the factors that influence food availability, that determine a household's ability to access sufficient food, or that govern individuals' ability to utilize the food they ingest. Impact evaluation is a type of analysis that focuses on quantifying the impact of a program after it has been executed, to learn lessons about the design of future programs. Answering these types of questions is critical to good policy and program design, and requires a broader range of research topics and data than for simply monitoring household food security. Data collection for analysis, including impact evaluation, can be less frequent than for monitoring; indeed, because the types of surveys needed for some of this work are quite intensive, it is not possible to conduct them with the frequency (e.g., monthly or yearly) that monitoring surveys are often conducted[6]. We focus primarily on data for analysis in this report, though of course there is some overlap between the two types of data.

3.1.1. Food Availability

Food availability is often defined at the national level, and measured in terms of calorie availability per person per day, where calorie availability is the sum of national food production (in terms of calories), commercial imports, and food assistance, less exports. The reliability of this measure depends upon the quality of estimates of national food crop production and food trade flows. We discuss the sources of such estimates below for each country.

The types of data needed for monitoring and analysis of food availability overlap but are not necessarily the same. For example, when properly executed with a sufficiently large sample, the area-frame sampling approach promoted by the FAO and used in many countries of the world produces reliable estimates of national production – a key piece of monitoring data.

[6] See Riely et al. (1999) for a discussion of these issues.

Yet because the household is not the unit of observation in these surveys[7], and because the survey instruments often do not collect data on factors of production (land area, purchased inputs, family and hired labor, etc) at the field or even household-level, the data are not typically useful for more general analysis of the factors that drive household level productivity. Thus, depending on their design, surveys intended for monitoring national crop production may not provide the range of data needed to better understand how various kinds of agricultural policies might influence household (and thus aggregate) crop production.

3.1.2. Food Access

Food access is typically defined as a situation in which household resources are adequate to obtain sufficient and appropriate foods for a nutritious diet for each household member. Food access depends on income (including in-kind income, e.g. unsold production), distribution of income in the household, and food prices. Thus, food availability is defined in aggregate terms (e.g. national) while food access is conceived at the household level and addresses how well available food is distributed. Measures of household resources are most often derived from household expenditure surveys (such as the World Bank's standard Living Standards Measurement Survey – LSMS), which measure household consumption of food and non-food items, along with many other characteristics of the interviewed households. Analysts can then assess the distribution of consumption across households and investigate the determinants of varying consumption levels[8]. Another typical measure of household resource levels comes from household income surveys, which quantify income earned from various sources and thus measure the potential for household consumption.

While household surveys provide important measures of the adequacy of household resources to ensure food access, sectoral-level data are also required to measure the relative prices of food and non-food items over time. For example, the typical CPI (consumer price index) tracks retail prices of each commodity over time included in the typical 'basket' of household consumption items. This basket is usually based on household expenditure data and updated over time. Analyses of price transmission from international to domestic markets (a topic of great interest over the past two years in light of the explosion in world commodity prices) and general agricultural policy analysis also require data on prices of key agricultural and livestock commodities at various stages of the supply chain (i.e. at farm, wholesale and retail).

As noted above for food availability, the types of data needed for monitoring and analysis of food access may overlap but are not necessarily the same. For example, vulnerability mapping based on rapid appraisal of household assets and coping strategies may yield reasonable indicators of average household welfare and/or vulnerability for a given point in time at relatively low cost, yet this type of survey often does not provide the richness of data on household and community characteristics that are needed to explain variation in per capita welfare (expenditure) across households and regions. Thus, analysis that can inform more

[7] In area frame samples, the units of observation are defined areas of land (typically called segments) on which all production is quantified. Households are interviewed only about the land that they have in production in the clusters; any production occurring outside the cluster is ignored.

[8] Although the distribution of household expenditure may vary across household members, few LSMS surveys collect expenditure/consumption data at the individual household-member level, due to time and budgetary constraints.

general agricultural and rural economic growth policy will tend to require richer household-level datasets such as household expenditure or income surveys.

Agricultural price series are an example of data crucial to both monitoring and analysis. Household-level information on income activities and assets can also provide information for both monitoring and analysis. First, estimates of total income per capita serve as a measure of food access (for monitoring). Second, information about the specific income-generating activities pursued by a given household (agricultural and livestock production and marketing, wage labor and migration, own-business activities, etc) as well as their physical and human capital (assets), can be used to explain the characteristics of households which enjoy higher total income (i.e. the household and community-level determinants of total income). Yet because it is impractical to conduct income surveys every year, monitoring systems either should include income as an annual indicator, or should base the reporting on proxy measures that are correlated with income.

3.1.3. Food Utilization

Food utilization is defined as the proper biological use of food, which requires a diet with sufficient energy and essential nutrients, potable water, and adequate sanitation. Proper food utilization is also a function of household knowledge of food storage, processing, basic nutrition and child care, and access to health care knowledge and facilities. Measures of child malnutrition such as stunting (an indicator of chronic malnutrition) and wasting (acute malnutrition) are commonly used indicators of poor food utilization[9]. Both malnutrition indicators are derived from anthropometric measurement, which is typically included in Demographic and Health Surveys (DHS) and sometimes included in LSMS-type surveys.

Another aspect of food security is *vulnerability*, which is often defined as the inability of a household (or country) to manage food price and/or production risk, resulting in vulnerability to food insecurity. Measuring vulnerability at the household level requires a considerable amount of information. First, production risk from drought, pests, and other factors needs to be quantified. Second, information is needed about typical food consumption baskets (provided by expenditure surveys) and how the cost of those baskets changes over time (requiring on-going collection of prices of those commodities that form the consumer price index) across various parts of the country. Both trends and variability are important. Third, information from household-level expenditure or income surveys may provide measures of the percentage and types of households in the country that are net buyers of specific food items and thus vulnerable to price increases. Fourth, analysis is often required to investigate the extent to which shocks to international prices are transmitted to domestic markets, since many factors can dampen the impact of international prices on local prices.[10]

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[9] Note that these are *indirect* indicators of food utilization and are in fact a result of access at the household level, distribution within the household, and utilization by the child's body. Direct indicators of food utilization would be of a biological nature and are seldom if ever used.

[10] For example, recent research by DeJanvry and Sadoulet (2009) found that although international price increases in Guatemala from January 2006 to July 2008 ranged from about 45% to 55% for rice, maize, wheat, and soybeans, these increases had little effect on wholesale prices of staple foods in Guatemala City. By contrast, other studies claimed that households in various Central American countries were vulnerable to international price increases, based on analysis of import dependence ratios for key food commodities, without investigating whether or not such increases on international markets were actually transmitted to domestic markets in Central America.

This very brief review should serve to highlight several points that need to be kept in mind when thinking about data for agricultural and food security policy analysis. First, food security is a multi-dimensional concept and is therefore complex to measure. Second, good policy and program design requires that food security be monitored (measured and tracked over time), that the factors that determine it be understood, and that the efficacy of specific program designs be established. Together, these two points imply the third point: that a wide range of data of various frequencies and at various levels – international, regional, national, sub-national, household, and individual (especially children) – is needed for monitoring and analysis of food security. Fourth, in the predominantly rural and agricultural economies of developing countries, including Central America, food security is intricately linked to the performance of the agricultural production and marketing system.[11] As a result, understanding food security and how to improve it requires a more detailed understanding of the rural economy in which households operate, and food security analysis overlaps to a great degree with the analysis of agricultural policies and of agricultural and broader rural investment programs.

3.2. Guatemala

Table 1 summarizes available data in Guatemala of relevance for agricultural and food security analysis, organized by broad topic. Main actors in producing data of potential use in agricultural and food security policy research are Instituto Nacional de Estadística (INE) and Ministério de Agricultura, Ganadería, y Alimentación (MAGA). The MSU team had three meetings with INE – one with the Subgerente Técnico and Subegerente Administrativo, then separate follow-up meetings with the head of the ENCOVI and ENA surveys. The team was able to obtain only one interview with MAGA, with one of the analysts in UPIE, the ministry's analytical and information unit (see below for more detail on each of these interviews). Written documentation that the team was able to review includes the questionnaires for several INE surveys, a very useful guide to the latest ENCOVI prepared by IDIES (Lara 2007), and tables of monthly average prices from UPIE's market information system.

Maintenance of quality staff is a serious problem throughout the public sector in Guatemala. For example, the MSU team was told by several individuals that over half of the staff of MAGA was replaced after the last election, and that such a replacement rate was not unusual. Most of the staff in MAGA's policy and information unit (UPIE – see below) was on three month contracts (known as 029) as of late January 2010, with no guarantee that they would be extended. In a modern market economy, this should be one of the most important units in a ministry of agriculture, generating information and perspectives on policy and programs for economic growth, increased agricultural productivity, and poverty reduction. INE has somewhat more stability but recently reduced its unit for crop production estimates from 15 to one. As a result, INE was unable to carry out its survey in 2009, and appears unlikely to do so in 2010! Under these conditions, it is frankly impressive that these organizations are able to continue producing the large amount of often good quality data that they do.

[11] Work off the farm is a key income source for many rural residents of Central America. Yet much of this work, especially for the poorest, depends directly on the agricultural sector, including large plantations that attract seasonal migratory labor and smaller farms that employ neighbors during peak labor demand periods.

Table 1. Sources of Data for Agricultural and Food Security Monitoring and Policy Analysis, Guatemala

Years	Organiz-ation	Acronym	Name	Data level	Data collected
Agricultural Sector					
2005, 2006, 2007, 2008	INE	ENA	Encuesta Nacional Agropecuaria	household	Production and sales of annual and permanent crops from two prior seasons; expected production for upcoming season; input use on expected production; land use; livestock holdings and production of livestock products.
2009-present	MAGA		Sistema de Monitoreo	sectoral	Estimates of national production of principal staple food crops based on qualitative reports from municipal officials every 10 days
2003	INE	CENAGRO	Censo Nacional Agropecuario 2003	household	National agricultural census
1999-present	MAGA		Precios de mercado	sectoral	Weekly wholesale and retail prices of key grains from 22 markets (about 13 with regularly reported data); monthly wholesale and retail prices of key grains, fruits & vegetables, and various ag inputs in Guatemala City Terminal market.
varies by data type	MAGA		Sistema de Informacion Geografico	sectoral	Maps of climate, soils and land use; temperature data, etc
Household Expenditures and Living Conditions (LSMS)					
2000, 2006	INE	ENCOVI	Encuesta Nacional de Condiciones de Vida	household & individual	Household expenditures, economic activities and income, time use, land tenure and use, agricultural assets and production, demographics, access to basic services, social participation, and maternal/infant health (and anthopometrics in 2000)
1998/99, 2009/10	INE	ENIGFAM	Encuesta Nacional de Ingresos y Gastos Familiares	household	Extensive information on household expenditures; used to determine the consumer food and non-food items in the consumer basket for the CPI
Health and Demographics					
1997, 1999, 2002, 2008	INE	ENSMI / DHS	Encuesta Nacional de Salud Materno Infantil	household & individual	Household demographics, maternal/child health, family planning methods/knowledge, sexual behavior/knowledge, anthopometrics
1986, 2001, 2009	MINEC / SESAN		Censo nacional de talla en escolares de primer grado de primaria	individual	anthopometrics of 99% of first graders across the country; provides malnutrition measures down to the municipial level

*Notes: INE (Instituto Nacional de Estadistica); MAGA (Ministero de Agricultura, Ganaderia e Alimentacion); MINEC (Ministerio de Educacion); SESAN (Secretaría de Seguridad Alimentaria y Nutricional)

Table 1. Sources of data for agricultural and food security monitoring and policy analysis, Guatemala (continued)

Years	Organiz-ation	Acronym	Name	Data level	Data collected
Consumer Price Index					
2000-present	INE	IPC	Indices de precios al consumidor	sectoral	Monthly prices at the national and regional level for food and non-food (clothing, household goods, housing, transportation, health) items in the consumption basket.
International Trade					
2000-present	INE		Comercio exterior (exports and imports)	sectoral	Annual data on imports and exports by commodity (value and weight, country of destination/origin)
Related surveys					
2002	INE	ENEI	Encuesta Nacional de Empleo e Ingresos	household	Household employment and income
2002	INE		Censo nacional de poblacion y habitacion	household	National household census

*Notes: INE (Instituto Nacional de Estadistica); MAGA (Ministero de Agricultura, Ganaderia e Alimentacion)

Guatemala and other countries of the region have been in fiscal crisis since the start of the worldwide financial crisis in late 2008. This crisis has made the public sector staffing problem more acute, but is not the only source of the problem: our team was repeatedly told that, since structural adjustment in the late 1980s dramatically reduced the size of the public sector, largely by eliminating many redundant and admittedly unproductive staff, the country has never reinvested in the kind of higher quality staff under long-term civil service contracts that is needed for public sector agencies to be productive contributors to economic growth in a market setting.

3.2.1. Agricultural Sector Data

Although INE has successfully implemented various kinds of surveys over the past ten years, Guatemala does not have a strong history or culture of agricultural statistics, exemplified by three facts: the third national agricultural census was implemented in 1979, the fourth was not implemented until 2003, and the country has generated no survey based estimates of agricultural production in 2009 and 2010.

Encuesta Nacional Agropecuaria (ENA): The best source of annual data on crop and livestock production is the Encuesta Nacional Agropecuaria (ENA), implemented by INE. The MSU team downloaded a copy of the latest ENA questionnaire available from the web (for 2005) prior to arriving in Guatemala, and met with the leader of the ENA survey.

a. Sampling: The sampling frame for the ENA is based on the 2003 Censo Agropecuario, and the sampling procedure uses a standard FAO area frame approach to cover small and medium-size farms. A separate list frame is used to cover the population of large farmers.

b. Coverage: The ENA is a nationally-representative survey that covers all major crops and livestock. It is representative at the department level for major crops, only at the national level for other crops. The ENA was implemented each year from 2005 to 2008, yet was not repeated in 2009 due to budget constraints. It was not clear during our team's visit whether or not it would be repeated in 2010, but indications were not positive.

c. Topical coverage: The ENA collects data on production and sales of all crops produced in the previous six months, and asks respondents to forecast their crop production for the coming season. Note, however, that because the ENA is based on an area frame sample, whose unit of observation is segments of land and not households (households are interviewed only to provide data regarding the segment), the survey does not provide estimates of household production. Key informants had a mixed opinion of the quality of ENA production data; several voiced serious doubts, while others felt that it was of fairly good quality. Further questioning suggested that estimates on major crops may be reliable, and that most concerns were about estimates for crops with high spatial concentration; this is a typical challenge faced by national-level crop production surveys.

d. Information Gaps: While the area-based sampling framework used by the FAO for agricultural surveys lends itself to reliable estimates of national production, this framework does not enable the ENA to collect reliable data on factors of production (land area, purchased inputs, family, and hired labor, etc) at the field level (or even household-level). Such field- and household level data are needed for a more general analysis of spatial and

inter-household variation in production for a given food crop. In other words, the sampling design of the ENA is ideal for monitoring levels of crop production, but not for analysis of its determinants.

Another gap which ENA could potentially fill would be to provide more information on commodity prices at the farm-level, which could be combined with wholesale price data from UPIE (see below) to investigate marketing margins over time. While the current ENA instrument asks farmers for a unit price for each commodity that is sold, additional information would be required (such as: where the sale was made; transport costs to the point of sale if not at the household; and the month of sale) in order to compute marketing margins in different parts of the country. Marketing margin analysis is an important component used to assess the performance of commodity markets. While adding questions to a questionnaire obviously increases its length (and thus the cost), it would appear that questions on the characteristics of a farmer's commodity sale for a given season could be added relatively easily to the existing ENA survey instrument.

e. Key Challenges: The principal challenge for the ENA is human resource capacity and reliable financing. The budget cuts of 2009 forced INE to not field an ENA that year and to reduce ENA staff from 15 to one, and made financing in 2010 unlikely. Thus, the human capital developed from implementing the ENA from 2005 to 2008 has either been lost or, at best, dispersed within the organization. Given the importance of reliable crop estimates to any informed food security analysis, this would seem a high priority for funding.

Crop Production Monitoring System: In the absence of quantitative production estimates from ENA in 2009 and probably 2010, production estimates have been developed through a poorly understood qualitative process with no obvious central coordination. After the ENA was not fielded in 2009, MAGA began in August 2009 to task departmental officials with submitting estimates of crop conditions and production every 10 days, based on interviews with three local farmers. MAGA then derives estimates of national crop production based on these reports and other qualitative interviews with key informants, all anchored in past quantitative estimates of production from ENA. MFEWS participates to some extent in this process, and FAO also appears to have been involved, using a qualitative approach that it applies in many countries of the world. How a final production figure is arrived at is not clear, and is not likely to become clear as long as ENA is not revived. Note that INE contracted two consultants from USDA to assess the possibility of using remote sensing techniques to generate crop estimates.[12]

3.2.2. Household Data (Living Conditions, Health, Expenditure)

Encuesta Nacional de Condiciones de Vida (ENCOVI): The ENCOVI is an LSMS-type survey that INE has fielded in 2000 and 2006 (and plans to field in 2011), and that serves as the basis for estimating household poverty rates. The quality of the sampling and enumeration methods as well as the instrument appear to be quite good, due in part to continued technical assistance from the Inter-American Development Bank through the MECOVI project (Mejoramiento de las Encuestas de Condiciones de Vida) as well as technical support from the World Bank. The MSU team downloaded copies of the 2000 and 2006 ENCOVI

[12] The main author of the report is Karla Tay: karla.tay@fas.usda.gov.

questionnaires from the web prior to arriving in Guatemala. All other information comes from our interviews at INE and from questions presented to users of ENCOVI data.

a. Sampling and Organization of Field Work: The sampling frame for the 2000 ENCOVI was the 1994 population census, while the frame for the 2006 survey was updated using the 2002 census. The 2000 ENCOVI is representative at the national and regional level, while the 2006 ENCOVI is representative down to the department level. The sampling procedure in 2006 involved selecting a clustered, stratified (urban/rural and socio-economic level) sample of approximately 13,600 households. This sample is among the larger that one will see in LSMS type surveys, and therefore provides the chance for more detailed disaggregation of analytical results. Data collection teams are composed of three enumerators and one supervisor – an excellent ratio to ensure proper questionnaire review and enhance quality. In addition, the 2006 survey used field-based data entry. In principle, this method can dramatically improve data quality by entering the data into a computer in the field, immediately after the interview is completed, using a program that flags inconsistencies as the data are entered; enumerators can then return to the household to correct data or resolve anomalies. More detail would be needed on how the procedure was used in this specific instance, but the fact that it was used at all, combined with the high supervisor: enumerator ratio, bodes well for data quality.

b. Topical coverage: The ENCOVI interviewed households from March-August (6 months), thus is unfortunately not able to fully reflect potential seasonal changes in household consumption during the other half of the year[13]. Apart from providing expenditure data used to construct poverty lines, the ENCOVI collects a considerable amount of household, household member, and agricultural field-level data of interest for food security and agricultural policy analysts. First, recall data on household consumption (over the past year) can be combined with crop production data to classify households as net sellers or buyers of specific food crop commodities, information which is critical for establishing the welfare effects of relative changes in food prices. Second, ENCOVI collects considerable information on economic activities and income, which enables the generation of household income estimates, and there is considerable data available for research on rural labor markets, a key element in many rural households' income and food security strategies.

c. Third, the ENCOVI's section on agricultural assets and activities is considerably more developed than is often the case for an LSMS, and records information at the field level on land tenure and land use. The section also collects valuable information on household access to agricultural extension and improved inputs. Such data could be very useful for analysis of the structural determinants of poverty and food insecurity. Fourth, anthropometric measurement from the 2000 ENCOVI could be used with a wide range of household and community-level variables to better understand the determinants of acute and chronic malnutrition.

Users of the data speak well of its quality. Both IDIES and IARNA (see sections 2.1.1 and 2.1.2) of Universidad Rafael Landívar have made fairly extensive use of ENCOVI data, especially from 2006. IDIES is building a research program on rural poverty that starts with careful use of ENCOVI data from both surveys to identify areas of the country that have shown most progress in reducing poverty.

[13] LSMS surveys are often not fielded throughout an entire year due to the higher cost relative to fielding the survey over part of the year.

d. Information Gaps: From the perspective of research on the rural economy, the principal gap in the ENCOVI is the absence of questions related to income from seasonal migration within the country. Various key informants indicate that this is an important source of income for a large number of poor rural households. While the section on agricultural production is quite good for an LSMS survey, it could be improved by requesting data on crop area, production, and sales on a seasonal basis, rather than an annual basis. This would, however, increase the already substantial length of the questionnaire, and it is not unusual that production data is not gathered in this way.

Encuesta Nacional de Salud Materno Infantil (ENSMI): ENSMI, the Guatemalan Demographic and Health Survey (DHS), provides important estimates for monitoring acute and chronic malnutrition at a national and regional level. It also provides a great deal of detail on health practices, knowledge, and outcomes, and use of health services. The data are thus likely to be quite valuable for understanding the micro-dynamics of health outcomes and some of their determinants. Because this instrument, like most DHS instruments, focuses almost exclusively on demographic and health-related variables, and do not collect data on household economic assets and activities, they are less useful for exploring the socio-economic determinants of health status. For these reasons, we did not focus on this survey in our interviews and provide no further detail on its quality.

Censo nacional de talla en escolares de primer grado de primaria: The Third National Height Census was implemented in 2008 by the Ministerio de Educación (MINEDUC) and the Secretaría de Seguridad Alimentaria y Nutricional (SESAN), with technical assistance from the Instituto de Nutrición de Centro América y Panamá (INCAP) and from the Programa Regional de Seguridad Alimentaria y Nutricional para Centroamérica (PRESANCA). This survey was preceded by National Height Censuses in 1986 and 2001. The 2008 census included 99% of boys and girls in the first grade (age 6 years-0 months to 9 years-11 months old) across the entire country. This survey data provides estimates of prevalence of malnutrition at the national, urban/rural, department, and municipal levels.

Encuesta Nacional de Ingresos y Gastos Familiares (ENIGFAM): This survey is specifically designed to establish the *consumption basket* of food and non-food items that becomes the basis for the national Consumer Price Index. The survey is done every 10 years, in 1998/99 and again in 2010. Being a special purpose survey, it does not collect the kind of detailed data about broader household characteristics that would be needed for the survey to be of most use for analytical purposes, and none of the individuals involved in food security research that we spoke with indicated that they have used the data for this purpose.

3.2.3. Price Data

Consumer Price Index (CPI): The CPI for Guatemala is based on household expenditure data collected by the ENIGFAM, (see above). The CPI is created by collecting monthly prices for each item in the ENIGFAM consumption basket at the national and regional levels to track the cost of purchasing the basket.

Agricultural Market Price System: Agricultural prices are collected through MAGA's Unidad de Políticas e Información Estratégica (UPIE). Wholesale and retail prices of key food crops are collected on a weekly basis in 22 markets across the country, 15 of which appear to report with some regularity.[14] We were unable to gain access to the original data base while in Guatemala, but did receive tables of monthly average prices (not weekly) from UPIE. We are therefore unable to examine the data ourselves, but the general opinion appears to be that the price data are of good quality; for example, MFEWS uses the data very regularly and indicates confidence in them. The available price reports list monthly prices by commodity at the regional level (north, south, east), which makes it difficult to monitor potential access or availability problems at the departmental level. Thus, reports with price data exhibiting more spatial disaggregation would be more useful from the perspective of food security monitoring. Note that price data are substantially less complex to collect, enter, and clean than household survey data, so it is likely that they would be quite useful for examining price trends and price behavior (e.g., international price transmission) in the country.

It should be noted that the system functions primarily as a price collection system for analysis within MAGA and elsewhere. UPIE does not appear strongly oriented towards providing timely market information (not limited to prices) to farmers and traders to assist in their decision making. Developing such an orientation and implementing it effectively would have a positive effect on data quality, for at least two reasons. First, people will use the data regularly and so will find anomalies. Second, users who find the data useful may indicate as much to government and argue in favor of budgetary allocations to protect or even expand the unit.

Rural Wages: There is currently little information available about real wage levels in rural areas, apart from those, which could be estimated from the 2000 and 2006 ENCOVI data on wage earnings. While government-established minimum wage levels exist, there is no systematic monitoring of real wages, to our knowledge. Such data could be a useful complement to the existing time-series data that tracks how the cost of living varies over time (i.e. the CPI in rural zones). In practice, household income surveys are often the only source of rural wage data in developing countries.

3.3. Nicaragua

Table 2 summarizes available data in Nicaragua of relevance for agricultural and food security analysis, organized by broad topic. Main actors in producing data of potential use in agricultural and food security policy research are Instituto Nacional de Información de Desarrollo (INIDE) and Ministério Agropecuário y Forestal (MAGFOR). The MSU team had two meetings with INIDE, one with the Coordinator of the Sistema de Estadística Nacional (SEN) and another with the head of the LSMS survey (ENMV) and a long-time World Bank consultant who works with her. We obtained one meeting with MAGFOR, attended by two representatives of their market information system, one statistician who assists in the ministry's agricultural production surveys, and their immediate supervisor. Written documentation of the data collection methodology which we could find for each of the data

[14] Key food crops include: white and yellow maize; black, white, and red beans; white and red sorghum; and rice.

Table 2. Sources of Data for Agricultural and Food Security Monitoring and Policy Analysis, Nicaragua

Years	Organiz-ation	Acronym	Name	Data level	Data collected
Agricultural Sector					
2002-present	MAGFOR		Crop Production Estimates	sectoral	Estimates of national production of principal crops, by season, based on qualitative reports by MAGFOR officials across the country, and selected surveys during each season
	MAGFOR	SIPMA	Precios de mercado	sectoral	Weekly wholesale prices for grains, fruits & vegetables for 4 departments and Managua; weekly wholesale and retail prices for livestock and dairy products in Managua; international prices for non-traditional crops
1990-present	INEC / INETER		Rainfall data	sectoral	Monthly rainfall data by zone (7 zones)
2001			III Censo Nacional Agropecuario	household	National agricultural census
Household Expenditures and Living Conditions (LSMS)					
1993, 1998, 2001, 2005, 2009	INIDE	ENMV	Encuesta Nacional de Hogares sobre Medicion de Nivel de Vida	household & individual	Household expenditures, economic activities and income, time use, land tenure and use, agricultural assets and production, demographics, access to basic services, social participation, maternal/infant health, and anthopometrics (in 2001 & 2005)
1998-99	INIDE	EIGH	Encuesta de Ingresos y Gastos de los Hogares	household	Extensive information on household expenditures; used to determine the consumer food and non-food items in the consumer basket for the CPI
Health and Demographics					
1998, 2001, 2007	INIDE / MINSA	ENDESA	Encuesta Nicaraguense de Demografia y Salud	household & individual	Household demographics, maternal/child health, family planning methods/knowledge, anthopometrics
Consumer Price Index					
1995-present	INIDE	IPC	Indices de precios al consumidor	sectoral	Monthly prices for food and non-food items in the consumption basket, collected at the national and zonal levels.
Related surveys					
1995, 2005	INIDE		Censo nacional de poblacion y vivienda	household	National household census

Notes: INIDE (Instituto Nacional de Informacion de Desarrollo); INEC (Instituto Nacional de Estadisticas y Censos); MAGFOR (Ministerio Agrogecuarcio y Forestal); MINSA (Ministerio de Salud); INETER (Instituto Nacional de Estudios Territoriales)

sources in Table 2 is limited to the ENMV questionnaire and weekly market information bulletins which we have been receiving via email since our meeting with MAGFOR.

The previous section on Guatemala discussed the extraordinarily high rate of turnover of personnel in public ministries after political elections in that country. Nicaragua's public sector suffers from endemic problems of low salaries and lack of investment in facilities, but the staff turnover appears to be less severe than in Guatemala. INIDE in particular was singled out as having relatively stable staff, and we note that the four MAGFOR officials with whom we met all had been with the ministry for well over five years.

3.3.1. Agricultural Sector Data

Crop Production Estimates: We interviewed the principal statistician who assists the head of the crop production survey unit in MAGFOR; the head of the unit was out of the country for the week and unavailable. Written documentation was not available on methods utilized in crop production estimates.

Responsibility for these estimates was passed from INIDE to MAGFOR in the 1990s. MAGFOR uses two types of information to develop their production estimates. First, they receive information from key informants in each of the MAGFOR *delegaciones* throughout the country regarding areas planted, growing conditions, and likely yields. Second, the unit conducts two surveys per year focusing on specific crops, with the timing and crop coverage of each depending on the seasons during which each is produced (primera, postrera, and apante). The survey for primera harvest goes to the field in September and October, while postrera and apante harvests are surveyed in March and April. With no written documentation on the sampling approach or questionnaires, it is not possible to further assess the quality of these data.

Other Agricultural Sector Data: Prior to its renaming as INIDE, the Instituto Nacional de Estadísticas y Censos (INEC) collected rainfall data with some frequency in seven zones of the country. To our knowledge, this data collection ended in 1999, and is currently collected by the Instituto Nacional de Estudios Territoriales (INETER). We were not able to visit INETER, but learned that began as a unit within the Ministry of Construction and Transportation, and was reorganized in 1998 as a decentralized entity with administrative and technical autonomy in the area of hydrology, seismology, geology, meteorology, and cartography.

The last agricultural census was carried out by INIDE (then called INEC) in 2001.

3.3.2. Household Data (Living Conditions, Health, Expenditure)

ENMV (Encuesta Nacional de Hogares sobre Medicion de Nivel de Vida): The ENMV is an LSMS-type survey that INIDE has fielded in 1993, 1999, 2001, 2005, and 2009, and that serves as the basis for estimating household poverty rates. The quality of the sampling and enumeration methods as well as the instrument appear to be quite good, due in part to six years of technical assistance from the World Bank through the MECOVI project (Mejoramiento de las Encuestas de Condiciones de Vida). Though MECOVI ended in 2007,

the World Bank consultant that has assisted with ENMV since 2001 was again assisting with the processing of the 2009 data. Both the head of the ENMV and the World Bank consultant were quite conversant with technical aspects of sampling, questionnaire design, and data analysis. It was also clear that they interacted regularly with users of the data and did their best to respond to user needs within the limits of the financial resources and central purpose of the survey. Financing in 2009 came from the national budget and from the Inter-American Development Bank (IDB).

a. Sampling and Organization of Field Work: The sampling frame for the 2005 ENMV was the 1998 Censo Nacional de Poblacion y Vivienda. The sampling procedure involved selecting a clustered, stratified sample of approximately 7,520 households. In 2009, the sample frame was updated using the 2005 census, but a nearly identical sampling strategy was employed. Both surveys are representative at the national, regional, and departmental levels (and by urban vs rural). The sample size is within the normal range of samples for this type of survey and provides plenty of degrees of freedom for disaggregated analysis.

As in Guatemala, the enumerator teams for the 2009 ENMV consisted of three enumerators and one supervisor. Unlike Guatemala, which used field based data entry in 2009, data from the 2009 ENMV in Nicaragua was entered in the traditional fashion, in the INIDE offices in Managua after completion of the survey.

b. Topical Coverage: The 2005 ENMV interviewed households during two rounds from July to October 2005, thus is unfortunately not able to observe potential seasonal changes in household consumption during the other half of the year. For 2009, the questionnaire was shortened somewhat while making certain to maintain the variables needed to estimate three living standards measures: Necesidades Básicas Insatisfechas (NBI), household income, and household expenditure. The 2009 interviews were conducted in a single round during the same period of the year.

The ENMV questionnaire is quite similar to that of the ENCOVI in Guatemala, reflecting the assistance that both countries had from the MECOVI program. Apart from providing expenditure data used to construct poverty lines, the ENMV collects a considerable amount of household and field-level data of interest for food security and agricultural policy analysts. First, ENMV collects considerable information on economic activities and income, from which income estimates can be generated, and there is considerable data available for research on rural labor markets. Second, anthropometric measurement in 2001 & 2005 can be used with a wide range of household and community-level variables to better understand the determinants of acute or chronic malnutrition; collecting these data in the same survey as the detailed socio-economic data greatly expands the type of analysis that can be done. Note that in 2009, anthropometry was removed from the survey in an effort to reduce the survey cost, due to more limited financing. Third, the ENMV's section on agricultural assets and activities is considerably more developed than is often the case for an LSMS, and records information at the field level on land tenure and land use. Data is also collected on household access to agricultural extension and improved inputs. Such data could be very useful for analysis of the structural determinants of poverty and food insecurity.

c. Information Gaps: While it is possible to combine recall data on a given household's food crop consumption with data from the household's annual food production – which can enable analysts to classify households as net sellers or buyers of specific food crop – the household consumption recall section could be improved to provide more reliable classification (such as

is available from the Guatemala ENCOVI). For example, the ENMV asks households about consumption of food items within the past 15 days; first inquiring about items that were purchased, then about items that were obtained from the household's own production. By contrast, the ENCOVI asks the same consumption questions with regard to the 15-day recall period (to obtain accurate quantity and value data) for both purchases and self-provision, yet first prompts the household with a question (for each item on the instrument) regarding whether or not they purchased that item in the past 12 months, and then for how many months. The question is then repeated to ask whether or not they obtained that item in the past 12 months via self-provision (and the number of months). Such data on the number of months of item purchase and self-provision can be combined with the 15-day recall data[15] on quantity and value to classify households as net sellers or buyers of individual commodities. Empirical classification of the percentage of households which are net buyers or sellers of a given food commodity is critical for anticipating the potential welfare effects of relative changes in food prices.

Secondly, from the perspective of research on the rural economy, the absence of questions related to income from both seasonal migration within the country and international migration is problematic, given that many key informants indicate that domestic migratory income is very important to a large number of rural households, especially the poorest. While the section on agricultural production is quite good for an LSMS survey, it could be improved by requesting data on crop area, production, and sales on a seasonal basis, rather than on an annual basis. As we noted for the ENCOVI in Guatemala, however, it is not at all unusual that a survey of this type would not collect production data on a seasonal basis.

Encuesta Nicaraguense de Demografia y Salud (ENDESA): Like the ENSMI in Guatemala, ENDESA, the Nicaraguan Demographic and Health Survey (DHS), provides important data for monitoring acute and chronic malnutrition at a national and regional level and for understanding the micro-dynamics of child health outcomes. The sampling frame of the 2007 ENSMI was the 2005 national census, interviewed 17,209 households, and it is representative at the national, regional, departmental, and urban/rural levels. Like the ENSMI, however, its exclusive focus on demographic and health-related variables does not allow for analysis of the socio-economic determinants of these health outcomes.

3.3.3. Price Data

Consumer Price Index (CPI): The CPI for Nicaragua is based on household expenditure data collected by the Encuesta de Ingresos y Gastos de los Hogares (EIGH) from 1998-99. As with the ENIGFAM in Guatemala, data from EIGH is used to construct a typical household consumption basket (of food and non-food items), and prices of each item are collected each month at the national and zonal level to track the cost of purchasing the basket (i.e. the consumer price index).

We note that the only CPI data available online at INIDE is for 2000 and 2001.

[15] LSMS surveys typically use a 7 to 15 day recall period for obtaining data on consumption quantities and values given that household respondent recall concerning specific quantities and values with respect to longer recall periods is generally less reliable.

Market Price System (SIPMA): SIPMA, the Sistema de Información e Precios y Mercados Agropecuarios in MAGFOR's Direccion General de Políticas Agropecuarias y Forestales, produces and distributes by email two weekly market information sheets. Data come from collection on Mondays and Wednesdays and is reported as weekly means. The Boletín Semanal de Precios is best described as a price sheet: it consists of price tables at farm, wholesale, and retail levels, along with international FOB and CIF prices, all distributed without comment and with a disclaimer regarding accuracy[16]. The information covers a large number of crops, animal products, and live animals from seven to nine *delegaciones* across the country. The Semana Agropecuaria is a market information sheet, reporting current and previous week prices (sometimes only wholesale, sometimes wholesale and retail) along with market commentary and sometimes pictures. It focuses primarily on basic grains, with a small number of animal products. We have not seen input prices in any of the sheets.

Prior to 2005, SIPMA was an integrated market information system, responsible for data collection, processing, and dissemination. In 2005, SIPMA was reorganized and broken into three units (Estadística, Análisis, and Difusión) and managed primarily as a statistical unit, not a market information system meant to provide timely and useful information to farmers and traders[17]. The MSU team was impressed with the two professionals still in charge of this effort, both of whom were with SIPMA prior to 2005: they had a keen sense of how a market information system *should* operate, were frustrated with the current state of affairs, but through commitment and persistence have been able to continue publishing two weekly information bulletins. We have little doubt that provided the opportunity and resources they would quickly increase the analytical content, market engagement, and general value and efficiency of the system.

Both of them noted that OIMA – the Organización de Información de Mercados de las America – which is run by USDA's Agricultural Marketing Service, runs a valuable annual conference for market information personnel in the region and even pays for the costs of participation, but that neither of them have been able to go for two years because of delays within MAGFOR in processing the paperwork for their travel.

[16] The statement on the bulletin reads (here translated) "The SIPMA/MAG-FOR team compiles the information contained in this report for the users' convenience and delivers it without taking responsibility for accuracy or content. The user accepts the information under the condition that any error or omission is not a basis for any legal claim".

[17] A similar reorganization took place in market information in Guatemala around the same time.

4. DEMAND FOR AND USE OF EMPIRICAL DATA

4.1. Introduction and Background

This section summarizes our findings regarding the demand for empirical data and analysis in Guatemala and Nicaragua in the design of food security and broader agricultural policies and programs. The MSU team interviewed government agencies, university research institutes and NGO's engaged in food security-related activities. Interviews with private sector representatives were also held to improve our understanding of the role of this sector in the topics under study. We start with brief background before discussing the key public sector organizations that *should* be demanding data and analysis.

Policy making is a political process. Different groups with divergent interests and their own view of the world compete to advance their interests as they see them. In the end, political leaders, regardless of the political system in which they operate, must balance these interests in a politically workable fashion. In this setting, the influence of empirical policy analysis on final outcomes can be difficult to discern, as any attempt at impartial quantification of the costs, benefits, and distributional impacts of alternative policies or programs is sliced, diced, modified, and merged with other ideas into a package that can pass political muster.

Empirical analysis is easier to see as an *input* to this process. Indeed, one of the roles of bureaucracies (we might think of these as the operational level of governmental ministries, agencies, and programmatic organizations) is to bring empirical information and rational analysis to bear in decision making. Modern bureaucracies do not just produce (rational) action plans; they collect and analyze data, build formal and informal models, and simulate (formally or informally) outcomes from alternative approaches to tackling an identified problem[18]. They do their own sifting of the various ideas and results that emerge, either to build into action plans under existing policies or to pass on to political authorities to propose new or influence emerging legislation.

For bureaucracies to play this role, they require sufficient and stable funding, well trained (and in the modern world, continually re-trained) staff, and reasonable pay and job security for that staff in order to retain them. Government must have the fiscal tools to generate sufficient revenue, and successive administrations must respect the principle that the great majority of the staff in such organizations is not to be changed for political reasons.

Guatemala and Nicaragua face major challenges in both these regards. According to RUTA (2009; Tables 3.3, 3.4), they rank 11th and 10th, respectively, out of 17 countries in the Latin American region in per capita *gasto agrícola ampliado*, at an average of $60 and $57 during 1997 to 2001. Despite these relatively low public expenditures in agriculture, they rank first and second, respectively in the share that these expenditures represent in total public expenditure. The implication is clear: each country generates very little fiscal revenue relative to its neighbors and has little room, within the existing public finance environment, to increase their spending in agriculture.

The way in which these limited funds are spent exacerbates the problem: 35% of all fiscal expenditure in agriculture in Guatemala goes to price subsidies, fiscal expenditures on such

[18] Note that these activities may be carried out in-house or be contracted out to organizations specialized in various types of empirical analysis.

private goods (especially fertilizer subsidies) have been increasing, and expenditure on public goods has been declining (RUTA 2009; Figure 4.12 and page 35).

These expenditure patterns put real pressure on the government's ability to maintain adequate staff, as salaries always make up an important share of operating expenses (currently about 20% in Guatemala). A more important factor, however, may be the deep turnover of personnel with each change in administration. In Guatemala, a large share of the public sector in MAGA, INE, and perhaps elsewhere is under temporary contract, not a civil service contract. Partly as a result, over 50% of MAGA's personnel changed when the new administration came into power, and we are told that this is not an unusual occurrence.[19] While the problem may be somewhat less severe in Nicaragua (interviews there were inconsistent on this point), the bottom line in both countries is that ministries are understaffed and have inadequate operating budgets, especially for training and for the international travel that can sensitize them to new ideas and information. Sustaining a high level of demand for data and analysis under these conditions is a major challenge.

Yet the need for such information is acute. Guatemala has the world's fourth highest rate of child malnutrition, which one interviewee likened to "*manufacturing* the next generation of cheap labor", given the demonstrated effects of childhood malnutrition on adult cognitive abilities. Both countries are among the most unequal in the world in terms of land and income distribution. What's more, and notwithstanding severe criticism from the press for perceived inaction[20], both governments are deeply aware of the need to improve living standards and food security in rural areas. Yet they also know that public sector ministries have very limited capacity to respond to this challenge. Partly as a result, new administrations in both countries have developed programs that are not delivered through the traditional bureaucratic scaffolding of the ministries of agriculture and health but rather through direct involvement of the President and the First Lady: Hambre Cero and related programs in Nicaragua, and the programs launched under Cohesion Social in Guatemala and ProRural.

Presidential Programs under ProRural such as ProMaiz, ProCafe and ProHortalizas and ProPecuario target municipalities with the highest poverty levels. These programs are supported in the field by ProRural-managed activities such as rural extension, marketing, credit and input facilitation. In spite of the rapid delivery of these executive programs to areas of need, the opinions we heard during interviews underline a debate about the effect of such quasi-parallel programs on regular ministry-led programs. As a result, even though its management is linked to the Minister of Agriculture and its budget depends on public funding, a direct communication line with the President seems to allow ProRural more exposure and financial flexibility. The most informed opinions on the subject, and also supported by RUTA's recent study on public spending on the agriculture sector, pointed out the need to further coordinate these activities with MAGA's on-going programs.

The policy and programmatic environment around food security is thus extremely complex in both of these countries, with many new initiatives, some of them competing with existing

[19] We have found no written quantitative estimates of staff turnover over the course of the last several decades; our figure of 50% in Guatemala is based on repeated use of that figure by various informants.

[20] In Nicaragua, for instance, press reports suggest a state of denial, lack of organization and lack of capacity in the public sector to respond swiftly to a starving population in the northern regions of Nueva Segovia and surrounding areas hit hard by the 1999's drought. In Guatemala, the press criticizes how the current government lacks a comprehensive program to address hunger in several municipalities located along the so-called dry corridor.

structures for public funds, and all of them with a mix of technical and political goals. Our limited time in each country made it impossible to even meet with the leaders of each, much less to adequately assess how they use empirical information and analysis in their decision making process. In what follows, we highlight the key impressions we took from the public sector meetings we were able to hold, and suggest areas where greater analytical input may be warranted and also welcomed.

4.2. Guatemala

Here we discuss three public sector organizations: the General Planning Secretariat of the Office of the President (SEGEPLAN); the Secretariat for Food Security and Nutrition (SESAN); and MAGA's Policy and Strategic Information Unit (UPIE). We also touch on a project based initiative, the Dialogue Project for Social Investment (PDIS), and on the NGO and research center sector.

4.2.1. SEGEPLAN

SEGEPLAN is the presidential cabinet's policy, planning, and programs drafting unit and has staff on board to access and analyze data, mainly coming from INE. During a short interview with SEGEPLAN, we were provided information that the policy and program drafting process starts with data analysis and follows a series of validation steps depending on weather plans and programs target issues of national or sector-specific interest. The participation of ministerial authorities is required in the policy drafting process while in some cases the participation of the civil society is needed in the validation process.

Food security-related plans and programs under Cohesion Social have been supported by SEGEPLAN's analytical capacities by identifying target populations for the conditional cash transfer programs under Mi Familia Progresa, an initiative highly subject to national debate and scrutiny, but with an arguably good reputation among most stakeholders. SEGEPLAN hosts the Sistema Nacional de Planificacion Estrategica (SINPET), a tool designed to make statistical and geo-referenced data available to departments and municipalities to support strategic regional and municipal development planning. SINPET is an important information diffusion tool that uses INE's 2003 population survey in a user-friendly environment. The data are only presented in descriptive statistics, but it is important to recognize that there is limited capacity in the rural areas to analyze these data further.

We were expecting more information from SEGEPLAN's data analysis process, internal discussion and constructive criticisms on how the data could be improved for their use in policy development and planning. An appointment with key informants in SEGEPLAN was scheduled, but they did not show up due to other commitments. Support staff available at the time of our visit provided some basic information on the issues addressed by the office in the last several months. To fill this information gap, we asked other informants and consulted recent documents on the role of SEGEPLAN, mainly the work developed by RUTA. The information received points out that, early in 2008, the government made major changes in personnel (a fate that SEGEPLAN had been able to avoid in the past) that led to a loss of influence on long-term planning, typically the role associated with SEGEPLAN in previous governments.

4.2.2. SESAN

SESAN is the inter-ministerial planning and technical arm of the National System for Food Security and Nutrition (SINASAN) enacted by National Decree 32-2005. Its board of directors is the National Council for Food Security and Nutrition (CONASAN). The CONASAN board is presided over by the vice president of Guatemala, the most prominent universities, worker organizations (unions), the Church, and the private sector. Because of the political momentum behind addressing food security issues and the direct involvement of the Presidential and Cohesion Social programs, SESAN is perceived by stakeholders as heavily linked to these programs when in fact it has been supported by law since 2005. As explained by its director, SESAN plays a necessary role coordinating multiple public, private and NGO actors engaged in food security programs such as Mi Familia Progresa, Mi Comunidad Produce the Solidarity Food Support (Bolsa Solidaria Rural) and Solidarity Restaurants.

SESAN also cooperates closely with the Ministry of Health on a variety of field programs particularly concerning the rehabilitation of children suffering from chronic malnutrition, using special content foods high in carbohydrates, micronutrient, and proteins. Special funding from the European Union is also being channeled through SESAN to support the Ministry of Health's target geographic areas with high prevalence of chronic malnutrition.

The current empirical data needs of SESAN are not being met, which is leading this office to collaborate with public offices in the Ministry of Health to improve existing data collection systems. For instance, we learned that SESAN is now receiving and tabulating data from the General Health Information System (SIGSA), a Ministry of Health weekly report on core health indicators. To improve the data gathering process SESAN has used a donation from IDB to hire over 25 technicians specialized in nutrition to improve how food security and nutrition data is gathered. SESAN processes the weekly reports on cases of severe, moderate, and chronic malnutrition in children and uses this information to map priority areas and elaborate contingency plans. SESAN is also considering generating its own data sets to fill important information gaps, particularly on outcomes and impacts of the Presidential and Social Cohesion programs. Staff has been hired to lead data generation efforts and talks are being held about partnering with IDIES from Universidad Rafael Landivar to work on this. It should be noted that the head of SESAN told us that "the donor community could make a major contribution by supporting objective impact assessment of these programs".

4.2.3. Unidad de Políticas e Información Estratégica del MAGA (UPIE)

By design, UPIE plays a major role in advising MAGA authorities in policy drafting and strategic planning by requesting, generating, analyzing, and making available strategic information. UPIE's information is gathered through MAGA's network of field offices, NGO, and private sector partners. Since its inception in the late 1990s the role of UPIE has been well regarded by interviewees and has been crucial to MAGA authorities by facilitating current and specific information on different sectors and by supporting budget planning for agriculture policy. In food security, this unit is in charge of formulating policies in coordination with other government entities involved.

UPIE's demand for information was clear, but the methods to generate, analyze and feed their reports into the policy making process have been hampered by what seems a weaker role in the current administration compared to the preceding governments. It is impossible to judge

the quality of the data shared by UPIE in PDF format, but we heard UPIE could play a major role if it addressed important data and information gaps such as the lack of a centralized information center that includes departmental and municipal information on production, rural wages, and other key indicators related to food security.

As mentioned in previous sections, personnel turn-over and short-term contractual arrangements have also affected the morale of the professional team, but they still count on a core team of well-trained individuals, some of them in UPIE for over 10 years. It is our opinion that the capacity of UPIE (and possibly other units with whom we were unable to meet) to play a more crucial role for their intended purpose exists. However, the professional and technical team in MAGA needs to be supported with adequate budgets to fill the gap in agriculture-related empirical data and information analysis, since INE or other institutions not specifically focused on agriculture cannot be expected to collect all needed data and conduct all needed analyses.

4.2.4. Proyecto de Diálogo para la Inversión Social (PDIS)

PDIS, a USAID-funded initiative managed by the Academy for Educational Development (AED), provides access for public sector users to data from the Ministry of Health and Education, combined with INE databases. The user-friendliness the PDIS web interface provides municipal-level authorities the capability to conduct basic descriptive research about key education, health, and social investment indicators to a detail not available before. Noteworthy is the capacity of local governments to use this interface to compare and contrast how they compare to other municipalities in terms of literacy, education, and health program coverage. The leaders of PDIS believe that this ability is motivating local leaders to improve areas of weakness and creating a sense of pride in areas of strength. MAGA is next on the list of ministries to be integrated into the system, but progress has been slow and there is no specific indication when this integration will take place.

We were impressed with this tool, which does a better job than SINPET in making data easily accessible to and manipulable by regional and local governments. By juxtaposing INE's databases with more current data from the ministries of health and education, it greatly expands the range of questions that users can explore. In our opinion, this initiative is also important as it is poised to motivate more users to access and use data in municipal-level policy making. In a next phase, it will be important that PDIS take advantage of this improved access by local users to begin assessing, collaboratively with those users, the quality of existing data and the key data gaps that could reasonably be filled.

4.3. Nicaragua

We were able to gather information to understand the demand for empirical data in Nicaragua, particularly from MAGFOR on policy and program development concerning food security. Similar to Guatemala, the Government of Nicaragua has faced severe criticism by the local press for their perceived inability to respond to needs in several food insecure areas. This could explain why the reception to our quest for information on how the current food security policy and programs use available data was received timidly by the visited MAGFOR authorities, who pointed out that such information is sometimes used against them. Despite the apparent disenchantment with US-led support programs every person

interviewed was supportive of our mission and shared information within their area of competence.

4.3.1. MAGFOR

The demand for and use of empirical data at MAGFOR was discussed around the content of the National Food Security and Sovereignty (SSAN) policy. The policy was developed by MAGFOR in cooperation with FAO in May of 2009. One of the major political instruments to attain the expected results of this policy is The Hambre Cero program, also named Programa Productivo y Alimentario (PPA). The PPA consists of a *productive package* of seeds, livestock, and other inputs aiming at the capitalization of poor families. It was not determined if empirical data from INIDE was used to select the priority areas, although the SSAN policy outlines the partnership with government offices (including INIDE) as one of the information providers to execute programs.

A key area under MAGFOR is the Sistema de Informacion Agropecuario y Forestal (SIAGROFOR). The domestic data needs of SIAGROFOR are satisfied through a network of national offices (or delegations) and key informants in different market points. The international trade data on prices for grains, meat, poultry, milk, and eggs are obtained from OIMA – Organización de Inforamción de Mercados de las Americas. The information is analyzed and summarized in a weekly market information newsletter diffused through email. When asked about the quality and reliability of the domestic data, the sampling approach was not clearly explained. It is understood that the information is faxed by the delegates in different points in the country and the central office in Managua digitizes and analyzes the data.

4.3.2. Catholic Relief Services (CRS)

CRS is has been in Nicaragua for over 40 years. Their work has evolved from humanitarian aid to supporting micro and small agricultural enterprise development. CRS manage the Acordar Project, a USAID-financed initiative working with 45 municipalities and 107 grassroots organizations in some of poorest areas of Nicaragua. When asked about their demand for data, CRS explained that they generate their own data to evaluate the impact of their projects and do not typically use INIDE data in their program development. However, when the MSU team commented the example of PDIS in Guatemala, CRS was enthusiastic about the possibilities of increasing their ability to combine their data with INIDE's empirical data and potentially other data sources.

Similar NGOs such as Technoserve manage projects for USAID and other donors that have an impact on food security, yet their use of available empirical data from INIDE is not used. This may be a technical gap in these organizations considering the seriousness of INIDE and the quality of the data generation procedures in place.

5. SUMMARY OF FINDINGS AND POTENTIAL AREAS FOR ENHANCED RESEARCH AND OUTREACH

We have reached five basic conclusions from this brief review. First, Guatemala and Nicaragua both have better than average data for applied analysis of agricultural and food security policy. Though suffering from problems typical of statistical institutes throughout the developing world, INE in Guatemala and INIDE in Nicaragua have generated what we expect to be reasonably good LSMS data for two recent years. Common strengths across these surveys include well designed and quite comprehensive questionnaires, more than adequate sample sizes, high ratios of supervisors to enumerators in data collection, and good understanding of the challenges involved in these activities by the individuals in charge. While we received little feedback on the quality of the ENMV in Nicaragua, feedback on ENCOVI in Guatemala was generally positive, and was quite positive for ENCOVI 2006. In addition, both LSMS-type surveys have larger and better-designed agricultural sections than is often found in an expenditure survey

Both countries collect agricultural commodity price data at least weekly from markets around the country. We know that in each case, these price data series have few gaps, and we expect that data quality will be acceptable for the types of uses to which it would be put; we say this in part because units of measure are fairly standard in each country and the data is relatively simple to collect and simple to clean. These are the basic data needed to generate better empirical understanding of a range of food security issues in each country, and could be complemented (as IDIES is doing in Guatemala and SESAN plans to do in the near future) with additional focused data collection built around specific analytical questions.

We did not focus on data for monitoring, except to the extent that there is overlap between it and data for more in-depth analysis. One reason is that monitoring data typically needs to be specific to the project or program being monitored, and so general prescriptions are difficult to make. That said, a few points bear keeping in mind:

- The most glaring gap in monitoring data is the lack of systematically collected yearly production data in Guatemala; rectifying this situation should be a high priority;
- It is probably unrealistic to expect major surveys by national statistical institutes (ENCOVI/ENMV, ENIGFAM/EIGH, ENSMI/ENDESA) to be carried out more than every three- to five years, due to their financial cost and the time it takes to enter, clean, and analyze the data;
- Proxy approaches, based on more easily collected variables that are correlated with variables of interest such as income or consumption, can be designed to fill some of these gaps. Yet these approaches can take substantial input on the front end to develop the system that will allow defensible estimates to emerge from the approach; and
- Much good can come at low cost from linking to on-going systems for regular data collection, sharpening the questions being asked, and perhaps adding a limited number of new, carefully conceived questions.

Our second finding is that each country has research institutions with some degree of sustainability, some demonstrated track record attracting outside funding and collaborators, a commitment to good research and active outreach, and great interest in improving their capacity. Yet all of these organizations are dominated by analysts trained at the M.S. level (very few Ph.D.s), some struggle to fund the research they wish to do, and none of them has so far been successful integrating students into their research and outreach activities. The

latter is important since the high-level, on-going research work at these institutes could provide undergraduate and M.S. level students the opportunity to learn from—and transition into—more rigorous research experiences, thus broadening the base of trained personnel for this type of work. In other words, both countries have institutions that are already doing good and relevant work but whom we judge could benefit greatly from increased training and from resources for collaborative research and outreach.

Third, a key challenge in both countries is building demand in public agencies for these analyses. Lack of civil service reform has combined with inadequate tax revenue to result in low funding, low salaries, inadequate operating budgets, and high turnover of personnel. These conditions make it difficult for the public sector to generate sustained demand for objective information and analysis. Yet there are areas that have been less affected by these problems, and in nearly all cases one can find committed and motivated people doing the best work they can under the circumstances and anxious to be able to do more: INE and INIDE have both had good stability of personnel in their LSMS surveys (not, unfortunately, in Guatemala's ENA!); UPIE in Guatemala has had less turnover than many other units in MAGA; SESAN has had turnover in its director but has a current director with a firm vision of how to coordinate food security initiatives and openly desirous of rigorous impact evaluation of several of these initiatives; SEGEPLAN in Guatemala suffered from high staff turnover in 2008 but had been relatively stable prior to that time and still has highly qualified analysts; the market information unit in MAGFOR in Nicaragua has been reorganized, sub-optimally in our view, but has retained good staff who still have a vision of how the unit should operate and who succeed in producing regular weekly market information bulletins despite difficult working conditions. In all these cases we believe that meaningful progress can be made by building research and outreach capacity in other institutions (preferably universities) and pursuing a process of flexible engagement with government in circumstances and with agencies (and specific personnel within those agencies) judged to be able to benefit from the engagement. This kind of university-public sector collaboration is a hallmark of effective policy analysis and outreach processes in many countries, and we believe it would pay high dividends in these countries as well.

Fourth, our review of existing analytical documents and discussions with analysts suggest to us that great value remains to be generated from existing household level data sets. Specifically, we believe that these data sets could be used to generate substantially greater insight regarding the distributional effects of a range of policies and programs[21]. This is especially true in Nicaragua, where the ENMV to our knowledge has been greatly under-exploited. The ENCOVI in Guatemala has received more use, much of it of high quality (by IDIES and IARNA), but can be profitably used for additional analyses. The capacity to extract as much information as possible from data sets such as ENMV and ENCOVI is important, as government and research institutions in both countries are quite interested in customized territorial development policies and the strengthening of municipality-level development planning.

Two such potential analyses stand out. First, what are the distributional effects of the existing structure of support to agriculture in both countries? RUTA (2009) and Berthelon, Kruger, and Saavedra (2008) both show the overwhelming importance of (a) price distortions driven by trade controls and (b) price subsidies through direct fiscal support (for example on fertilizer in Guatemala) in overall support to the agricultural sector. RUTA (2009) also

[21] See De Janvry and Sadoulet (2009) for one such analysis, which raises important issues for further research.

documents the limited investment in public goods in Guatemala, due in large measure to the predominance of price subsidies in MAGA's budget. Neither of these studies quantifies the distributional implications of these policies – who wins, who loses, and how much? ENCOVI in Guatemala and ENMV in Nicaragua could be used to generate a detailed, disaggregated answer to this question, with major implications for policy.

For example, studies of agricultural investment dominated by spending on private goods in other countries (subsidized fertilizer in Zambia, for example) have found that the returns are often considerably lower than alternative investments in more general agricultural R&D, roads, and other public goods. These studies also tend to show that the lion's share of the benefits accrue to wealthier farmers and thus displace private sector demand for fertilizer, since these farmers are the most likely to buy fertilizer with their own funds from private dealers (Ricker-Gilbert and Jayne 2009). Of course, such programs are popular for political reasons. Yet the scarcity of funding for the agricultural sector means that empirically-based analysis of this type is critical for policymakers to have in hand when faced with strong political pressure to continue to pursue such programs and when justifying modifications that would lead to more equitable outcomes and higher social returns. See Annex B for a brief note on analytical approaches to assessing the distributional consequences of agricultural policies.

A second analysis is specific to Guatemala: what has been the effect of the boom in export horticulture on poverty in the altiplano? USAID has for many years supported this sector, and it has been a major success, including for smallholder farmers. Yet the boom has reached only the southern portion of the altiplano (an area with comparative and competitive advantages in relationship to other areas, due in part to better infrastructure and consequent better access to markets), leaving the historically poorest areas in the north and northwest relatively untouched. In the southern areas where the boom has occurred, which farmers have been able to participate directly in the export boom and what has been the impact on their standard of living?; which farmers have benefited from increased demand for labor driven by export production, and how has this affected their livelihoods?; how have both of these affected farmers' crop mix and their productivity in staple grains?; to what extent have crop protection chemicals been overused, and what impact has this had on human health and the environment? All of these questions can be usefully explored with existing data sets. Such analyses could then be linked with assessments of whether and how the boom could be extended into historically poorer areas of the altiplano. High quality research on this topic, quite possible with existing data and in collaboration with local researchers, would help USAID to explicitly bridge its focus over the past decade on non-traditional agricultural exports into the new era of emphasis on broader agricultural productivity, food security, and poverty reduction. Existing research is quite specific to product, company, and geographical area, thus lacking the broader scope needed to contrast improvements with areas where no such horticultural development boom has taken place.[22]

[22] Please refer to the works by von Braun, Hotchkiss, and Immink (1989); James (2000), Carletto, deJanvry, and Sadoulet (1999); Barham, Carter, and Sigelko (1994 and 1999); Berdegue et al. (2005); von Braun, Hotchkiss, and Immink (1989); Hamilton and Fischer (2005). Balsevich (2006); Hernandez, Reardon, and Berdegue (2007). Many other analyses could be conceived. One that deserves special attention, though this would require additional data collection, relates to options for reducing the extraordinarily high rate of childhood malnutrition in areas of Guatemala, since recent research has demonstrated long-term negative effects of such malnutrition on health and lifetime earnings (Malucchi et al. 2006).

Our fifth and final finding is that both countries urgently need to put into place well designed impact assessments for the plethora of special projects that have been launched in recent years. Mi Familia Progresa and Mi Comunidad Produce in Guatemala, the various components of Hambre Cero in Nicaragua, all have obvious potential positive and negative effects that need to be understood in order to improve them over time and to design second generation projects that are better targeted and have larger positive impacts. Most such analyses would require dedicated data collection focused on beneficiaries and non-beneficiaries – ENCOVI and ENMV may be able to play complementary but not central roles.

We close by outlining an approach to collaborative research and outreach that we believe would contribute to three objectives: quickly enhancing the empirical content of the policy debate in each country, helping to build sustainable local capacity for strengthened applied policy research and outreach, and strengthening the linkages between government and applied research organizations that are central to good policy making. The approach is built on four pillars: (1) funding collaborative applied policy research and outreach in an independent local research organization, (2) ensuring that students and young professionals are involved in this research, (3) engaging flexibly with government agencies and individuals to involve them in the work, and (4) financing graduate training for promising individuals with strong institutional links, whether in the local research organizations or in the public sector, and integrating their thesis research work into research and outreach in the country.

The research and outreach should be collaborative in two ways: between the research organization and the public- and private sector stakeholders with an interest in the topic being investigated; and between the research organization and an international organization engaged to help build this capacity. This international organization would bring additional technical skills to the work, be able to provide short-term technical training in key skills, offer perspective on policy and programmatic issues from worldwide experience in these areas, and be in a position to offer or facilitate graduate training that is strongly linked to the research and outreach topics being pursued in the country. By cycling local university students and motivated public sector officials through graduate degree training and back into the research and outreach process in their country, human and institutional capacity can be built simultaneously and an ethic of injecting empirical analysis into policy debate can be strengthened.

In our judgment, the organizations in Guatemala most likely to generate high payoffs in both the short- and long runs from this approach are IDIES and IARNA; the institutional stability provided by Universidad Rafael Landívar is crucial in this regard. In Nicaragua, the choice would be between Nitlapan and UNAN-Managua. Though UNAN currently has less capacity and a lesser track record than Nitlapan, they have some past experience and great desire to renew it; success with UNAN would make a major contribution to Nicaragua by creating a second center of excellence for this type of work.

Flexible engagement with government is an art, not a science. It requires a serious commitment to building capacity in the public sector but a strategic and, in a positive sense, opportunistic approach to doing so; units and individuals should be engaged when the substantive issues are relevant for them and when it is judged that they can benefit from active involvement in the work. We propose this approach, rather than focusing all capacity building efforts directly on government agencies, due to the serious and unresolved institutional weaknesses that permeate the public sectors in both countries. In Guatemala,

UPIE should rank high on the list of any public sector organization to be strengthened through this approach, though other units should certainly be considered, depending on the topics and circumstances. In Nicaragua, MAGFOR's Direccion General de Políticas Agropecuarias y Forestales, and SIPMA in particular (the market information system), should be strongly considered.

Integrating graduate training into the research and outreach approach pays high dividends. If students studying abroad work on topics and with data relevant to the work being done in country, their theses become working papers and policy briefs that can be directly used in outreach in the country. Ideally, the students conduct the outreach themselves, but in collaboration with local and international researchers. This engagement makes it more likely that the students will continue in this type of applied work after their degree, and that they will quickly be seen by stakeholders as having valuable information and perspective to contribute.

APPENDICES

Appendix A: List of People and Institutions Contacted in Guatemala and Nicaragua

MSU Food Security Group
17 January – 1 February 2010

Guatemala Meetings (in order of meetings held)

1. Ricardo Santa Cruz and Carlos Urizar, AGEXPORT
2. Jaime Mejia (sub-gerente técnico) and Irma Rodriguez (sub-gerente administrativo), INE
3. Carlos Mancia (head of ENCOVI) and Pablo Toledo (head of ENA), INE
4. Juventino Galvez, Director IARNA (U. Rafael Landívar)
5. Miguel von Hoegen, Director IDIES (U. Rafael Landívar; 2 meetings, one at IDIES offices)
6. Wilson Romero, Director of Research, IDIES (U. Rafael Landívar)
7. Jaime Carrera, Gestion Institucional, U. Rafael Landívar)
8. Mario Aragón and Ricardo Fromadher, Abt Associates
9. Mario Chamalé, FAO/PESA
10. Jaime Muñoz Reyes and Abelardo Viana, IICA
11. Claudia Yolanda Dónis and others, FLACSO
12. Lily Caravantes, SESAN
13. Sergio Sommerfield and Gustavo Estrada, Social Dialogue Project
14. Erika Ruano, UPIE/MAGA
15. Ana Maria Mendez and Juan Enrique Lee, SEGEPLAN
16. Lorena Aguilar, MFEWS
17. Ronald Perez, Central Agrícola S.A., (subsidiary of ADM Central America)

Guatemala Field Trips

1. To Huité near Zacapa, in corridor seco (Wednesday, 20 January)
    a. Met with Alcalde
    b. Interviewed workers and work supervisors in melonera field
    c. Interviewed packing plant manager
2. To Cooperativa Tecún Umán, near Tecpán Guatemala, Chimaltenango; Saturday, 30 January)

Nicaragua Meetings (in order of meetings held)

1. Francisco Perez, NITLAPAN
2. Laurent Dietsch, Dean of Graduate Studies in Food Security
3. Angeles Barberena, INIDE
4. Mario Lopez, Henry Pedroza and Dr. Sequeira. UNAM-Managua
5. Margarita Sánchez, Consuelo Morales, Arcangel Abaunza, Denis Fajardo, MAGFOR, SIAGROFOR
6. Diana Saavedra, IICA
7. Edwin Noboa, Juan 23 Institute, UNAM-Managua
8. Martha Vargas, INIDE (head of Nivel de Vida) and Melva Bernales (WB consultant)
9. Lilian Torres and Luis Mejia, FAO/PESA
10. Mario Arana, FUNIDES

11. Jefferson Shriver, CRS
12. Julio Montealegre, Technoserve
13. Azucena Castillo, APEN
14. Pedro Blandon y Dan Cruz, CARANA

Nicaragua Field Trip

1. To plantain farming household in Leon. Met with Tomas Membreno of MCC project. During the trip, we interviewed the beneficiary family on costs, profits, and overall benefits of improving and expanding plantain production compared to their traditional agricultural activities.

Appendix B: Brief Note on Analytical Approaches to Assessing the Distributional Consequences of Agricultural Policies

Distributional insights regarding the effects of agricultural policies can be generated in several ways. Perhaps the most accessible to policy makers is to conduct detailed descriptive analysis of household data based on various ways of grouping households. For example, households could be divided into quintiles of land holding – five groups of equal size from largest to smallest land holding – and various indicators of household behavior and characteristics could be computed for each quintile. Key among these indicators would be households' marketing behavior – the share of households in each quintile selling the crops of interest, the share buying those crops, the mean and median values in each case, and the share of the group in total sales and total purchases. Data on the incidence of the policy instruments on prices to farmers and prices to consumers can then be used to show how the direct benefits and costs of the policies are distributed across the groups; characterizing those groups by income and asset levels would generate further insight regarding the poverty effects of the policies. Alternatively, households could be grouped on the basis of their marketing behavior: those neither buying nor selling, those only selling, those only buying, and those both buying and selling. By looking at the share of households in each group, their mean sales and purchases, the share of each group in total sales and purchases, and their income and asset characteristics, one generates another image of the distributional characteristics. The same analysis could be done grouping households by income level, or any number of variables of interest.

These descriptive analyses can be complemented with econometric analysis that attempts to isolate important causal factors. For example, after examining through descriptive analysis the types of households benefiting from a fertilizer subsidy, one can apply econometric techniques to the same data set to explore the factors that may determine the access of a household to that subsidy. Relatedly, one can explore the drivers of fertilizer use more generally among households, whether obtained through private or public channels.

There are several advantages to such an approach. First, it is transparent and intuitive to policy makers; they can easily see what was done by the analyst and conclusions emerge transparently from the results presented. This transparency is likely to have a positive effect on policy makers' ability and willingness to internalize and take ownership of the results; these are overriding objectives in any kind of policy outreach. Second, the approach is flexible: households can be grouped in any way that is relevant and that the data supports. By looking at the same issue – how the benefits and costs of selected policies are spread across the population – from several perspectives, a more nuanced and robust understanding of the implications emerges. Third, such analysis is relatively straightforward to conduct: once a skilled analyst has become familiar with the data, results reflecting a wide variety of household groupings can be generated relatively easily. Complementary econometric analysis can take more time to develop, but the descriptive analysis is useful in its own right, especially for opening a discussion on the issues. Finally, a policy analyst with broad experience and contextual knowledge specific to the country in question can use these results to make well informed inferences regarding the likely implications of eliminating or modifying the policies; this amounts to a type of informal simulation analysis, necessarily qualitative but rooted in a detailed quantitative understanding.

Formal simulations can be achieved through Computable General Equilibrium (CGE) models. The key advantage of such models is that they generate a fully quantified estimate of

the impacts of alternative policies, estimates that take into account the possible dynamic effects of these policies – effects seen over time as households adjust their behavior to the specific changed incentives and to responses of the broader economy to the changed policy. These models are also highly flexible in the types of policy questions that can be asked; many different permutations of a given policy can be simulated. Ease of simulation, and the idea that these models capture dynamic effects, can be very attractive to policy makers.

Like all formal modeling, however, CGE models also have costs, both financial and analytical. Financially, the models are data intensive and take a lot of time of highly skilled analysts to develop. We see three principal analytical costs. First, the flexibility of CGE models in terms of the number of policy simulations that can be run is mirrored by great *inflexibility* in how these distributional consequences are shown: once a model is developed, the household groups incorporated into the model cannot be changed without major analytical input. Second, the data demands and analytical complexity of the models means that even so-called *micro* or *disaggregated* CGE models tend to be highly aggregated, typically incorporating only two or three types of households which, as we explain above, cannot be changed without major analytical work. The inability to look at the same question from several perspectives reduces the richness and nuance of insights that can be generated with such models. Finally, the complexity of CGE models means that they tend to be *black boxes*, with unknown (to the consumers of the results) inner workings leading to results that have to be accepted on faith and which, if they are contrary to existing perceptions, may be easily discounted. If one wants an interactive and inclusive policy dialogue, CGE models need to be only one element, and probably not the central one, of a range of analytical approaches.[23]

[23] For more technical critiques of CGE modeling, see McKitrick (1998), Scrieciu (2007), and Flôres (2008).

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