**CGIAR
Research
Program 2**

Proposal submitted by
the International Food
Policy Research
Institute

IFPRI

BIOVERSITY

CIAT

CIMMYT

CIP

ICARDA

ICRAF

ICRISAT

IITA

ILRI

WORLDFISH

Policies, Institutions, & Markets

to Strengthen Food Security and Incomes for the Rural Poor

CGIAR RESEARCH PROGRAM 2

Policies, Institutions, and Markets to Strengthen Food Security and Incomes for the Rural Poor

A revised proposal submitted to the CGIAR Consortium Board

by the

International Food Policy Research Institute (IFPRI)

on behalf of

Bioversity International
International Center for Tropical Agriculture (CIAT)
International Maize and Wheat Improvement Center (CIMMYT)
International Potato Center (CIP)
International Center for Agricultural Research in Dry Areas (ICARDA)
World Agroforestry Centre (ICRAF)
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
International Institute of Tropical Agriculture (IITA)
International Livestock Research Institute (ILRI)
The WorldFish Center

IFPRI

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Acronyms

AARINENA	Association of Agricultural Research Institutions in the Near East and North Africa
APAARI	Asia-Pacific Association of Agricultural Research Institutions
ACMAD	African Centre of Meteorological Applications for Development
AfDB	African Development Bank
AGRA	Alliance for a Green Revolution in Africa
AGRODEP	African Growth and Development Policy
AR4D	agricultural research for development
ASTI	Agricultural Science and Technology Indicators
CAADP	Comprehensive Africa Agriculture Development Plan
CCAP	Center for Chinese Agricultural Policy, Chinese Academy of Science
CAAS	Chinese Academy of Agricultural Sciences
CACAARI	Central Asia and the Caucasus Association of Agricultural Research Institutions
CAPRi	The CGIAR Systemwide Program on Collective Action and Property Rights
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza
CEPAL	Economic Commission for Latin America and the Caribbean
CGE	computable general equilibrium [models]
CIAT	International Center for Tropical Agriculture
CIFOR	Center for International Forestry Research
CIMMYT	International Maize and Wheat Improvement Center
CIP	Centro International de la Papa
CGIAR	Consultative Group on International Agricultural Research
CMAAE	Collaborative Master's Program in Agricultural and Applied Economics Eastern, Central, and Southern Africa
COMESA	Common Market for Eastern and Southern Africa
CORAF/ WECARD	West and Central African Council for Agricultural Research and Development
COSA	Committee on Sustainability Assessment
CRS	Catholic Relief Services
CRSP	collaborative research support programs
CSI	Consortium for Spatial Information
CSISA	Cereal System Initiative for South Asia
CSSP(s)	Country Strategy Support Program(s)
DREAM	Dynamic Research EvaluAtion for Management [modeling software]
Embrapa	Brazilian Agricultural Research Corporation
FAO	Food and Agriculture Organization of the United Nations
FARA	Forum for Agricultural Research in Africa
FDI	foreign direct investment
FORAGRO	Forum for the Americas on Agricultural Research and Technology Development
FRUTAM	Fruta Amazonicas
GE	genetically engineered
GFAR	Global Forum on Agricultural Research
GM	genetically modified
GIS	geographic information system

GRB	Gender-Responsive Budgeting
GTZ	German Agency for Technical Cooperation
GTAP	Global Trade Analysis Project
IASC	International Association for the Study of the Commons
ICAR	Indian Council of Agricultural Research
ICARDA	Sustainable Agriculture for the Dry Areas
ICPAC	Climate Prediction and Applications Centre
ICRAF	World Agroforestry Centre
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ICTs	information and communication technologies
IDRC	International Development Research Centre
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
ILC	International Land Coalition
ILRI	International Livestock Research Institute
ILWM	integrated land and water management
IMF	International Monetary Fund
IMPACT	International Model for Policy Analysis of Agricultural Commodities and Trade
INERA	National Institute of Agricultural Research
IPHAE	Institute for Mankind and the Environment
IRRI	International Rice Research Institute
IWMI	International Water Management Institute
KAP	knowledge, attitudes, and practices
LAC	Latin American and the Caribbean
LDCs	least-developed countries
LSMS-ISA	Living Standards Measurement Survey initiative for improved agricultural panel data for Africa [World Bank]
MDGs	Millennium Development Goals
M&E	monitoring and evaluation
MENA	Middle East and North Africa
MIRAGE	Modeling International Relationships in Applied General Equilibrium
MIS	management information systems
MSSRF	M.S. Swaminathan Research Foundation
NARES	National Agricultural Research and Extension Systems
NARS(s)	national agricultural research system(s)
NCRC-Ghana	National Research Conservation Center
NEPAD	New Partnership for Africa's Development
NGO(s)	nongovernmental organization(s)
NRM	national resource management
NUS	neglected and underutilized species
OECD	Organisation for Economic Co-operation and Development
P&I	policy and investment
PBS	Program on Biosafety Systems
PES	payments for environment services

PEP	Poverty and Economic Policy
PGRFA	Plant Genetic Resources for Food and Agriculture [FAO]
PMU	Program Management Unit
PRADAN	Professional Assistance for Development Action
PROINPA	Foundation for the Promotion and Investigation of Andean Produce
R&D	research and development
ReSAKSS	Regional Strategic Analysis and Knowledge Support System
RTB	roots, tubers, and bananas
RUTA	Regional Unit for Technical Assistance of Central America
SAARC	South Asian Association for Regional Cooperation
SAKSS	Strategic Analysis and Knowledge Support System
SPAP	Science and Policy Advisory Panel
SLO	system-level outcome
SPAM	Spatial Production Allocation Model
SSA	Sub-Saharan Africa
SVEs	small and vulnerable economies
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNIFEM	United Nations Development Fund for Women
USAID	United States Agency for International Development
VLS	village-level studies
WFP	World Food Programme
WTO	World Trade Organization

ACKNOWLEDGMENTS

EXECUTIVE SUMMARY

Rationale

Poverty and hunger remain enormous problems. Nearly 1 billion people in the world go hungry, and more than 1 billion live on just $1.25 a day. Seventy-five percent of the poor live in rural areas, and the majority of them depend on agriculture for their livelihoods. Food prices are high and rising—a situation that points to continued challenges in food security in the coming years. Despite global efforts to overcome these problems, one of the most promising tools for promoting development and reducing poverty—pro-poor, sustainable agricultural growth, particularly for small producers—has been underexploited. Evidence shows that agricultural growth reduces poverty by twice the rate of growth in nonagricultural sectors, but this growth has been held back by failures related to policies, institutions, and markets and will be further challenged by emerging trends such as climate change and natural resource scarcity. Past agricultural growth has also been constrained by a narrow focus on agriculture that excluded macroeconomic dimensions, environmental inputs and outcomes, and important enabling conditions, such as rural infrastructure, effective markets, and complementary services like credit and agricultural extension.

It is precisely here that CRP2 can make a critical contribution. CRP2, "Policies, Institutions, and Markets to Strengthen Food Security and Incomes for the Rural Poor," will establish how these challenges and failures can be overcome so that policies, institutions, and markets can be used most effectively to reduce poverty, improve food security, and grow small producers' incomes.

Under business as usual, projected growth in agricultural productivity in the next two decades is unlikely to meet effective demand for food without significant price increases. Small agricultural producers face enormous challenges, but they also have great potential to feed the world—if they can get access to the inputs, technologies, markets, and public services they need. The adoption of evidence-based policies, inclusive institutions, and equitable and efficient markets—based on sound and cutting-edge research focused on the complex agricultural development process—can help achieve this goal. CRP2 addresses this challenge by producing a body of knowledge to support appropriate policies, institutions, and markets for pro-poor agricultural growth.

This body of knowledge will not result in a single approach to reforming policies, institutions, and markets in all countries. Developing countries not only face a tremendous variety of development challenges, but also vary greatly in their policy, institutional, and market capacities. Consequently, a distinguishing feature of CRP2 is its emphasis on supporting country-led, country-driven, and country-owned development processes through collaborative research, partnership, and capacity building. This country-led approach has so far received too little attention in the research and development community, including in the CGIAR.

The Comparative Advantage of CRP2

CRP2 will for the first time bring together analysis of policies and institutions related to food security, poverty, and sustainable agriculture from across the CGIAR. It will combine research expertise in both the social and the biophysical sciences at key CGIAR centers to find ways to enhance agricultural productivity while reducing rural poverty and improving outcomes for the environment.

The CGIAR and its partners are well placed to provide the research laid out in CRP2. Although many institutions work on issues related to policies, institutions, and markets in developing countries, the CGIAR has a comparative advantage based on its specific mandate related to the intersection of food security, poverty, and sustainable agriculture; its focus on research-based capacity building in the public, private, civil society, and academic sectors; its institutional and political independence; its scale (large enough to generate an intellectual critical mass but nimble enough to flexibly adjust to emerging needs); its recognized research capabilities; and its large network for data collection in developing countries.

Other institutions possess some of these characteristics, but the combination of all of them is unique to the CGIAR.

The program will be a platform of excellence, drawing on expertise not only within the CGIAR system, but also in many other research and development organizations and agencies worldwide. The challenges facing the rural poor are large and complex. As one of the largest research programs focused on food policy for the rural poor in Africa, Asia, and Latin America, CRP2 will be well positioned to identify solutions for improving policies, institutions, and markets in ways that will improve the lives of millions of rural poor people.

Strategic Results Framework

The CGIAR seeks to achieve four system-level outcomes: (1) reduced rural poverty; (2) increased food security; (3) improved nutrition and health; and (4) more sustainable management of natural resources. CRP2 will contribute to all four of these outcomes, with an emphasis on the first two, through activities related to three overall themes:

- **Effective Policies and Strategic Investments (Theme 1)**: This theme will improve policy options at the global, regional, and country levels by modeling scenarios of future trends, analyzing how best to allocate public resources for research and investment, and strengthening governments' capacity to design and carry out policies and investments that will increase agricultural productivity and enhance rural incomes.

- **Inclusive Governance and Institutions (Theme 2)**: This theme will examine the scope for policy, institutional, and governance reforms and contribute to effective and equitable access to rural services, property rights, collective action, and assets by studying existing systems and testing institutional innovations in these areas.

- **Linking Small Producers to Markets (Theme 3)**: This theme will increase the competitiveness of markets to benefit producers and consumers and offer greater income opportunities by integrating small-scale producers into upgraded value chains.

These themes, which were determined after an analysis of development challenges in different types of countries and a priority-setting consultation with key stakeholders, are interlinked (see Figure 1). Policies set the enabling environment for effective agricultural growth; institutions structure the delivery of goods and services and the context for action; and markets organize the relationships among value-chain actors, including smallholder producers. Given these linkages, working across the themes will allow CRP2 researchers to address key challenges and opportunities related to policies, institutions, and markets.

Figure 1—Links among the three themes of CRP2

Theme 2 clarifies feasibility of policy reforms; shows how property rights, collective action, and asset patterns affect technology adoption

Theme 1 identifies needed technology policies, investments, and safety nets

THEME 2
Inclusive Governance & Institutions

Theme 2 shows how producer groups and control over assets can help small-scale producers participate in value chains

Three Interlinked themes

THEME 1
Effective Policies & Strategic Investments

OUTCOMES
- **Reduced rural poverty**
- **Improved food security**
- Improved nutrition and health
- Sustainable management of natural resources

THEME 3
Linking Small Producers to Markets

Theme 3 identifies market opportunities, product quality needs, and certification, food safety, and traceability standards that affect the institutional environment

Theme 1 identifies macroeconomic conditions, investments, and technology policies to improve inclusive markets for smallholders

Theme 3 identifies sector strategies, regulation and investment needs, and market failures to be overcome

Priority-setting

The CRP2 team developed current research areas and priorities through a participatory process and an analysis of the major development challenges and strategies for each type of region. Research priorities among activities and regions will be further developed and adjusted at the beginning of the program implementation phase. The team will organize participatory priority-setting workshops, applying a multicriteria scoring approach, and complement these consultations with a modeling approach that uses quantitative ex ante assessment tools. These activities will result in a ranking of priority research areas and regions aimed at optimizing CRP2's contribution to the system-level outcomes.

Impact Pathways

CRP2 will help achieve CGIAR system-level outcomes through three main impact pathways (see Figure 2):

1. Informing and enriching research and bolstering the capacity of research communities
2. Influencing policy development and implementation by major development agencies
3. Providing policy recommendations for policymakers and decisionmakers at the global, national, and local levels

One foundational element is common to all three impact pathways: the contribution of research (under all three themes) to improved knowledge and analysis of development processes.

Impact pathway 1 shows how social science information feeds back into CGIAR and non-CGIAR research. This feedback loop will continually bolster the Consortium's capacity to produce ambitious, cutting-edge research that leads to long-term improvements for the poor. Impact pathway 2 reflects the potential for CGIAR-generated research to influence the international development and implementation community, including global and international agencies, donors, and implementers, such as governments and civil society organizations. Impact pathway 3 shows how social science research can influence government policy. The body of research-based evidence and analysis generated by CRP2 will provide concrete evidence of policy options that policymakers can use to craft reform policies aimed at achieving the desired outcomes.

Figure 2—CRP2 impact pathways
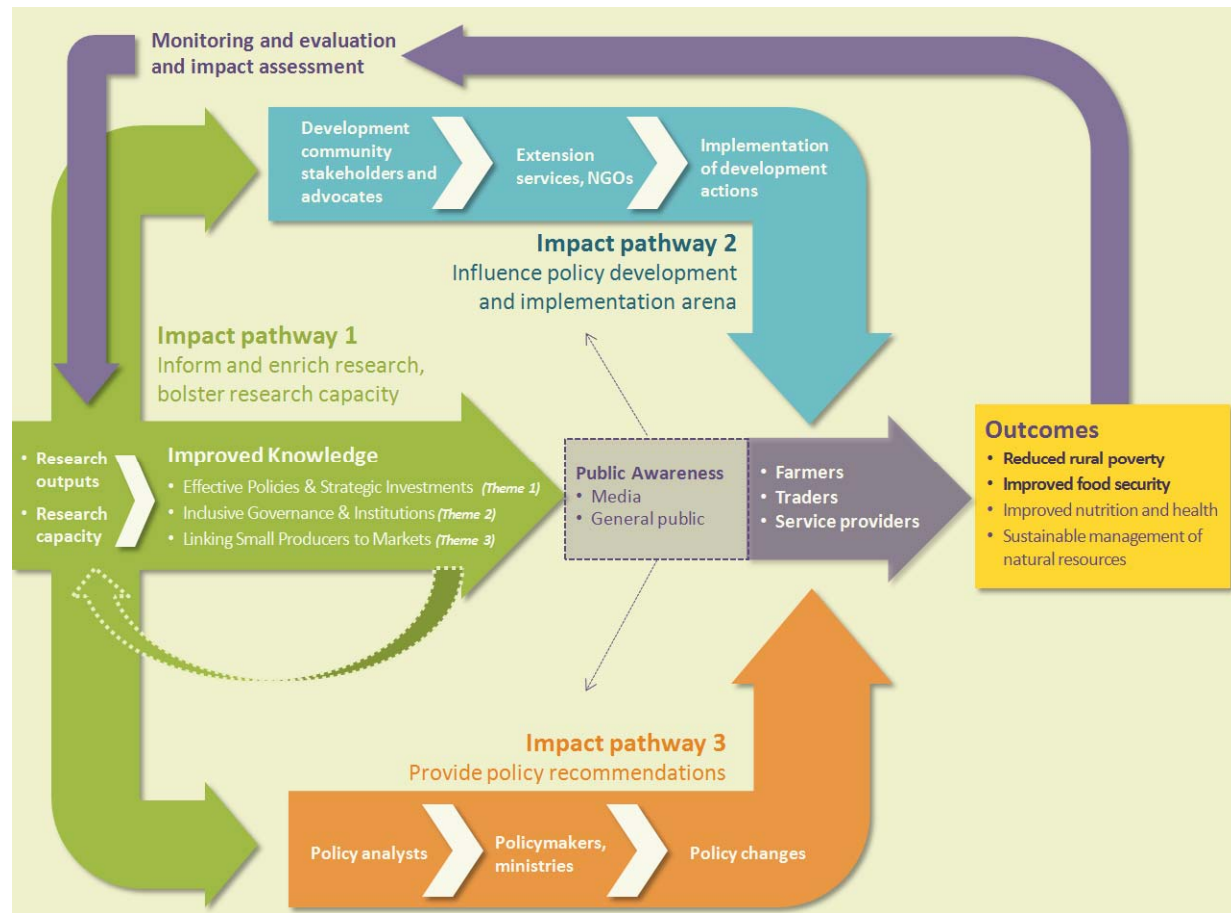
Ensuring Uptake

High-quality research outputs alone are not enough to achieve impact; they must also be taken up and used. In addition to the three impact pathways described above, the CRP2 strategy to ensure that outputs are translated into outcomes includes the following components:

- partnerships, to link research to on-the-ground implementation and widen CRP2's influence;
- capacity strengthening, to enhance the capacity of partners who will translate research results into on-the-ground impacts;
- communication, to produce different outputs that will ensure research dissemination and influence; and
- specific outreach strategies to be developed by each subtheme.

All these components aim to build bridges to users, going beyond the basic question of "what is produced?" to address the broader issue of "who is being reached?". This process starts at the inception of the research, when intended users of the research can help identify the relevant questions and priorities. Some of these users will become partners in the research itself, such as when policymakers or NGOs participate in action research or when CRP research evaluates the impact of particular programs. Application of best practice methods and publication in peer-reviewed outlets will help ensure the legitimacy of the findings. Also needed, however, are broader forms of outreach, including policy briefs, web-based dissemination, media outreach, and presentations at in-country and international forums.

IFPRI's Country Strategy Support Programs (CSSPs), by helping researchers stay close to the issues and facilitating the delivery of results in the developing world, are a promising vehicle for enhancing the impact of CRP2 at the country and local level.

Monitoring and Evaluation

CRP2 will include a monitoring framework to report on program activities, track progress, and take corrective actions when needed. Monitoring will be based on indicators and metrics for all outputs and outcomes. Evaluations will assess the achievement of outcomes and the translation of outcomes into impact. The main outputs, outcomes, and impacts of CRP2 research are described in the performance indicators matrix in Annex 1.

Research Themes and Subthemes

Research in the three overall themes will be managed at the subtheme level. Within the broad focus of each subtheme (described in the following sections), the specific development challenges, problems, opportunities, and required strategies vary depending on the characteristics of the different countries and regions. Because developing countries face a great variety of challenges and opportunities, approaches to improving policies, institutions, and markets must be country and context specific.

To reflect this heterogeneity, the activities in each research theme and subtheme are specified in more detail based on a country typology. Drawing on the *World Development Report 2008* (WDR 2008), we have identified three types of countries or major subnational regions—agriculture-based, transforming, and urbanized—based on the main characteristics of countries' agricultural development. Following from this typology, we have determined the key development challenges, approaches, and strategies for each type of country. Based on this assessment, we have specified the key CRP2 research areas at a more detailed level and categorized them by subtheme for each type of country or region. The detailed research areas are shown in Table 3.1.

Theme 1: Effective Policies and Strategic Investments

Policies provide the enabling environment in which development actions occur and investment choices play out. This first theme of CRP2 analyzes which policies and investments might be better formulated to improve food security and accelerate agricultural income growth and, of equal relevance, how. It also evaluates key growth, equity, and sustainability tradeoffs associated with alternative development strategies and scenarios that provide the broader context in which policies and investments are formulated.

Theme 1 consists of 4 subthemes aimed at addressing the key policy gaps identified above. Subtheme 1.1 (Foresight and Strategic Scenarios) focuses on designing scenarios reflecting emerging challenges, modeling the consequences of these scenarios, and using the outputs of the modeling to inform policy research, thereby improving existing agricultural policy and investment decisions. The Foresight program will work closely with the GCARD process. The three other subthemes center on policy analysis, with a global objective of enabling smallholders, the rural poor, and other vulnerable groups to participate in income-generating and asset-building growth. Research under Subtheme 1.2 (Macroeconomic, Trade, and Investment Policies) is designed to correct underinvestment and policy and market distortions in the agricultural sector relative to other sectors. Subtheme 1.3 (Production and Technology Policies) will strive to facilitate participation of smallholders, female farmers, rural laborers, and vulnerable groups in agricultural productivity growth and sustainable resource use. Subtheme 1.4 (Social Protection Policies) plans to increase poor people's access to safety nets, food assistance, and cash transfers to reduce their vulnerability to risks.

Theme 2: Inclusive Governance and Institutions

For new policy ideas to be translated into changes on the ground, two conditions need to be met: (1) policy ideas must be formulated into policies; and (2) policies must be adequately implemented.

Subtheme 2.1 (Policy Processes) will study research-policy linkages and policy implementation processes in order to increase the likelihood that science- and evidence-based policy options will be adopted into progressive reforms.

One major obstacle to policy implementation arises from the failure of governments and markets to provide rural services and infrastructure. Subtheme 2.2 (Governance of Rural Services) will address this issue by identifying governance arrangements suitable for providing critical rural services and for supporting effective and equitable farmer organizations, resource user groups, and producer groups.

Tenure security and capacity for collective action are prerequisites for reducing poverty and enabling more effective management of common pool resources and environmental services. Moreover, agricultural policy processes often suffer from the lack of voice of smallholder farmers and women, who make up so much of the agricultural labor force in developing countries. How can sound arrangements for property rights and collective action be achieved, and how can small-scale producers be empowered to increase their voice in policy decisions and to gain access to investment and market opportunities? These are the questions that Subtheme 2.3 (Collective Action and Property Rights) will strive to address.

Translating increased productivity and incomes into sustainable rural development requires ensuring that poor people are able to accumulate the tangible and intangible assets that will allow them to generate sustainable livelihoods. Such changes often go beyond single policies and require appropriate institutional structures. To address this challenge, Subtheme 2.4 (Institutions to Strengthen the Assets of the Poor) will focus on creating enabling institutions for the poor.

Theme 3: Linking Small Producers to Markets

Establishing competitive and efficient markets is a central challenge of achieving economic growth. Millions of low-income people participate in agricultural value chains as producers, small-scale traders, processors, retailers, and consumers. Improving the performance of value chains therefore stands to benefit large numbers of people. This theme identifies key constraints and opportunities in value chains; evaluates options for upgrading value chains; and provides tools, strategies, and policy approaches for achieving development change that is pro-poor, sustainable, and gender sensitive.

Subtheme 3.1 (Innovations across the Value Chain) will look into how to make commodity markets function better for the poor through value-chain innovations in five key areas: reducing transaction costs, managing risk, building social capital, enabling collective action, and redressing missing markets. Subtheme 3.2 (Impact of Upgrading Value Chains) will develop a comprehensive strategy for assessing the impact of interventions designed to upgrade value chains across different CRPs. It will identify appropriate indicators and methods for monitoring the performance of projects, evaluating their effectiveness, and assessing their impact on the poor and other target groups, including women.

Strategic Research on Gender

For the CGIAR to deliver on its mission—achieving sustainable and positive change for those who need it most—its approaches to agricultural research and development must engage, empower, and invest in women, not only to correct gender inequities, but also to achieve more effective development. CRP2 will ensure that gender issues are not only integrated into each of the research themes, but also that critical gender issues become a focus of R&D in their own right. In CRP2, experiences with gender analysis under individual projects will be collected, compared, and contrasted to uncover broader lessons on gender integration in its research.

Methods and Data

Researchers will apply a range of interdisciplinary approaches and methods to research activities, including econometric methods, model-based simulation analyses, strategic foresight assessments, social network analyses, qualitative analyses, participatory action research, experimental and randomized controlled approaches, and gender and intrahousehold analysis. CRP2 also proposes an annual competitive grants program to promote innovation among researchers in both developed and developing countries.

The quality, credibility, and cost of CRP2 research, the program's capacity to develop timely, relevant, and accessible research products and services, and its ability to respond to evolving research priorities will all be highly conditioned by CRP2's data strategy. Therefore, the development of integrated data and knowledge management platforms is a priority of CRP2. CRP2's data strategy aims to reduce research costs, enrich analytical opportunities for CRP research partners, and deliver a major international public good in the form of an open-access data portal, which will foster broad opportunities for innovation beyond CRP2 by both the public and the private sectors. These objectives go well beyond existing practices for data management and sharing within and across CGIAR centers.

Partnerships

CRP2 sets out an ambitious agenda for research and impact, and achieving it will require a concerted collective effort. Of course, the CGIAR centers cannot do all of the research, much less achieve impact, alone. Meeting the research and implementation objectives requires close partnerships not only with conventional research partners from universities and national agricultural research systems, but also with a wide range of stakeholders at national, regional, and global levels, such as farmers' organizations, national agricultural research systems, regional forums, governments, development agencies, donor agencies, and the private sector. CGIAR centers participating in CRP2 already collaborate with more than 500 partner organizations today—evidence of the strong networks and relationships that CRP2 will draw from and further develop.

CRP2 has three types of partners: (1) research partners; (2) policy and practitioner partners; and (3) knowledge-sharing partners. Research partners will participate in the design and conduct of CRP2 research. Policy and practitioner partners are organizations that have a direct stake in the outcomes of research, such as government agencies, donor organizations, nongovernmental organizations, farmers' organizations, and private sector actors. Knowledge-sharing partners are those who help to store and transmit knowledge. In some cases, the same organization may have all three types of partnerships with CRP2, such as when an agricultural research institute or NGO participates in the research, helps to implement policy innovations, and contributes to or spearheads dissemination of research findings.

Capacity Strengthening

Strengthening the capacity of partners and of those who will translate research results into on-the-ground impacts is a core function of CRP2. Capacity strengthening in CRP2 can be divided into two broad sets of activities, which will be combined to maximize development impacts: (1) capacity strengthening through collaborative research partnerships; and (2) production of global public goods for long-term capacity development. The specific mechanisms that will be used range from links with formal academic programs, to collaboration with developing-country policy analysts to ensure they have the tools they need to answer policy questions in their countries, to the creation of development-oriented learning networks at the regional scale. Meeting the demand for capacity strengthening creates international public goods that can help amplify the impact of CPR2 over time and beyond the immediate areas where research is done.

Communications Strategy

The effectiveness of all three impact pathways for CRP2 will depend on regular communication of research results to diverse audiences. Consequently, this program will rely on a state-of-the-art communications strategy based on successful past and current CGIAR outreach strategies. This comprehensive strategy will spread the word about the program's progress and findings through a wide range of traditional and new media, including scholarly papers, policy reports and briefs, print and broadcast journalism, websites, social media, and videos, as well as through presentations at workshops and conferences. These communications efforts will be designed to help forge close ties with local collaborators and key policymakers, increase opportunities for hands-on research in the field, and promote seamless collaboration among CGIAR centers and partners—all of which will lead to enhanced dissemination and impact of research results.

Management Structure

The design of the oversight, planning, management, and implementation structure of CRP2 is based on the following criteria: high involvement of stakeholders, high-quality scientific oversight, transparency, low transaction costs, clear accountability and responsibility, and minimal bureaucracy. CRP2 will have one Lead Center—IFPRI—accountable to the Consortium Board under the terms of the performance contract with the CRP. The Lead Center will have responsibility for governance, intellectual and fiduciary oversight, and financial management of the main performance contract for the CRP. The CRP2 director, assisted by a Management Committee, will be responsible for overall management of CRP2. The CRP2 director will be appointed by the Lead Center and will report directly to the IFPRI director general.

The Management Committee will be made up of the CRP2 director, the leader of Theme 1 and another representative of Theme 1 chosen among the subtheme leaders, the leader of Theme 2 and another representative of Theme 2 chosen among the subtheme leaders, the leader of Theme 3, and the leader of the Strategic Research on Gender. To reflect the importance of the participation of other centers and partners in the management processes, a minimum of three members will be drawn from centers or partners other than IFPRI. The CRP2 director and Management Committee will be assisted by a small Program Management Unit, including a program manager and a research coordinator. A Science and Policy Advisory Panel will provide independent oversight of the content and quality of the scientific research and overall program, and will interact regularly with the Management Committee and Lead Center. Advisory panel members will come from outside CGIAR centers and core partner organizations of CRP2 and will be actively recruited from participating centers and partners by the Management Committee to ensure broad acceptance and representation. This panel will advise CRP2 management on strategic directions, the research program, research priorities and focus, and relevant management and partnership issues.

Budget

The CRP2 budget is projected at US$82 million for 2011, rising to US$95 million in 2013. This budget captures the costs of the research program and those associated with collaboration among 11 CGIAR centers, including IFPRI, in addition to the large number of research and implementing partners.

1. RATIONALE

Poverty and hunger remain enormous problems. Nearly 1 billion people in the world go hungry, and more than 1 billion live on just $1.25 a day; Sub-Saharan Africa and South Asia account for the largest shares of these people. Despite global efforts to overcome these problems, one of the most promising tools for promoting development and reducing poverty—pro-poor, sustainable agricultural growth—has been underexploited. Seventy-five percent of the poor in developing countries live in rural areas, and the majority of them depend on agriculture for their livelihoods. Evidence shows that agricultural growth reduces poverty by twice the rate of growth in nonagricultural sectors (World Bank 2007; Diao et al. 2007). Improving agricultural productivity is also critical to achieving most of the targets specified under the Millennium Development Goals (MDGs) (Rosegrant et al. 2006). Agriculture is central in the lives of poor people, and any strategy for cutting poverty and hunger must center on rapid agricultural growth.

Growth in agriculture, however, has been slowing. During the past two decades, a slowdown in investments in agricultural research and development (R&D) and rural infrastructure has contributed to a decline in crop yield growth in much of the world. Equally important, lack of enabling policy environments, poor governance, weak institutions, and inadequate markets for small producers have held back agricultural growth (World Bank 2007). These developments have gradually tightened global food markets over the past decade. Now, with lower food stocks and reduced excess capacity, the global food system is exposed to greater price volatility and trade instability when exogenous supply shocks occur, as seen in the food price spike of 2007 and 2008 and in the current run-up in prices as of early 2011. The food price spikes (as well as sharply rising energy prices and the financial crisis) have affected all countries in differing ways, but developing countries, and especially poor and vulnerable producers and consumers, have generally fared the worst. Poor people in Asia, Sub-Saharan Africa, and Latin America still spend 50–70 percent of their income on food, so price spikes and fluctuations hit them hard. Higher food prices could in principle give farmers an opportunity to raise their incomes, but they often lack the inputs, technologies, markets, and financial and credit services they need to exploit this opportunity. And, in any case, most farmers in developing countries are currently net purchasers of food.

Prospects for future food security remain serious. After declining slowly for decades through the mid-2000s, food prices appear likely to keep on climbing. Maize, rice, and wheat prices are projected to rise by 21–61 percent, and beef, pork, and poultry prices by 17–40 percent by 2050 according to IAASTD's reference projections (Rosegrant et al. 2009a). Under conditions of more severe climate change, price increases could be even larger (Nelson et al. 2010). Rising prices will dampen food demand of poor consumers and lead to relatively slow growth in calorie consumption. If current policies and investments continue—that is, under business as usual—the number of malnourished children in the group of developing-countries will decline only slowly, from about 146 million in 2000 to 99 million by 2050, with one-third of malnourished children in Sub-Saharan Africa (Rosegrant et al. 2009a). This poor progress on food security does not come close to meeting the targets set out in the MDGs (Rosegrant et al. 2006).

Yet a combination of improvements in agricultural policies, accelerated investments, and market reforms can change this situation markedly. Scenarios of alternative futures suggest that concerted action could lead to real improvement in food security. These scenarios estimate that policy reforms and high agricultural investments—including more and more efficient agricultural research, expanded irrigation, enhanced natural resource management with more efficient water use, investments in rural roads, and improved marketing and communications—could reduce the number of malnourished children in 2050 by 30–40 percent, compared with business-as-usual, depending on assumptions about climate change (Rosegrant et al. 2009a, 2009b).

Drivers of Future Food Security

In the coming decades, challenges to agricultural growth and food security will be driven by factors on both the demand side and the supply side (see Box 1.1). On the demand side, rapid economic growth and urbanization in much of the developing world is expected to raise demand for meat, maize, and soybeans for livestock feed, and higher-value commodities such as fruits and vegetables. Improved economic growth in Africa will likely strengthen demand for staples, such as rice and wheat. At the same time, growth in cereal and meat consumption will be much slower in developed countries. These trends will lead to an extraordinary increase in the importance of developing countries in global food markets.

Box 1.1—Global drivers affecting future food security

Demand Side

- Income and population growth
- Urbanization
- Biofuels and links to energy markets
- Climate policy related to emissions, mitigation, and carbon sequestration

Supply Side

- Science and technology policy
- Investment in agricultural research and complementary public services
- Macroeconomic, trade, and sectoral policies, farming systems management, and governance reform
- Value chains and markets
- Climate variability and change
- Water and land scarcity and quality, rising energy prices
- Nonmarket ecosystem services, such as biodiversity levels and its feedbacks

On the supply side, resource constraints will be a key challenge. Water scarcity due to competition from other sectors, changes in the volume and pattern of rainfall, and declining water tables and quality will play a particularly important role. Farmers who rely on irrigation and who live in water-scarce areas—where gross domestic product (GDP) is rising and population is expanding rapidly—will be most affected. By 2050, key water-scarce agricultural regions in China, India, Central and West Asia, and North Africa will likely need to produce more food with virtually no increase in water for agriculture because of little increase in supply and significant transfers of water from agriculture to other uses and sectors. Land and water resources will also come under pressure, as food production increasingly competes with urban and industrial expansion, biofuel crop production, and demand for greenhouse gas (GHG) emissions mitigation and carbon sequestration practices. Although some GHG-reducing strategies such as minimum tillage will create win-win synergies with continued crop yield growth, other strategies, including reduced fertilizer use and shifts to carbon farming, may have trade-offs with food production. Emerging energy scarcity also poses new challenges and opportunities for sustainable and equitable agricultural productivity growth. In the longer run, demands for ecosystem conservation and biodiversity will also compete with food for agricultural land and water resources. Because of the decline in the availability of water and land that can be profitably brought under cultivation, expanding cultivated area will make only a limited contribution to future food production growth (Evans 2009), except in Sub-Saharan Africa and Latin America. The burden of meeting future cereal demand and achieving

sustainable agricultural productivity growth thus rests on crop yield growth, which will need to provide 90 percent or more of future growth (Rosegrant et al. 2009a).

The Need for Sound Policies, Institutions, and Markets

Two separate but related strategies are required to achieve sustainable crop yield growth that reduces poverty and improves food security. The first is the development of new agricultural technologies. As noted in the CGIAR's Strategy and Results Framework (SRF), "If poverty and hunger are to be eradicated, substantial investments must be made in agricultural research and innovation as well as in agricultural development" (CGIAR 2011). Because demand for new technologies will always exceed available resources, it will be important to carefully assess and prioritize appropriate agricultural and rural investments.

But investments in agricultural R&D alone are not enough. Improved technologies will not lead to the necessary yield growth without appropriate policies, extension, and other services to disseminate the technologies; property rights and collective action institutions to enable smallholders to adopt technologies; and well-functioning markets to provide farmers with inputs and incentives for increased production. Thus, the second strategy centers on carefully crafted policies, institutions, and markets that ensure that these technologies are adopted and benefit the poor. Indeed, sound policies, institutions, and markets go beyond technologies to contribute to the food security and incomes of the rural poor in a whole range of ways. This is the focus of CRP2, "Policies, Institutions, and Markets to Strengthen Food Security and Incomes for the Rural Poor."

Current policies, institutions, and markets suffer from some **important gaps and failures**, including the following:

- **Neglect of emerging challenges:** Development policies often fail to anticipate and address the emerging challenges of rising energy prices, climate change, natural resource scarcity, and agrobiodiversity loss.

- **Neglect of smallholders:** Policies that support agricultural productivity and marketing tend to favor large-scale farmers while failing to address the needs of smallholders, women farmers, and other vulnerable groups, and they often do not provide adequate risk protection for the rural poor. Few policies are in place to support producers' organizations, resource users groups, producers groups, and other actors who are essential for building effective smallholder-oriented value chains.

- **Narrow focus on agriculture:** Agricultural policies tend to overlook important macroeconomic conditions and environmental implications of policy implementation, with large costs to agricultural and economic development.

- **Underinvestment and market distortion:** Market and governance failures result in underinvestment and policy and market distortions in the agricultural sector, especially with regard to R&D and the pricing of inputs and natural resources.

- **Weak institutions and infrastructure:** Current policies are often ineffectively implemented because of weak institutions and are not sufficiently supported by infrastructure and agricultural service provision owing to market and government failures.

Solving these problems will be critical to fostering the positive change in policies, governance arrangements, and market systems that will allow agriculture to fully contribute to poverty reduction and development.

It is precisely here that CRP2 can make a critical contribution. CRP2 research will clarify how to overcome these gaps and failures so that policies, institutions, and markets can be used most effectively to reduce poverty and improve food security, health, nutrition, and sustainability:

- **Policies:** Policies should be designed to sustainably increase land, labor, and water productivity and to promote appropriate, gender-differentiated technology adoption (Quisumbing 2003). They should support the marketing of agricultural inputs and outputs, especially for small producers (Rosegrant et al. 2009b). Targeted social protection policies to increase poor people's access to safety nets, food assistance, and cash transfers (Evans 2009) will also be needed, as an alternative to subsidies (which drain government's budgets) or price controls (which reduce farmers' incentives to produce).

- **Governance and institutions:** Inclusive and enabling governance and institutions are needed to foster policy implementation, promote technology adoption, and provide services, as well as ensure that benefits are translated into long-term asset building (Birner, Quisumbing, and Ahmed 2010; World Bank and IFPRI 2010). The CGIAR's Social Science Stripe Review notes: "Just as agricultural technologies and NRM practices are deeply embedded in the farming systems in which they are found, so are those farming systems equally embedded in agroecological processes and economic, political, and social structures that fundamentally shape their evolution and performance (Conway et al. 2006). In many of the settings of greatest interest to the CGIAR—areas with the highest rates of poverty, malnutrition and resource degradation—these broader structures limit the speed and extent of adoption of improved technologies, practices and policies" (CGIAR Science Council 2009).

- **Markets:** Effective markets benefit both producers and consumers and offer greater income opportunities by integrating small-scale producers into upgraded value chains.

Within these major challenges, the specific development challenges, problems, opportunities, and required strategies vary depending on the characteristics of countries and regions. In order to adapt the research areas to the country types, we have utilized the typology developed by the World Development Report (2008). As shown in Table 3.1 in Section 3, this typology divides countries or major subnational regions into three broad types based on the main characteristics of agricultural development. These three types are *agriculture-based*, *transforming*, and *urbanized*. Table 3.1 therefore specifies the main CRP2 research areas for each subtheme according to these country types.

Improving agricultural productivity and translating agricultural gains into food and nutrition security also requires addressing the gender gap. The 2011 FAO *State of Food and Agriculture* report highlights that women almost everywhere "face more severe constraints than men in accessing productive resources, markets, and services" (FAO 2011). This gender gap in assets constrains agricultural productivity growth. There is strong evidence that men and women do not use income or assets in the same ways and that increasing the resources under the control of women is likely to do more to increase the nutritional status and health of children (Quisumbing 2003). The 2009 Global Hunger Index (IFPRI 2009) shows a significant correlation with the gender inequality index. CRP2 will thus consider ways to address the gender gap in assets; ensure that agricultural technologies, extension, and other services address the needs of women producers and consumers; and make markets accessible to women.

Under business as usual, projected growth in agricultural productivity in the next two decades is unlikely to meet effective demand for food. Small agricultural producers face enormous challenges, but they also have great potential to feed the world—if they can get access to the inputs, technologies, markets, and public services they need. The adoption of evidence-based policies, inclusive institutions,

and equitable markets—based on sound and innovative research focused on the complex agricultural development process—can help achieve this goal. The purpose of CRP2, "Policies, Institutions, and Markets to Strengthen Food Security and Incomes for the Rural Poor," is to address this challenge by producing a body of knowledge to support appropriate policies, institutions, and markets for pro-poor agricultural growth.

The Comparative Advantage of the CGIAR

The CGIAR and its partners are well placed to provide the necessary research. Many institutions work on issues related to policies, institutions, and markets in developing countries. Therefore, it is important to clarify the comparative advantage that CRP2 organizations have to work on those issues. This comparative advantage is based on several factors.

First, the CGIAR institutions have a specific mandate to focus on the intersection of food security, poverty, and sustainable agriculture. Other international organizations have mandates on development, macroeconomic, trade, and microeconomic issues, but their focus—in terms of sectors and topics—is more general. Second, the activities of CRP2 are centered on research and knowledge-based capacity building in the public, private, civil society, and academic sectors. Other organizations that may use loans and financing of technical assistance do not focus on research and knowledge generation, and sometimes interact only with certain actors within the public, private, civil society, and academic realms. Third, the CGIAR organizations have the advantages of institutional and political independence. This feature allows the CGIAR Consortium to be seen as an "honest broker" that can tackle different problems without a priori institutional points of view and without being constrained by political decisionmaking processes. Fourth, the CGIAR organizations operate at a large enough scale to generate an intellectual critical mass but are not so large that they are hampered by cumbersome organizational arrangements. Therefore, these organizations can be relatively flexible and agile in responding to new intellectual and policy challenges in ways that larger organizations with more constraining political structures of decisionmaking may not be able to replicate. Fifth, the CGIAR organizations are widely recognized as centers of high-quality research and development that apply novel approaches and instruments and possess large networks of data collection in developing countries. Whereas other institutions may show some of the above traits, the combination of all of them is unique to the CGIAR institutions.

Further analysis of the CGIAR's comparative advantage with respect to alternative suppliers for each research area is provided in Section 4 and in Annex 5. Please note that most alternative suppliers are also, by design, partners in CRP2. Rather than "alternative suppliers," we prefer to think of most of these as joint suppliers of joint products.

2. CRP2 STRATEGIC RESULTS FRAMEWORK

The CGIAR seeks to achieve four system-level outcomes (SLOs): (1) reduced rural poverty; (2) increased food security; (3) improved nutrition and health; and (4) more sustainable management of natural resources. This section describes how CRP2 will contribute to these outcomes while addressing the major challenges described in Section 1.

As previously noted, there are many constraints to meeting the SLOs. The CGIAR's Strategy and Results Framework notes: "Multiple and interacting constraints imply the need for multiple interventions, with the objective that a subset of critical interventions release further investment by poor households as a pathway out of poverty. Such complementary interventions to productivity-enhancing technologies include organizational innovations for access to input and output markets, insurance, microcredit, enhanced property rights, especially for women, and safety nets" (CGIAR 2011). CRP2 is designed to facilitate these complementary interventions by providing knowledge and tools to support a policy, institutional, and market environment in which agriculture and directly related sectors fully contribute to rural poverty reduction, food security, nutrition, and sustainable rural development.

Besides directly contributing to the SLOs, CRP2 will have synergies with other CRPs and with the work of national agricultural research system(s) (NARS[s]) and other organizations involved in agricultural research for development (AR4D). CRP2 will inform priorities for appropriate investment by the public and private sector, including producers themselves. It will facilitate the creation of environments that ensure that appropriate technologies are developed and adopted. And it will ensure that small-scale producers and poor consumers benefit from increases in agricultural production through better access to markets.

Many areas of research have the potential to contribute to delivering on the SLOs. After extensive priority-setting and consultation with key stakeholders, we have grouped the components of CRP2 into three interlinked themes to optimize the delivery of solutions to the problems detailed in Section 1:

- **Effective Policies and Strategic Investments (Theme 1)**: This theme will improve policy options at the global, regional, and country levels by using models and scenarios; analyzing how best to allocate public resources for research and investment; and strengthening capacity for formulating and implementing policies and investments designed to increase agricultural productivity and enhance rural incomes.

- **Inclusive Governance and Institutions (Theme 2)**: This theme will examine the scope for institutional and governance reforms and contribute to effective and equitable access to rural services, property rights, collective action, and assets by studying existing systems and testing institutional innovations in these areas.

- **Linking Small Producers to Markets (Theme 3)**: This theme will increase the competitiveness of markets to benefit producers and consumers and offer greater income opportunities by integrating small-scale producers into upgraded value chains.

The third section of Annex 1 (performance indicator matrix) provides the detailed contributions of each of these themes to the SLOs.
Policies set the enabling environment for effective agricultural growth; institutions structure the delivery of goods and services and the context for action; and markets organize the relationships among value-chain actors, including smallholder producers. Therefore, each of these research themes provides a critical entry point to addressing the challenges identified in Section 1. Working across the three themes will allow us to address several of the market failures and research gaps laid out in Section 1. Figure 2.1 illustrates the linkages between themes and the overall integration across themes. For example:

- Theme 1 identifies needed technology policies, investments, and safety nets, thus contributing to Theme 2.

- Theme 1 identifies macroeconomic conditions, investments, and technology policies to improve inclusive markets for smallholders, thus contributing to Theme 3.

- Theme 2 analyses how producer groups and control over assets can help small-scale producers participate in value chains, thus contributing to Theme 3 (see Figure 2.1 for more examples).

Because of these links among the themes, research is needed in all three areas to contribute to an environment in which pro-poor, sustainable agricultural growth can thrive. Reforming policies or institutions without linking small producers to markets, for example, could risk leaving smallholders behind. Strengthening markets without reforming macroeconomic policies could doom market-building efforts to failure.

Figure 2.1—Links among the three themes of CRP2
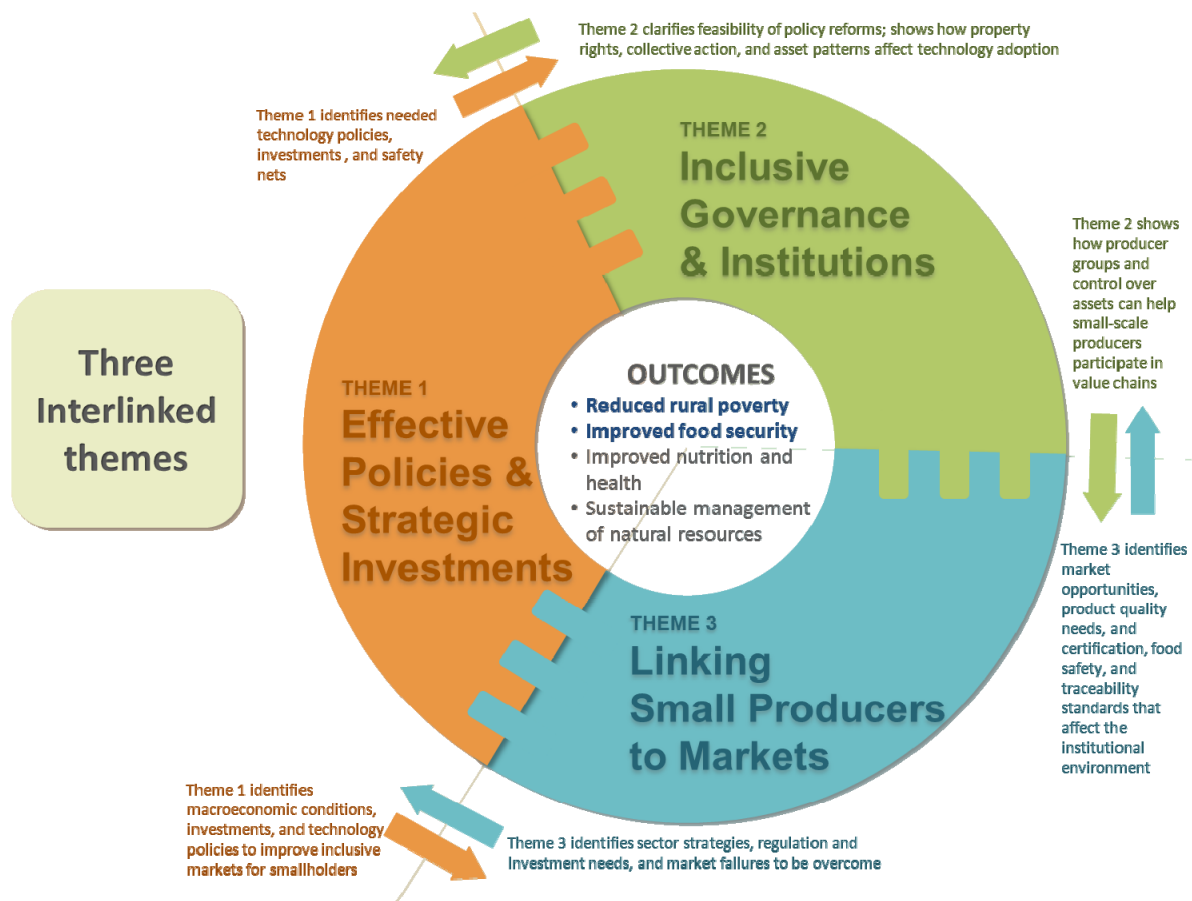
More specifically, Theme 1 analyzes how countries can improve their policy environments to support agricultural income growth, based on research under four subthemes:

- **Foresight and Strategic Scenarios (Subtheme 1.1)**

- **Macroeconomic, Trade, and Investment Policies (Subtheme 1.2)**

- **Production and Technology Policies (Subtheme 1.3)**

- **Social Protection Policies (Subtheme 1.4)**

Research on strategic scenarios will identify emerging challenges and their implications for agricultural policy and investment (P&I). These scenarios will inform research on what policies can best provide an enabling framework for agricultural and rural development in a dynamic and changing world. Research on macroeconomic, trade, and investment policies; agricultural production and technology policies; and social protection policies will make it possible for smallholders, the rural poor, and other vulnerable groups to participate in growth that generates income and builds assets. Effective policies can correct state and market failures—for example, by helping to internalize the cost of environmental externalities and by factoring overall economic and trade policies into the development of agricultural support policies.

Theme 2 investigates governance and institutional arrangements that are needed for critical policy reforms and institutional changes to be adopted and implemented. This research will be carried out within four subthemes:

- **Policy Processes (Subtheme 2.1)**

- **Governance of Rural Services (Subtheme 2.2)**

- **Collective Action and Property Rights (Subtheme 2.3)**

- **Institutions to Strengthen the Assets of the Poor (Subtheme 2.4)**

Research on policy processes will examine policy and implementation processes and policy-research linkages. Research on governance of rural services will analyze alternative reform options that are helpful to the agricultural sector and to smallholders and address critical implementation issues for delivering rural services. Research on institutions that support collective action and property rights and strengthen the assets of the poor will deal with the interface between policies, on the one hand, and people's responses, on the other. Theme 2 will interact closely with actors and institutions, analyzing their institutional incentives and reform options and helping strengthen their capacity and coordination.

Theme 3 identifies constraints and opportunities in value chains, evaluates options for upgrades, and provides tools and strategies for development change that is pro-poor, sustainable, and gender sensitive. Theme 3 has two subthemes:

- **Innovations across the Value Chain (Subtheme 3.1)**

- **The Impact of Upgrading Value Chains (Subtheme 3.2)**

Research on innovations across the value chain will seek to foster opportunities for smallholder farmers by, for example, revealing ways to reduce transaction costs and improving value-chain outcomes for smallholders. To evaluate option for upgrading value chains, Subtheme 3.2 will examine both upgrades that apply to a number of commodities and upgrades that are commodity specific (this work will be done in collaboration with commodity-specific CRPs). This theme will thus contribute to relieving market failures related to investment in value chains for smallholder agriculture.

Of course, there are complementarities among the different subthemes. In the example of Theme 2, policy processes will affect governance of rural services and property rights reform; rural services may rely on collective action approaches for provision of water or extension; and collective action and property rights will affect the accumulation of social capital and other tangible assets. These four subthemes will therefore regularly share information and approaches.

The outputs of each theme will lead to a range of intermediate outcomes that, collectively, will contribute to the CGIAR's four SLOs, and particularly to rural poverty reduction and increased food security. To be as specific as possible, we are providing this information by subtheme in Table 2.1, while Annex 1 (performance indicators matrix) provides the detailed contributions of the overall themes to the SLOs.

Some work will cut across all themes in CRP2. The strategic gender research, as well as attention to key gender issues in each theme of CRP2, will ensure that strategies are identified to overcome gender disparities. Partnerships, policy communications, and capacity-strengthening activities are also cross-cutting. These activities are linked to and embedded in the research agenda, in addition to being key elements of achieving impact in the follow-up to the research.

Although CRP2 research will be conducted at different levels, from the local to the national, regional, and global levels, all of it will contribute to the production of international public goods (IPGs). Innovative global models will simulate different scenarios on how regions and countries could be affected by critical drivers of change and could develop strategies to respond to these changes and optimize investments. Comparative analysis across research sites and projects will ensure that the research carried out in particular countries and even localities contributes to IPGs, as recommended by the CGIAR Social Science Stripe Review (CGIAR Science Council 2009). As much as possible, we will design research to be comparable across sites. In other cases, we will study particular innovations or "outliers" to identify lessons applicable to other regions.

Table 2.1—How CRP2 subthemes contribute to the system-level outcomes of the CGIAR

Subtheme/SLO	Reduced rural poverty	Increased food security	Increased nutrition and health	More sustainable management of natural resources
THEME 1: Effective Policies and Strategic Investments				
1.1 Foresight and Strategic Scenario	• More effective prioritization of fiscal and public investment policies meet the needs of the rural poor			• Strategic foresight identifies environmental threats and appropriate responses to reduce impact of climate change • Identification of appropriate policies and regulations allows for sustainable agricultural growth
1.2 Macroeconomic, Trade, and Investment Policies	• Macro, trade, sectoral, and rural labor policies needed to optimize agricultural growth and competitiveness are identified • Key sectoral policies required for broad-based rural growth increase job creation and optimize rural-urban linkages, creating new income opportunities	• Appropriate policies help cope with risk and volatility in international markets • Policies improve participation of smallholders in global market in light of country trade specialization, trade costs, and farm heterogeneity		
1.3 Production and Technology Policies	• Policies supporting rural income diversification increase resilience to climatic, price, and other income shocks	• Enhanced development, and management of germplasm of major agricultural commodities improves food security • Sustainable intensification through development and adoption of agricultural policies increases food security at national and global levels • Enabling environments increase productivity and agricultural growth	• Enhanced development, management, and use of germplasm of neglected and underutilized species improves nutrition security	• Increased efficiency of agricultural technologies allows sustainable intensification of agricultural production, reducing pressure on other areas

Subtheme/SLO	Reduced rural poverty	Increased food security	Increased nutrition and health	More sustainable management of natural resources
1.4 Social Protection Policies	• Effective safety nets prevent income loss	• Effective safety nets ensure food security in times of crisis		
THEME 2: Inclusive Governance and Institutions				
2.1 Policy Processes	• Research findings are more likely to result in policy reforms that reduce social exclusion			
2.2 Governance of Rural Services	• Better agricultural research, extension, and infrastructure services increase incomes		• More responsive agricultural research and extension systems provide women and men farmers with information on production of nutrient-rich foods	• Improved extension services provide information on managing resources under climate change
2.3 Collective Action and Property Rights	• Stronger collective action enables smallholders and women to engage in markets	• Collective action for pooling resources, safety nets, and access to credit provides buffer against shocks		• Secure property rights give incentives for investment in resource base, especially common property • Collective action enables management of resources across scales to ensure equitable access and reduce resource degradation
2.4 Institutions to Strengthen the Assets of the Poor	• Gender-differentiated strategies of asset accumulation overcome poverty traps	• Women's productive assets increase food production	• Stronger women's assets increase women's bargaining power, which leads to better child nutrition	

Subtheme/SLO	Reduced rural poverty	Increased food security	Increased nutrition and health	More sustainable management of natural resources
THEME 3: Linking Small Producers to Markets				
3.1 Innovations across the Value Chain 3.2 Impact of Upgrading Value Chains	• Transaction costs and market failures are reduced • There are greater opportunities for smallholders and women to benefit from growth in demand for high-value commodities and access to retail structures • Institutional and infrastructure innovations generate equitable and sustainable benefits to value-chain actors	• Best practices are identified to increase yields and market access, and reduce transaction costs for smallholders	• Improving standards and certification across the value chain ensures food safety and quality and rewards farmers for good production practices • Nutrition content of value chains is improved (linking with CRP4)	• Partnerships among more effective public agricultural research and extension organizations, private firms, NGOs, and producer associations ensure sustainable use of natural resources in the production practices in the different points of the value chain

Measurable Impacts

As estimated in Rosegrant et al. (2009b) and as noted in the CGIAR's SRF (2011), CRP2 is expected to have several measurable impacts on the poor. Ex ante analysis of the impacts of policy research can be undertaken using simulation and scenarios analysis. Estimates of the impacts of strategic foresight and technology policies and investments that are given in this proposal are derived from the background paper prepared for the CGIAR Strategy and Results Framework (Rosegrant et al. 2009b) and from additional simulations utilizing the IMPACT model. In Rosegrant et al. (2009b), a series of agricultural investment and policy scenarios were designed and implemented using IFPRI's International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT). Four types of policy and investment scenarios were analyzed: (1) improvement in natural resource management policies; (2) investments and management enhancement for agricultural R&D; (3) investments in irrigation infrastructure; and (4) changes in agricultural marketing. The projections horizon is out to 2050, overlying alternative policy and investment scenarios over a baseline that assumes a continuation of trends in population and agricultural and economic growth; and moderate climate change, under the NCAR A2 scenario with carbon fertilization.

The estimated impacts of CRP2 by 2025 toward the four SLOs are as follows (see Annex 1):

- **SLO 1: Reduced rural poverty**
  - Reduction of 7–10 percent in poverty due to improvements on market access, thereby reducing marketing margins, increasing farm-gate prices, and boosting the production incomes of rural households
  - More secure environment for uptake of new Technologies increases efficiency of production by 1–3 percent
  - Diversification of nonfarm income and reduced risks

- **SLO 2: Increased food security**
  - Global crop, livestock, and fish production increased by 10–15 percent
  - 4–6 percent increase in calorie consumption by the poor due to lower prices and higher farm incomes

- **SLO 3: Improved nutrition and health**
  - Reduced child malnutrition by 3–5 percent

- **SLO 4: More sustainable management of natural resources**
  - Reduction in crop area by 3–4 percent, thereby freeing land for conservation

The positive impact of gender equality on poverty reduction has been well documented (Meinzen-Dick et al. 2002; World Bank 2007). A recent study estimates that countries that are off track on meeting MDG 3 on gender parity are likely to lose an average of 0.4 percentage points in annual economic growth between 2005 and 2015 (Abu-Ghaida and Klasen 2004). Therefore, improved governance and policy processes that reduce gender disparities through reductions in the gender asset gap and increases in women's involvement in decisionmaking processes will be a crucial component of further efforts to reduce poverty.

3. PRIORITY-SETTING, IMPACT PATHWAYS, AND MONITORING AND EVALUATION

Priority-setting

Section 1 presents a description of key development challenges related to agriculture and rural development and Section 4 provides a detailed description of the research themes and subthemes. Given the constraints of the proposal format, this material is presented at a relatively general level. To better reflect the heterogeneity in the relative importance of problems and opportunities across regions, **Table 3.1 provides a typology of countries or major subnational regions in terms of characteristics, development challenges, approach/strategy, and CRP2 research areas**.

The three types of countries or major subnational regions listed in this table (agriculture-based, transforming, and urbanized) are based on the main characteristics of countries' agricultural development and are drawn from the World Development Report (WDR 2008). Following from this typology and based on our own analysis and other literature referenced in the table, we have identified the key development challenges (column 2 of the table) and development approaches and strategies (column 3) for each type. This analysis has led us to determine **CRP2 research areas—at a more detailed level and categorized by subtheme—for each country/region type** (column 4).

It should be noted that some research areas cut across the different types of countries or subnational regions. For example, Subtheme 1.1 on Foresight and Strategic Scenarios is a global activity, designed to capture how global drivers and scenarios influence countries throughout the world while capturing the interconnections of agricultural markets and the global externalities of climate change. Although global in nature, the analysis allows for assessment of highly disaggregated and spatially explicit subnational productivity and natural resource impacts of drivers of global change. As can be seen in Table 3.1, other research areas also cut across two or more country/region types.

At this early stage, the typology outlined in Table 3.1 does not fully capture the complexity of some large countries in which significant differences are found across regions. For example, in the rapidly transforming countries of Brazil, China, and India, some regions have lagged behind in agricultural development, such as western China, northeast Brazil, and eastern India. Relatively higher levels of poverty and food insecurity persist in these regions (Pingali 2010). The research areas for these regions are similar to those for the agriculture-based countries.

Research priorities across types of countries and regions will be further developed during the participatory priority-setting process that will be established during the project implementation phase (see below).

Table 3.1—Typology of countries/regions and CRP2 research areas

a) Agriculture-based

Main characteristics	Development challenges	Approach/strategy	CRP2 research areas	Regions
- Low income, least developed countries – 49% of people live on less than $1a day - Agriculture contributes significantly to growth (share of agriculture in GDP: 29%) - Public spending on agriculture as a share of agricultural GDP is very low: 4% - 68% of population in rural areas - The poor are concentrated in rural areas	- Poor market access conditions, high transaction costs in linking domestic and international markets - Poor provision of public goods investments in rural areas - Under-investment in technology R&D on commodities and environments important to the poor - High share of agro-climatically constrained land resources - Institutional barriers to	**Help agriculture play its role as engine of growth and poverty reduction** - Improve agricultural productivity - Deliver location-specific technologies tailored to agroecological characteristics and production systems, aiming at both productivity and sustainability - Provide policies and technologies for integrated farming systems - Improve access to market and develop modern market chains - Increase spending and efficient investment in rural infrastructure, research, and communications - Strengthen governance for the implementation of agricultural policies - Provide an enabling policy environment that includes intellectual property protection, reduced trade	**Subtheme 1.1** - Conducting global assessments and scenarios to analyze highly disaggregated subnational productivity and natural resource impacts of drivers of global change, including R&D interventions **Subtheme 1.2** - Improving market access by supporting analysis for trade negotiations (regional, global) and trade reform in terms of economic (macro and micro) effects - Identifying multiple pathways for the rural poor to move out of poverty traps and policy options needed to promote sustainable rural employment - Improving macro, trade, and agricultural sectoral policies in both agriculture and nonagriculture for broad-based rural growth - Prioritizing and sequencing public investment and improving its efficiency - Crafting policies to mitigate excessive volatility and its impacts through the role of trade and trade policies in managing price fluctuations in agricultural markets **Subtheme 1.3** - Crafting policies that facilitate access to improved crop cultivars and animal breeds - Improving legal, regulatory, and policy frameworks on improved cultivars and breeds, including seed systems, NUSs, and international collaboration - Improving policy research capacity and cross-country knowledge sharing - Crafting policies that sustainably increase productivity along the land-water-energy-food nexus - Evaluating policies on improving access to resource-efficient and multifunctional technologies, focusing on appropriate technologies - Crafting policies that enable adoption of more sustainable agricultural practices - Strengthening analytical capacity on systems-based and impact analysis - Evaluating impacts of alternative extension approaches on women and men **Subtheme 1.4** - Identifying design features of social protection interventions that are most suited to deliver synergies between social protection and agriculture	Most African countries and lagging regions of Asia, Latin America, and the Middle East (examples: Tanzania, Ethiopia, Nigeria, Kenya, Ghana, Malawi, Uganda, Nepal, Cambodia, Paraguay)

| | enhancing productivity growth

- Macro and trade policies biased against agriculture

- Weak governance and civil society | barriers, and a transparent biosafety procedure

- Reform export taxation of agriculture and remove barriers to regional trade | - Evaluating the joint impacts of social protection and smallholder interventions
- Making innovative institutional arrangements for the provision of weather and health insurance

Subtheme 2.1
- Building capacity for policy analysis to support evidence-based policy-making
- Political economy of institutional reforms to empower smallholders and women, especially devolution policies
- Including women and poor in community and local government political processes
- Determining factors that facilitate or limit the uptake of policy research findings

Subtheme 2.2
- Innovating institutional arrangements to provide rural services and infrastructure, especially in situations where government capacity is low
- Crafting governance reform strategies to address governance challenges of public and other organizations in the agricultural sector
- Focusing on most binding constraints in rural services (which may differ across agriculture-based economies)

Subtheme 2.3
- Crafting land tenure reforms and other strategies to strengthen property rights of smallholders, pastoralists, fishers, indigenous peoples, women, and the poor
- Crafting strategies for improving collective action and tenure security for effective management of common-pool resources and environmental services
- Ensuring that benefits of land-based investments are shared with local residents and land users
- Identifying effective collective action strategies for small-scale producers and rural poor to gain access to market opportunities

Subtheme 2.4
- Understanding the roles of assets of women and men in pathways from poverty
- Identifying improved institutional arrangements for asset accumulation by poor women and men
- Utilizing risk management in protecting assets
- Evaluating agricultural and other programs and policies to strengthen assets of the poor

Subtheme 3.1
- Identifying opportunities for smallholders to benefit from rising demand for high-value commodities and gain access to the available retail structures, including modern | |

			retail chains	
			- Upgrading value chains by removing constraints to participation and enhancing benefits from participation	
			- Improving institutional designs for collective action among smallholders and through contract farming	
			Subtheme 3.2	
			- Crafting policies for creating an environment for willing buyers and enabling sustainable linkages between capable farmers and willing buyers	
			- Utilizing best practices to upgrade value chains and increasing the adoption of best practices through the knowledge clearinghouse	

b) **Transforming**

Main characteristics	Development challenges	Approach/strategy	CRP2 research areas	Regions
- Agriculture contributes less to growth (share of agriculture in GDP: 15%) - However, agriculture employs 57% of labor force - Public spending on agriculture as a share of agricultural GDP: 11% - Poverty remains over-whelmingly rural—more than 80% of the poor live in rural areas	- Rural-urban income disparities - Low productivity and competitive-ness of traditional staple crop systems - Small farmers poorly incorporated in value chains - Slow absorption of the agricultural labor force in the urban economy - Lack of growth in lagging regions - Natural resources under growing pressure from agriculture and the competition	**Reduce rural-urban income gaps and rural poverty** - Develop a competitive and labor-intensive smallholder sector - Promote high-value activities to diversify smallholder farming - Provide infrastructure to support the diversification of agriculture and of the rural economies - Improve integration between producers and markets and develop contract farming (farmer organizations for marketing, supply chain for high-value exports produced by smallholders...) - Invest in sustainability of intensive farming systems - Promote a dynamic rural nonfarm sector linked to both agriculture and the urban sector - Invest in human capital and labor market policies	**Subtheme 1.1** - Undertaking global assessments and scenarios to analyze highly disaggregated subnational productivity and natural resource impacts of drivers of global change, including R&D interventions **Subtheme 1.2** - Improving sectoral policies for broad-based rural growth - Identifying more effective international trade policies (regional and global) and institutional setting needed to support inclusion of poor countries in trade negotiations - Examining the impacts and interactions of national macroeconomic policies with agricultural, climate change, and biofuel policies - Assessing the macro and micro effects of FDI, including foreign investment in land, on the agricultural sector, particularly on the smallholder agriculture and rural households - Identifying excessive price volatility in global food markets and the most vulnerable groups that will be negatively affected by price volatility, and promoting policies to mitigate such shocks and impacts **Subtheme 1.3** - Crafting policies that facilitate access to improved crop cultivars and animal breeds - Improving legal, regulatory, and policy frameworks on improved cultivars and breeds, with a focus on market-led growth - Crafting policies that sustainably increase productivity along the land-water-energy-food nexus - Evaluating polices on improving access to resource-efficient and multifunctional technologies, focusing on advanced farm management systems - Assessing potential impacts of advanced science applications on food security - Evaluating impacts of alternative extension approaches on women and men - Crafting policies that diversify rural incomes sustainably - Analyzing the role of public and private sectors in rural income diversification - Evaluating the impact of sustainability standards on efficiency and equity **Subtheme 1.4** - Identifying design features of social protection interventions that are most suited to	Asia, North Africa, Middle East, some countries in Latin America (mostly in the middle income level) (examples: China, India, Pakistan, Indonesia, Thailand, Guatemala Tunisia, Egypt)

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for land and water from rapidly growing urban populations and non-agricultural sectors	- Ensure income transfers and social protection for the remaining rural poor - Increase spending and efficient investment in rural infrastructure, research, and communications, especially in the poorer areas - Provide secure property rights and efficient land markets - Correct incentive-distorting policies that encourage unsustainable use of the resource base - Strengthen governance for the implementation of agricultural policies - Provide an enabling policy environment that includes intellectual property protection, reduced trade barriers, and a transparent biosafety procedure	deliver synergies between social protection and agriculture - Evaluating the joint impacts and distributional consequences of social protection and smallholder interventions - Making innovative institutional arrangements for the provision of weather and health insurance **Subtheme 2.1** - Crafting political economy of policy reforms that facilitate the agricultural transformation - Identifying the roles of new agricultural interest groups (e.g., agribusiness organizations, commodity-specific organizations) in agricultural policy processes - Identifying factors that facilitate or limit the uptake of policy research findings **Subtheme 2.2** - Making reforms of rural services to allow for increasing private sector participation - Strengthening governance of public sector services that are required for high-value and export crops (e.g., food safety regulation) - Improving the investment climate for private sector service providers **Subtheme 2.3** - Identifying ways to strengthen property rights of women and small-scale producers so that they benefit from rising land values - Crafting strategies for improving collective action and tenure security for effective provision of environmental services - Identifying effective collective action strategies for rural poor to gain access to market opportunities **Subtheme 2.4** - Mapping asset portfolios of women and men and role in empowerment, poverty reduction - Crafting policy reforms and institutional arrangements to allow asset accumulation for women and men - Utilizing risk management and insurance in protecting assets **Subtheme 3.1** - Identifying strategies to target vulnerable groups to increase their access to inputs and dynamic markets (small-scale, vulnerable, or female-headed farm households) - Promoting rural innovation and provision of information to communities on inputs, technologies, and resource management systems through the public, private, and civil society sectors	

			- Prioritizing post-harvest and hard infrastructure needed to improve competitiveness of producers and to address standards required by dynamic markets - Improving institutional design on horizontal coordination (rural producer associations) and vertical coordination (contract farming) **Subtheme 3.2** - Improving small farmers' access to financial markets and insurance mechanisms - Identifying policies for creating environments for willing buyers and enabling sustainable linkages between capable farmers and willing buyers - Increasing the adoption of best practices through the knowledge clearinghouse and collaborative partnerships	

c) **Urbanized**

Main characteristics	Development challenges	Approach/strategy	CRP2 research areas	Regions
- Agriculture contributes little to growth (share of agriculture in GDP: 10%) - Agriculture employs 18% of labor force - Public spending on agriculture as a share of agricultural GDP: 12% - 75% of population in urban areas - Rural poverty still high— 45% of poor are in rural areas	- Remaining rural poverty and inequality - Weak governance	**Link smallholders to the new food markets and provide good jobs** - Use advanced technologies to increase agricultural productivity growth - Improve integration between producers and new markets, develop contract farming (farmer organizations for marketing, supply chain for high value exports produced by smallholders…) - Promote high-value agribusiness - Increase the access of smallholders to assets - Develop rural non-farm employment - Put in place sound macroeconomic (fiscal, monetary, exchange rate…) policies - Ensure income transfers and social protection for the remaining rural poor	**Subtheme 1.1** - Conducting global assessments and scenarios to analyze highly disaggregated subnational productivity and natural resource impacts of drivers of global change, including R&D interventions **Subtheme 1.2** - Improving sectoral policies for broad-based rural growth - Developing trade and trade policy to benefit developing countries by encouraging greater specialization or diversification - Making policies and investments required to promote equitable economic development - Investigating the endogenous policy and political processes and identifying policies that can be implemented to benefit the poor - Identifying and mitigating the effects on the poor of excessive price volatility in global food markets - Investigating the mechanism through which international migration and remittances affect poor household income, rural development and agriculture **Subtheme 1.3** - Crafting policies to sustainably increase agricultural productivity along the land-water-energy-food nexus - Assessing technology and policy solutions to reducing adverse impacts of sustainable renewable energy on food security - Assessing potential impacts of advanced science applications on food security - Crafting policies that diversify rural incomes sustainably - Evaluating impacts of sustainability standards on efficiency and equity **Subtheme 1.4** - Assessing the distributional consequences of social protection and smallholder interventions **Subtheme 2.1** - Addressing the challenges of agricultural policy processes in urbanized economies (e.g., special interest capture, demand for subsidies) - Crafting policy reforms that promote high-value agribusiness	Most of Latin America (examples: Chile, Brazil, Argentina, Ecuador, Mexico, Peru)

				- Determining policy processes involved in establishing social protection policies in rural areas	
				Subtheme 2.2	
				- Crafting governance reforms that promote transformation of agricultural and rural service providers (e.g., reduction of the state involvement to essential functions in support of devolving functions to farmers' organizations and the private sector) - Promoting of social protection services and services that facilitate exit from agriculture	
				Subtheme 2.3	
				- Improving collective action and empowerment of women, small-scale producers	
				Subtheme 2.4	
				- Identify how migration, rural-urban linkages, and structural transformation affect poor women's and men's abilities to acquire and protect different forms of assets - Strengthening the assets of the poor, especially human capital - Utilizing risk management and insurance in protecting assets	
				Subtheme 3.1	
				- Making innovations in contract farming and linking farmer associations to dynamic export markets - Prioritizing post-harvest and hard infrastructure needed to improve competitiveness of producers and as to address standards required by dynamic markets - Crafting policy incentives to facilitate the participation of the private sector in delivery systems of inputs - Improving small farmers' access to financial markets and insurance mechanisms	
				Subtheme 3.2	
				- Crafting policies for creating an environments for willing buyers and the enabling sustainable linkages between capable farmers and willing buyers, and for upgrading value chains to promote south-south cooperation and learning - Increasing the adoption of best practices through the knowledge clearinghouse and collaborative partnerships	

Sources:
Typological criteria for improved selection of IFPRI Country Strategy Support Programs (CSSPs). IFPRI
World Bank World Development Report (WDR 2008)
Pingali 2010 (chapter 74)
Yu and Fan 2010
Zhang, Rockmore, and Chamberlin 2007
Zhang et al. 2008

Short-term priorities will be based on commitments in the existing research pipeline. As anticipated in the CGIAR Strategy and Results Framework (CGIAR 2011), a core of research consists of contracted and funded research already underway across partner CGIAR centers. The need to complete and finalize these existing projects, which represent about two-thirds of CRP2's first-year budget, makes them a priority. Our prioritization of research activities in Section 4 also takes into account uncertainties in initial funding levels. We would accommodate funding restrictions by changing the phasing and scaling of new subthemes and activities, rather than by eliminating a subtheme. We would also scale down the level of ambition across the themes (for example, we would work in fewer countries and decrease the number of cases and study sites), whereas greater investment would allow a finer scale of research.

In the longer term, the strategic priorities of each theme and subtheme will increasingly be aligned with the outcomes of a systematic priority-setting process aimed at refining the typology presented in Table 3.1 to point out the most efficient ways of delivering on the SLOs. In terms of regional prioritization, a global priority at the CRP level will be given to Africa and South Asia; more refined regional priorities, by subtheme and activity, will be laid out within the frame of this priority-setting process.

Our philosophy is that strategic research projects should be defined not only from the top down, but also from the bottom up. Therefore, **the first component of the CRP2 priority-setting process is based on a participatory approach.**

The research activities described in Section 4 were developed during a preliminary phase of this participatory process, based on an extensive expert e-consultation that involved more than 200 participants (June 28–July 14, 2010); on a face-to-face consultation with more than 50 participants (August 17–19, 2010, in Addis Ababa, Ethiopia); and on continuing interactions with writing teams throughout the proposal development process. These intense discussions have led to the identification of a number of priorities, including the science-technology-practice link; gender; multistakeholder partnerships; regional specificities; enabling institutions; farmer costs; and many other factors, all of which are reflected in the prioritization of proposed new activities.

The second phase of the participatory approach will start in November 2011. This more elaborate process will include consultation with the following stakeholders:

- **End users or beneficiaries**: These key groups include farmers, farmers' organizations, extension services, nongovernmental organizations (NGOs), and national, regional, and multilateral organizations.

- **Researchers**: Inputs from those who carry out the research are essential, including partners within the CGIAR, NARs, and universities.

- **Senior policymakers and decisionmakers**: These groups have responsibility for final decisions.

- **Disciplinary experts:** These experts identify relevant research parameters and provide data.

- **Donors**: In addition to funding, donors bring insight and expertise to the table and are important stakeholders in using research findings and scaling up their application.

Two main sets of criteria will be used to establish policy research priorities for CRP2:

1. the potential benefits of the research in terms of contributing to the SLOs (for instance, the potential for research results to engender socioeconomic equity; to answer scientific problems related to income enhancement, poverty reduction, and environmental sustainability; and to strengthen institutions, etc.); and

2. the likely costs/barriers related to research development (such as investments required, lag time of adoption, risk that research is not successful, etc.).

The participatory priority-setting process will use a multicriteria scoring method: participants will assign a weight coefficient to the different criteria belonging to the two categories described above, and assign a score to each of these criteria for each of the research alternatives. The scores for the different criteria will then be aggregated and rigorously discussed by participant groups in order to obtain an overall assessment of each research alternative. Regional prioritization exercises will be conducted using the same method.

At this point, five regional priority-setting workshops are envisaged, one for each of the following regions: (1) South Asia; (2) Southeast Asia, East Asia, and the Pacific; (3) Central and West Asia and North Africa; (4) Sub-Saharan Africa; and (5) Latin America and the Caribbean. These will be followed by a global priority-setting workshop. The aim of the regional workshops will be to assess priorities among themes and subthemes within one region. The aim of the global workshop will be to assess priorities among the different regions and to finalize the priority-setting exercise at the subtheme level. Expert working groups will then be held for each theme, to pursue prioritization at the activity level. Guidelines will be developed for translating priorities into funding allocation. In some cases, priorities may translate into phasing of research components over time. The phasing of the research also includes an opportunistic component and therefore will not be determined entirely in the initial priority-setting process.

If possible, the priority-setting sessions will be held in tandem with existing events in order to reduce the costs. The first regional workshop is currently being planned (Alexandria, Egypt, November 28–29, 2011, within the frame of the Conference on Setting Priorities for Food Security and Poverty Reduction in the Arab World). The other regional priority-setting exercises will be planned in due course and will take place in the first months of 2012.

The second component of CRP2 priority-setting will consist of modeling approaches. Ex ante and ex post quantitative analysis will provide estimates of economic, poverty, and environmental benefits per dollar of investment in the different research areas, and these estimates will serve as inputs into the priority-setting process. The ex ante assessment tools that will be used for this exercise are reviewed in detail in the description of Subtheme 1.1. To assess progress against goals, ex post impact assessment will be employed when CRP2 research becomes more mature.

Once CRP2 is formally established, the combined participatory and modeling approaches will

- guide initial collective priority-setting,
- guide periodic revision of CRP2's overall strategy and approach, including rolling three-year annual planning processes, and
- closely link to the program monitoring and evaluation approaches described later in this section, as a basis for dynamic adaptation to the changing environments of CRP2.

Impact Pathways

Producing high-quality research is not enough; to achieve the strategic objectives of the CGIAR, CPR2 must also ensure that those outputs are used by a range of key stakeholders, whose actions will, in turn, have an impact on improving the lives of millions of poor people. Ensuring impact of policy and institutional research is particularly challenging. Strong and sustained engagement at the country level (e.g., through Country Strategy Support Programs) has been shown to increase uptake of the findings. However, creating international public goods also calls for sharing information internationally, and creating multiplier effects of the research requires strengthening the capacity of a range of partners to undertake similar research, adapted to their particular conditions. Thus, CRP2 has developed a strategy that involves multiple impact pathways.

Although each research theme will have specific types of impact (as discussed in detail below), the impact of CRP2 on the SLOs can be broken down into three main impact pathways (see Figure 3.1):

1. **Informing and enriching research and bolstering the capacity of research communities**
2. **Influencing policy development and implementation by major development agencies**
3. **Providing policy recommendations for policymakers and decisionmakers at the global, national, and local levels**

Figure 3.1—CRP2 impact pathways
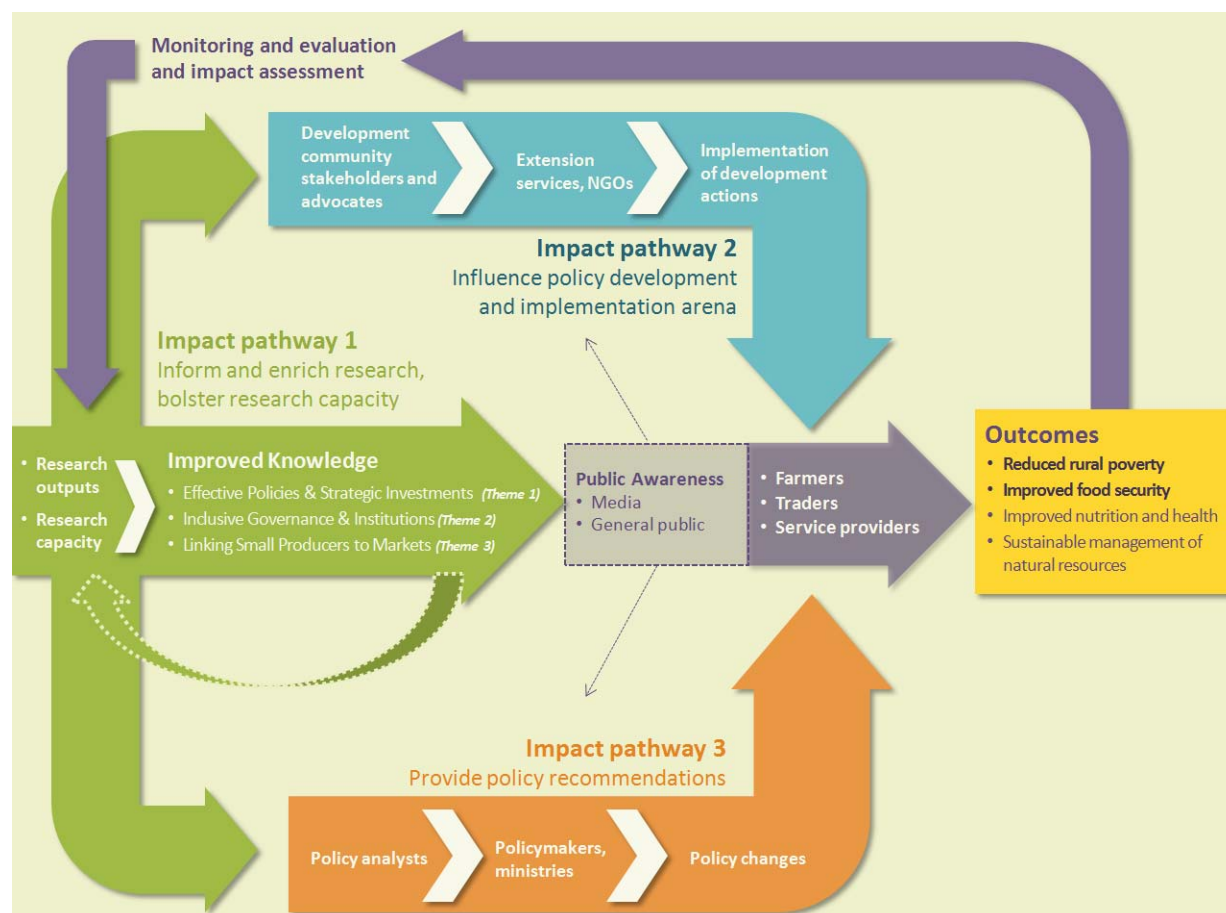
One foundational segment is common to all three of these impact pathways: the contribution of research (under all three research themes) to improved knowledge and analysis of development processes. While the content of the research outputs will vary among the themes, the different forms of outputs that will ensure research dissemination and influence on the 21st century agricultural research and development agenda are common across themes:

- Traditional research outputs, such as research papers and articles in high-impact publications
- Open-access publications and datasets, to ensure widespread distribution in developing countries
- Research methods, strategic foresight models, and other tools for further research
- Policy information communicated through policy briefs, seminars, and strategic workshops, reaching experts, media, and the general public
- Capacity building through direct engagement and other materials

Impact pathway 1 depicts the feedback of social science information into the CGIAR's own technical research and, more importantly, into non-CGIAR research, especially by national agricultural research systems (NARSs) and as coordinated by the Global Forum on Agricultural Research (GFAR). Improved knowledge about what works in agricultural development will inform individuals and units involved in policy research (such as the CGIAR, other agricultural research organizations, regional economic bodies, ministries of agriculture, and academic research institutions in both developed and developing countries), enabling them to

- acquire a deeper understanding of the complex problems linked with agricultural development processes;
- identify constraints and targets for research; and
- plan research work and set research priorities.

This feedback loop will continuously enrich research and bolster the Consortium's capacity to produce ambitious, cutting-edge research leading to long-term improvements for the poor. It will also enhance the efficiency, effectiveness, and overall impact of agricultural research outside the CGIAR system. For example, strategic foresight models or improved gender analysis will provide guidance for priority-setting in agricultural research to meet the needs of women and men in responding to changing conditions.[1]

Impact pathway 2 reflects the potential for CGIAR-generated research to influence the international development and implementation community, including donors and implementers, such as governments and civil-society organizations and global and international agencies, among which the Food and Agriculture Organization of the United Nations (FAO), the Global Forum on Agricultural Research (GFAR) and regional agricultural forums, the International Fund for Agricultural Development (IFAD), the World Bank, the World Health Organization (WHO), the World Food Programme (WFP), and the World Trade Organization (WTO). This pathway builds on CRP2's direct involvement in the implementation or evaluation of programs led by international, national, nongovernmental, and producer and women's organizations, as well as CRP2's outreach to such organizations with research findings. Donor policies and civil society initiatives are formed using a combination of different elements, including sound research and a sense of "how development works"—both of which the CGIAR is equipped to take a lead in providing. Donors, implementers, and producer organizations are thus a highly important audience for CRP2 research.

Impact pathway 3 represents the way in which social science research can influence government policy. CGIAR research has already had significant impacts on policies, which in turn have resulted in higher agricultural growth, more food production, and reduced poverty in many countries (see Box 3.1). The body of research-based evidence and analysis generated by CRP2 will provide further concrete evidence of policy options that policymakers can use to craft reform policies aimed at achieving the desired outcomes. The targets of this pathway are not only policymakers, but also the policy analysts and specialists who support decisionmakers. We will go beyond the traditional agricultural sector to work with ministries of finance, trade, women's affairs, environment, and others, as needed.

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[1] For detailed examples for each pathway, see the discussion of impacts under each subtheme, in Section 4.

Box 3.1—The impact of CGIAR policy research

CGIAR research has significantly affected policies in a number of countries, including Bangladesh, China, Ethiopia, India, and Vietnam.

IFPRI's study of the rice sector in Vietnam provided original insights on aspects such as trade flows, marketing channels and margins, costs of production of paddy, price differentials within and outside the country, and transport costs. This research showed that relaxing rice export quotas and internal trade restrictions on rice would not adversely affect regional disparities and food security and would have benefits for farm prices and poverty. These findings "changed the level of dialogue in Vietnam" (Ryan 1999, 19) and led to the relaxation of the country's rice export quotas and internal trade restrictions. The most conservative estimate of IFPRI's contribution to Vietnam is a present value of $45 million, yielding a benefit-cost ratio of 56. For the more optimistic scenario, the present value increases to $91 million and the benefit-cost ratio to 114-to-1 when calculated to 2000. The present value of the two policy changes without attribution is estimated at $222 million up to 2000, rising to almost $1 billion if policies remain in place until 2020 (Ryan 1999).

IFPRI's evaluation of the Food for Education Program (FFE) in Bangladesh led policymakers to begin the program one year earlier than they might have without the IFPRI input. This program, which reached 2.1 million students in 17,811 schools, created total benefits estimated at $248 million. Capacity building and policy research guided the conception, evaluation, and targeting of the initiative starting in the early 1990s. Based upon the total cost of the IFPRI-FFE research program of US$151,000, the internal rate of return on this research investment ranges from 64 to 96 percent if all the other benefits are added to this (Ryan 2004).

Other examples of the impacts of policy research and advocacy by CGIAR centers include research and advocacy aimed at decriminalizing the marketing of milk by small-scale vendors in Kenya. The results of this effort created benefits for producers and consumers worth an estimated $44–$283 million. Another example is research on improved policies on pesticides in the Philippines. This work started in the late 1980s and involved the regulation of highly toxic products used on rice and the training of rural health officers; it has resulted so far in benefits valued at $117 million (Renkow and Byerlee 2011).

As it pursues impact pathway 3, CRP2 will focus on the CGIAR's fundamental role—conducting and disseminating research and supplying policy information to policymakers. In some cases, working closely with policymakers can help improve our understanding of the policy process and implementation constraints, which can be synthesized to generate international public goods. In general, however, we believe that the CRP should rely on a network of partners to help implement the more action- and policy-oriented tasks and translate CGIAR research into on-the-ground action. For example, close ties to the Comprehensive Africa Agriculture Development Programme (CAADP) process can help disseminate research findings to policymakers in numerous African countries. Advocacy can be considered "extension for policymakers," and many other organizations have extensive expertise in this activity. CRP2 will thus pass advocacy activities on to partners better qualified for it. Identifying partners qualified to implement CRP2 research on the ground will be an essential component of CRP2's initial research design.

These three pathways may have different time lags in achieving impact, with impact pathways 1 and 2 taking longer than impact pathway 3. However, for researchers to be able to respond to short-term requests, they must draw on longer-term research results, as the example of responses to the food price crisis has shown (see Box 3.2). Therefore, as described in Section 4, CRP2 resources and programs will focus on achieving both shorter-term goals/quick impact and longer-terms goals along these pathways.

Box 3.2—Responding to the global food price crisis: Research and media outreach

When global food prices began to rise in 2007, the International Food Policy Research Institute (IFPRI) was one of the first institutions to warn of an impending global food price crisis. With an extensive research portfolio and expertise ranging from markets and trade to nutrition and food consumption, IFPRI was well placed and well prepared to answer questions from the public, media, and policymakers with regard to "What happened?" and "Why did it happen?" The Institute provided evidence-based information through a coordinated communication campaign to inform policy debates through publications, media interviews, face-to-face meetings with policymakers, testimony before legislators, press releases, and the communication of research findings through the internet. During 2007–08, more than 700 media citations, ranging from major international media to influential outlets in the countries most affected helped raise public awareness and engage policymakers.

In May 2008, well before many others, IFPRI published an action plan proposing an emergency package of policy actions that could yield immediate impacts as well as medium and long-term activities. These recommendations were used as the basis for discussions at several high-level meetings and summits. Seven out of the eight urgent actions advocated by IFPRI appear in the UN's Comprehensive Framework for Action as policy recommendations and are being implemented through the High-Level Task Force on the global food security crisis.

Source: IFPRI 2009a.

Partnerships are a critical component of each of the three impact pathways. Impact pathway 1 emphasizes researchers and scientists—in the CGIAR, NARSs, and developed countries—not only as producers of research results, but also as users of research. Collaboration with other CRPs (as indicated in Annex 2) will facilitate the application of CPR2 outputs within the CGIAR, while working with GFAR and regional agricultural forums will facilitate broader outcomes among NARSs and other research institutes. Impact pathway 2 involves various development stakeholders (such as development organizations, producers' and women's organizations, advocacy groups). Working with organizations involved in developing or implementing policies and programs will ensure that the research addresses their needs and that the findings are likely to be taken up. For example, lessons from research to assess the impact of agricultural development projects are likely to be applied by the local implementing agency, other offices of that agency, and the organization that funds that type of program. Impact pathway 3 is intended to reach policymakers and policy analysts. Research in response to government requests has a high likelihood of being taken up through this pathway. Training and other capacity-strengthening activities will enable policy analysts to carry out such research themselves, broaden outcomes to other groups, and enable such analysis to continue beyond CRP2's direct research. IFPRI's Country Strategy Support Programs provide an example of such partnerships. And circulation of highly visible publications in journals, policy briefs, and websites will promote the international public goods nature of this impact, by spreading it beyond the partners we work with directly.

Thus, partnerships will

- strengthen CRP2's ability to undertake sound applied research in a range of countries;
- widen CRP2's range of influence and expand its overall impact; and
- allow CRP2 research teams to concentrate on their comparative advantage—that is, the production of policy-oriented research.

For the impact pathways to be effective, CRP2 research must be designed in a way that makes it useful to end users. We will integrate extensive feedback into the initial research design from key stakeholders, including representatives of community groups, local government officials, and a range of CGIAR partners, from donors to development organizations. Another crucial condition for maximizing the uptake of research and capacity outputs is packaging the outputs to suit the specific needs of different user groups. To ensure policy relevance, CRP2 will work closely with other CRPs to ensure that the new

technologies for accelerating agricultural growth that these CRPs are developing will reach small producers and the rural poor through the formulation of appropriate policies, effective and equitable governance structures, and efficient markets. Monitoring, evaluation, and impact assessment, in turn, will provide feedback to help reshape research agendas and processes.

Other more diffuse impact pathways involve flows of research and capacity products through other users, such as the media and the general public. These pathways affect the general discourse on certain key issues and create greater public awareness and demand for appropriate policies, feeding into both impact pathways 2 and 3 (see Figure 3.1). Examples include the media outreach in response to the food price crisis, innovative approaches such as the IFPRI/International Livestock Research Institute TEDx presentations on gender and development, and partnership with Oxfam to provide information for their information campaigns.

Measuring progress along these impact pathways is challenging, especially for policy-oriented research. Even a standard linear model, the results chain from inputs, to activities, to outputs, to outcomes (use of the outputs), to impact (effects on poverty reduction, environment, ultimate goals) involves decreasing levels of involvement or control on the part of the researchers and greater uncertainty, resulting in an "attribution gap" (Earl, Carden, and Smutylo 2001; Kuby 2003). Until now, few researchers have tackled the complex methodological issues that are inevitably encountered in assessing the concrete benefits of policy research (Ryan and Garrett 2003). There are several other challenges with measuring impact along the pathways identified for CRP2. The complex nature of the relationships means that it is possible neither to identify simple cause and effect nor to predict where impacts will be seen. The objective of generating public goods means that findings from one country or sector may be taken up in a different country or sector.

The CGIAR's increasing emphasis on partnerships increases the likelihood of impact, but also makes attribution of impact much more problematic. Unlike crop varietal improvement, research on policies and institutions does not necessarily develop identifiable "germplasm." In a research program in which researchers work with policymakers, ideas are co-produced; if changes in policy or programs are attributed to the "adoption" of research ideas, the local ownership of the changes can be reduced. Moreover, given the relatively rapid timeframe for decisionmaking compared with the time required for scientific publications, policies and programs may change based on research findings before those findings are published. The researchers have no control over what their other partners may do; political, institutional, or other considerations may restrict the adoption of particular recommendations. Agricultural policies are particularly challenging to measure because of the diversity of their types and objectives, and any analysis must be disaggregated by major policy type (Norton and Alwang 1998). Even then, the direct relationship between policy research and policy is difficult to capture due to "human" factors such as politics. Even more difficult is predicting the adoption of policy recommendations. The effects of policy are complex, blurring the clear link between results, action, and outcomes (Ryan and Garrett 2003). Research under CRP2 (Subtheme 2.1) will address methodologies for assessing the impact of policy research.

Thus, while the outcomes of research, such as publications or training materials, are quantifiable and relatively easy to verify, tracing impacts is much more difficult and requires a mix of qualitative and quantitative methods, with more reliance on ex post analysis that traces the pathways through which research influenced policies or other changes, which in turn had an impact on the lives of the ultimate beneficiaries (Kuby 2003; CGIAR Science Council 2008).

Therefore, CRP2 will use a mix of methods for monitoring, evaluating, and assessing impact. In the following sections, we will first discuss monitoring, which focuses on outputs, then go on to discuss what will be done to transform outputs to outcomes, and finally to methods for impact assessment.

Monitoring and Evaluation (M&E)

With support from the Program Management Unit, the CRP2 director and the Management Committee will have the primary responsibility for designing the M&E framework and for monitoring progress. This M&E framework will also serve as a crucial tool for the independent Science and Policy Advisory Panel. More generally, the M&E framework will be used by all CRP stakeholders to

- report on program activities and outputs;
- track progress; and
- take corrective actions when needed.

We will develop a monitoring plan under each subtheme, encompassing all of that subtheme's activities. The monitoring will be based on indicators and metrics for all outputs and outcomes. Progress in delivery of the outputs of each research theme and subtheme will be reviewed and reported annually. All researchers will use a standardized, web-based, real-time tracking system, so that all outputs can be captured and accounted for on a continuing basis, using information such as that presented in Table 3.2. In addition to these generic outputs, **specific outputs have been identified at the subtheme level: see performance indicators matrix in Annex 1.**

Table 3.2—Sample output indicators for all themes

Outputs	Indicators
Peer-reviewed publications	- Journal articles - Books - Book chapters and published conference proceedings - Research reports and discussion papers - Policy briefs
Non peer-reviewed publications	- Non peer-reviewed journal articles - Discussion papers and project papers - Unpublished reports and photocopies (include unpublished in-country papers and other unpublished project papers written for host-country audiences)
Other research products	- Methodologies - Databases - Films - Websites, information clearinghouses - Presentations of findings at scientific, policy, and public forums, and international, global and national conferences
Capacity strengthening	- PhD, MSc, undergraduate students conducting research with CRP2 (classified by OECD or developing country, and by gender) - Training short courses, and trainees (classified by type of institution, OECD or developing country, and by gender) - Textbooks and training manuals - Partnerships with other training/capacity building institutions for use of CRP2 research - Participation in/organizing networks and conferences

Within each subtheme and in consultation with the leaders of each research theme, we will identify key performance indicators and metrics to be used to review the quality and quantity of outputs and outcomes. For example, all journal articles will be quantified, but the number of journal articles published in high-impact journals and influential open-access outlets—as identified by research theme leaders for reaching target audiences—will be prioritized over articles published in less influential outlets. Conferences, trainings, and other research outcomes will be similarly weighted.

Ensuring Uptake: Translating Outputs into Outcomes

High-quality research outputs alone are not enough to achieve impact; they must also be taken up and used. While the use may be beyond the control of the researchers, much can be done to increase the likelihood that outputs are translated into outcomes by building bridges to users. At the most basic level, this may mean ensuring that findings are published in a form and an outlet that is accessible to the intended users. For example, if the intended users are other researchers, publications in a prestigious scientific journal may be effective, but if the intended users are government policymakers, policy briefs translated into appropriate languages are more important. Even the availability of the research findings is insufficient: the intended user needs to know about the research and trust the findings. Cash et al. (2002) identify three key factors linking research findings to decisionmaking: (1) salience (findings are relevant to the problems at hand); (2) credibility (findings are authoritative and believable); and (3) legitimacy (findings are perceived as fair). They also highlight the importance of boundary-spanning organizations that link research to users of the information.

Taking these factors into consideration increases the likelihood of research outcomes. CRP2 researchers will therefore consider publication outlets in terms of reaching their intended audience. In addition to ensuring the credibility of findings by applying best-practice methods and peer reviews, researchers will increase salience by working with prospective research clients (for example, governments and NGOs) to identify the most relevant questions and increase legitimacy by working with appropriate partners. Professional societies, policy networks, or project advisory committees can provide boundary-spanning functions. In addition, presentations about the project and research results in a variety of forums increase awareness of the findings and the likelihood that results will be applied. Each subtheme will develop its own outreach strategy to increase the uptake of research results, going beyond the basics of "what did you produce?" to "who did you reach?" Process indicators can be used to document whether these strategies are being effectively followed to increase the likelihood of project outcomes. Beyond this, CRP2 can use stakeholder feedback and knowledge, attitudes, and practices (KAP) surveys to provide indicators of outcomes and influence.

Another important set of indicators is the extent to which each of the user groups (such as donors, policymakers, other researchers, and women's or producers' organizations) is being served by, is using, and is satisfied with the program's research deliverables. This satisfaction will be assessed through the collection of distribution and product usage statistics and citations in peer-reviewed publications; the media; and government, NGO, and donor reports. Examples of quantitative indicators include downloads and citations of publications, downloads and uses of databases and films (including uses in student theses or training courses), and follow-up evaluations of training courses or materials. Many government and donor reports may not include direct citations, but content analysis can identify where key findings or concepts have been used in policies. Stakeholder feedback on the quality of outputs using annual web-based surveys will generate indicators of satisfaction and provide information on the end users of each type of product.

KAP surveys go a step further in documenting the influence of research on various stakeholders. For example, a newly initiated study of the impact of agricultural programs on the gender gap in assets is administering a KAP survey to donors and implementing organizations at the project's outset and after three years in order to document the extent to which staff members have improved their knowledge of gender relations in agriculture, their attitudes toward the importance of addressing gender issues, and the practices of their organization. This approach could be broadened to include a larger set of stakeholder organizations, as well as other issues related to CRP2. While the methodology for KAP studies is

relatively well established, using it to track the impact of CRP2 will present challenges, including turnover of individual staff in surveyed stakeholder organizations. Using this approach requires identifying the appropriate stakeholders and a minimum set of KAP questions for each.

IFPRI's Country Strategy Support Programs (CSSPs) (see Box 3.3, Box 3.4, and Box 3.5) are a promising vehicle for enhancing the impact of CRP2 at the country level, staying close to the issues, and facilitating the research and delivery of results in the developing world. CSSPs will also be key in understanding agricultural and rural development processes, collecting longitudinal data, testing and experimenting policy options, and building capacity for impact within countries. CSSPs can serve as a platform to integrate different research themes together to present policy options and strategies in a holistic approach.

Box 3.3—Country Strategy Support Programs

A Country Strategy Support Program (CSSP) is a country-based intensive and sustained program of research, policy communication, and capacity strengthening undertaken by IFPRI and its partners in an individual country. CSSPs work directly with national research institutions, decisionmakers within the government, and other stakeholders to (1) increase the availability of research in that country on a broad range of issues related to food policy and development strategies, (2) enhance national capacity to undertake such policy research, (3) provide a platform through which CGIAR research staff can remain better informed about the national policy process of food policy and development strategies, and (4) promote dissemination and outreach of research results and facilitate public dialogue on key issues at various levels of government, civil society, and the private sector.

The quality of the research is crucial for policy uptake. High-quality research addressing high-priority issues and effectively communicated to policymakers can play a catalytic role in the policy process. Researchers can use the credibility of their research to influence policy, and CSSPs allow researchers to play such a role. For example, CSSPs in Africa have been actively involved in supporting the CAADP process by conducting high-quality research, organizing and participating in strategy development consultations and other events, and participating in direct dialogue with policymakers. CSSP research programs are designed to meet demand from policymakers and other stakeholders in a timely way to contribute to policy debates in host countries. Examples of such research include analysis of fertilizer marketing and pricing (Nigeria, Ghana, and Malawi), agricultural growth options and prioritization of public investment (Ghana, Ethiopia, and Uganda), and options for enhancing rural and urban linkages (Ethiopia, Ghana, Malawi, Mozambique, Nigeria, and Uganda). Research results, such as from the Ghana fertilizer subsidy analysis, has provided useful input into policy dialogue and contributed to the improvement of the relevant policy. CSSP research also provides international public goods in the form of broad lessons on agricultural and rural issues for other developing countries.

The CSSP approach to strengthening the analytical capacity of selected national institutions uses collaborative research, based on state-of-the-art analytical tools and techniques. Almost all CSSP research projects are designed and undertaken by IFPRI researchers jointly with their in-country partners. For example, the Ethiopia Strategy Support Program (ESSP) has developed sustainable partnerships with the Ethiopian Development Research Institute (EDRI), the Central Statistics Agency (CSA), and the Ministry of Agriculture and Rural Development (MoARD) and has conducted various research and survey projects jointly with these partners. CSSPs also provide training programs to their partner institutions. More than 200 women and 500 men in Africa have been taking short courses organized by CSSPs about the application of different policy analytic tools. The technical assistance ESSP provided to Ethiopian CSA analysts in GIS techniques, database management, and data analysis helped CSA produce the Population and Housing Census Atlas of Ethiopia 2007, published in 2010.

The institutional platform developed by CSSPs creates an environment where research teams within the CGIAR can jointly undertake country-specific work on strategies to alleviate hunger and poverty. In so doing, the CSSPs facilitate the generation of international public goods and contribute to achieving better impact on policy and national capacity in the countries. CSSPs are also useful for regional networking and can play an important role in bringing a variety of stakeholders—including the numerous bodies of the CGIAR—together to inform the policy process.

Box 3.4—Ghana Strategy Support Program

The Ghana Strategy Support Program (GSSP) is a research, communication, and capacity-strengthening program that builds the capabilities of researchers, administrators, policymakers, and members of civil society in Ghana to develop and implement agricultural and rural development strategies. With core funding from the USAID and a mandate to develop a multi-donor-funded program, IFPRI launched GSSP as a partnership between Ghana and its development partners.

Unlocking the potential of Ghanaian agriculture and achieving the country's growth and poverty reduction goals requires strong and strategic partnerships committed to the achievement of the following GSSP objectives:

- To develop and implement a research and capacity-building agenda that addresses knowledge and capacity gaps;
- To improve the information and knowledge base required to develop and implement strategies through better data standards, integration of information across sectors, and improved management of knowledge;
- To strengthen the analytical capacity of Ghanaian researchers and institutions by adopting innovative collaborative arrangements that take advantage of complementarities;
- To stimulate and invigorate policy discussions by popularizing innovative policy analysis tools; and
- To strengthen policymaking processes, stimulate policy dialogue, and communicate research outcomes to relevant stakeholders.

To meet these objectives, GSSP collaborates closely with policymakers, researchers, and other partners at the national and subnational levels who identify program priorities and guide their implementation. GSSP builds on existing work and capacities in Ghana by forming broad partnerships and networks with institutions and individuals in research, the private sector, civil society, and government. Examples include the Office of the President, the Department of Agricultural Economics at the University of Ghana in Legon, the Council for Scientific and Industrial Research (CSIR), and the Private Enterprise Foundation (PEF).

Government and donor stakeholders have emphasized the unique and unprecedented value-added dimension that GSSP has brought to Ghana. The program has been able to create a niche in research and has been recognized as providing knowledge-based services that donors, the Government of Ghana, and other stakeholders can identify with. The program has helped provide an avenue for improving analytical capacity among numerous stakeholders, namely the Ministry of Food and Agriculture, the Ministry of Finance and Economic Planning, Ghana Statistical Services, the National Development Planning Commission, the Institute of Statistical Social and Economic Research (ISSER), the University of Ghana, and the University of Cape Coast.

Box 3.5—Ethiopia Strategy Support Program

Based in Addis Ababa, the Ethiopia Strategy Support Program (ESSP) began its activities in late 2004, with the aim of forming broad partnerships and undertaking timely and actionable research to fill knowledge gaps, improve knowledge database management systems, and strengthen national capacity to undertake policy relevant economic analysis.

Phase I of ESSP conducted a varied program of economic research and provided extensive technical and analytical support toward the establishment of the Ethiopia Commodity Exchange (ECX). Phase II (ESSP-II), which began in July 2008, places a greater emphasis on strategic partnerships and capacity strengthening, while continuing a collaborative program of capacity building, research, policy analysis, and knowledge dissemination by IFPRI and the Ethiopian Development Research Institute (EDRI).

ESSP-II is country-driven and country-owned program that aims to promote sustainable development and poverty reduction in Ethiopia through policy-oriented research, institution strengthening, capacity building, and dialogue on economic and agricultural policy issues. The program's priorities are set and updated regularly by a high-level National Advisory Committee. Additionally, ESSP-II is supported by a consortium of four donors, with the understanding that national partners set the agenda. As a result, ESSP-II is structured in a way that enables close collaboration with an extensive and unlimited range of partners, including national academic institutions, private-sector and civil-society actors, technical experts in line ministries, and donor agencies.

To respond effectively to Ethiopia's growing development challenges, IFPRI, ESSP-II, and the latter's advisory committee identified four key activities. The first main activity includes collaborative research with EDRI, the Central Statistical Agency of Ethiopia, and the Ministry of Agriculture and Rural Development, with a focus on promoting poverty reduction and economic development in Ethiopia. The second activity focuses on the achievement of robust knowledge management to contribute to policy dialogue, strategic priority-setting, and evidence-based policy analysis. Capacity strengthening and increased knowledge dissemination within the academic and policy research community is the third activity. The final activity seeks to enhance communications and institutional linkages among policymakers, policy analysts, civil society, and other policy and research actors through joint seminars and other dissemination events.

ESSP-II achievements depend on collaboration, coordination, and communication with key partners and stakeholders, including policymakers, donors, researchers, and private-sector and civil society leaders. Therefore, the program has developed formal and important links with institutions such as the Central Statistical Agency, the Ministry of Agriculture, the Ministry of Finance and Economic Development, the Ethiopian Institute of Agricultural Research, the Ethiopian Economics Association, Ethiopian universities and research institutes, and numerous private trade associations.

For further details, please see: http://www.ifpri.org/book-757/ourwork/program/ethiopia-strategy-support-program.

Finally, studies of the policy process (Subtheme 2.1) will provide insights on political constraints and on how the values, motivation, and power of different actors shape the policymaking process. This research is analogous to the "constraints to adoption" research that can increase the likelihood that new crop varieties or other technologies will be adopted. Policy research findings are more likely to contribute to policy if they fit an environment's political limits, institutional pressures, and vested interests. Changing political environments often provide opportunities for better use of research by decisionmakers. Such insights can help to increase the application of CRP2 outputs and thereby make a difference in practice.

Impact Assessment

The aim of impact assessment is to evaluate the success of CRP2 in achieving its stated goals by measuring the effects of the project on intended beneficiaries, using tangible intermediate and final impact indicators. Moving from outcomes to impacts requires triangulation among quantitative and qualitative methods to identify how research has influenced policies or practice and how those changes have, in turn, affected the welfare of poor agricultural producers and rural laborers, the ultimate beneficiaries of CRP2. These methods include the following:

- **Impact narratives:** These narratives document cases where research has led to policy changes and impact on the ground. Narratives will be suggested by project teams and independently verified through interviews with key stakeholders to document the mechanisms through which research contributed to change.

- **Ex post impact assessments**: These assessments can document the impact of a particular change in policy, institutions, or markets on the SLOs of poverty reduction, food security, nutrition and health, and environmental sustainability. Wherever possible, these impact assessments will also explicitly address the differential impact of changes on men and women. Ex post studies play an important role in documenting the value of policy-oriented research, as well as in examining how the implementation of a policy affects the ultimate impact.

- **External reviews:** These reviews will assess the effects of major research projects after their completion and provide lessons for other research. Once every five years (or another agreed-upon timeframe), external reviews of the entire CRP2 will be commissioned by the Independent Evaluation Arrangement of the CGIAR on behalf of the Fund Council. These independent evaluations will provide an external perspective on research relevance and performance and will serve as an important input into the periodic revision of the CRP.

Once the final structure of CRP2 is approved, a workshop will be held to finalize the impact assessment framework of CRP2. The outputs of this workshop will include

- a complete set of measurable indicators at the subtheme and research theme level and more globally aggregated at the CRP level (the indicators mentioned in each subtheme of this proposal and in the performance indicators matrix in Annex 1 are initial propositions, with quantitative targets and dates to be provided at the initiation workshop, when the resource availability is known);
- a baseline of the values of those indicators by target region, and the evolution of the values of those indicators by target region as expected over the CRP period;
- the modalities and timeframe for collecting and analyzing the information needed for assessing the values of the indicators; and
- the roles and responsibilities of the different partners in the measurement of indicators

The indicators should be aligned with

- the SLOs of reducing rural poverty, improving food security, enhancing nutrition and health, and facilitating sustainable management of natural resources; and
- the impact pathways of CRP2, as described above.

In designing the impact assessment framework, we will consult the CGIAR Social Science Stripe Review, keep a pragmatic approach (the system should be as simple as possible so as not to be too great a burden for stakeholders), and focus on the goals of M&E, which are to report on the actual progress made thanks to CRP funding, as well as to provide institutional learning about what makes research effective in influencing policies and improving the welfare of the ultimate beneficiaries.

4. TOWARD A DYNAMIC AND INTEGRATED RESEARCH PORTFOLIO: RESEARCH THEMES AND SUBTHEMES

The proposed research portfolio of CRP2 addresses policy, institutional, and market challenges for global food security and rural poverty and is derived from an extensive consultation with our partners and beneficiaries. The program proposed here builds upon the ongoing programs and funding of the CGIAR centers, with CRP2 providing new integration to move from individual projects to a more comprehensive approach to the key and strategic research areas. In the first year of its operation, two-thirds of CRP2's funding is committed to ongoing restricted donor projects. As these projects are completed, funding will be freed up to develop new programs addressing critical gaps, new collaboration, and integration across research activities. In Year 2, 52 percent of the funding is from the CGIAR Fund, and by Year 3, 64 percent of the funding is new and will be allocated through the CGIAR Fund and CRP2. This funding can be allocated to filling research gaps and new programs, in addition to expanding core CRP2 research areas. During subsequent years, the remaining restricted donor-funded projects will come to a close, completing the transition. Because of this transition process, most of CRP2's research activities comprise both ongoing and new projects over the course of the three-year budget horizon.

For each of the subthemes in the proposed research portfolio, we present the following:

- **Rationale** for the research, including its goals and the processes through which those goals will be reached

- Selected **research questions**

- Proposed **research activities** that will be conducted to answer those questions

- Tentative **priorities** (these priorities might be modified after the priority-setting process that will start in November 2011 [please also see Table 3.1 for a typology of countries or major subnational regions in terms of research areas])

- Main **partners/alternative suppliers**[2], and **CRP2's comparative advantage**

- Expected **outputs, outcomes, and impacts** of the research

Annex 1 (performance indicators matrix) provides an integrated view of CRP2's contribution to the SLOs at the theme level. Table 2.1 in Section 2 provides the detailed contributions of each of the research subthemes to the SLOs.

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[2] An extensive list of CRP2's alternative suppliers by subtheme can be found in Annex 5.

Theme 1. Effective Policies and Strategic Investments

Introduction

Policies provide the enabling environment in which development actions occur and investment choices play out. This first theme of CRP2 analyzes which policies and investments might be better formulated to improve food security and accelerate agricultural income growth and, of equal relevance, how. It also evaluates key growth, equity, and sustainability tradeoffs associated with alternative development strategies and scenarios that provide the broader context in which policies and investments are formulated.

Theme 1 consists of 4 subthemes aimed at addressing the key policy gaps identified above. Subtheme 1.1 (Foresight and Strategic Scenarios) focuses on designing scenarios reflecting emerging challenges, modeling the consequences of these scenarios, and using the outputs of the modeling to inform policy research, thereby improving existing agricultural policy and investment decisions. The Foresight program will work closely with the GCARD process. The three other subthemes center on policy analysis, with a global objective of enabling smallholders, the rural poor, and other vulnerable groups to participate in income-generating and asset-building growth. Research under Subtheme 1.2 (Macroeconomic, Trade, and Investment Policies) is designed to correct underinvestment and policy and market distortions in the agricultural sector relative to other sectors. Subtheme 1.3 (Production and Technology Policies) will strive to facilitate participation of smallholders, female farmers, rural laborers, and vulnerable groups in agricultural productivity growth and sustainable resource use. Subtheme 1.4 (Social Protection Policies) plans to increase poor people's access to safety nets, food assistance, and cash transfers to reduce their vulnerability to risks.

At its core, the Theme 1 policy and investment research agenda involves the design, implementation, and dissemination of public goods tools and analyses that examine and inform strategic agricultural development choices for practitioners and researchers at different spatial levels, including the global and regional context, both macro and micro levels, for both agriculture and nonagricultural sectors. A key area of innovation in the policy and investment agenda of Theme 1 will be spatially explicit, multiple-scale analysis in which more detailed national and subnational analysis can be embedded within and bounded by regional and global contexts.

Methods and Data

To address these challenges, each of the four subthemes of Theme 1 draws on cutting-edge modeling approaches that permit macro, meso, and micro analysis of agriculture and the broader economy, in an increasingly spatially explicit way. Some examples of the economic models that will be applied are single-commodity, economic surplus models (for example, Dynamic Research EvaluAtion for Management, or DREAM) and economywide, multimarket models (such as IFPRI's national models for African countries); multicommodity, agriculture-focused, global food projection models (for example, the International Model for Policy Analysis of Agricultural Commodities and Trade, or IMPACT); and computable general equilibrium (CGE) models, such as the Global Trade and Analysis Project (GTAP) and Modeling International Relationships in Applied General Equilibrium (MIRAGE). Other research approaches include the Spatial Production Allocation Model (SPAM) and the GeoWiki supported geo-referenced data analysis coupled with the application of biophysical models (for example, water resources, crop and livestock systems, and soil carbon balance) that can evaluate the potential marginal physical productivity and natural resource impacts of a range of R&D interventions.

Many of these models will be adapted to address specific research questions. For example, gender will be integrated into the research to assess the differential impact of trade and macroeconomic policies on men and women. By enhancing CGE models, econometric estimations will be able to capture impacts disaggregated by the gender of the household head. Building on the GTAP database, a global database in which labor is broken down by gender and skill level at the sectoral level will improve analysis of gendered labor markets.

Complementing these modeling approaches, research activities will also involve socioeconomic analyses relying on both quantitative and qualitative methods. Data will increasingly be collected at the level of individuals, disaggregated by sex and age, and at the household and community level. Experimental/randomized and quasi-experimental (matching, regression discontinuity) designs will be used. Where appropriate, survey work will be complemented by experimental/"games" work (for example, to elicit preferences and willingness to pay and to understand gender and age differences in response to social protection interventions), as well as web-based "crowd-sourcing" techniques for data collection and data and model validation.

Subtheme 1.1. Foresight and Strategic Scenarios

Rationale

Over the next half century, the world's population will increase by roughly 50 percent—mostly in poorer countries—and become increasingly urbanized. Aggregate demand for food, feed, fiber, and biofuel products is projected to double.[3] Just keeping pace with this scale of growth would represent an unprecedented global food security challenge, but agriculture is also being subjected to increasing stresses from socioeconomic, environmental, and other drivers of change. Growing competition for water and biomass resources, increasing variability in cereal yields in Sub-Saharan Africa, and slowing productivity growth in the rice-wheat systems of South Asia's Green Revolution belt—one of the world's primary breadbaskets—are all symptomatic of the stresses being faced by major farming and food systems. These changes are rapidly shifting the structure, composition, and distribution of the agricultural production and farming systems that support the livelihoods of smallholder producers and the rural poor. The interplay of underlying drivers[4] has ushered in an era of increasing variability, uncertainty, and risk. Given these challenges, there is an increasing demand for incorporating more strategic foresight into decisionmaking in many areas of agricultural research and agricultural development for the developing world.

To help meet this demand, this subtheme will develop a **CGIAR Strategic Foresight Platform consisting of sets of spatially explicit data, scenario-building and modeling capacities, and a global network of analysts and partner scientists.** This platform will be linked to the mobilization of foresight activities identified through Global Conferences on Agricultural Research for Development (GCARD) 2010 to bring together a wide range of partners active in foresight considerations at global, regional and national levels. Mobilizing diverse perspectives and models in foresight-linked prioritization of agricultural research for development is recognized as essential to identifying best bet approaches for successful impact from research for development. CRP2 will build on the good fit between the delivery capability of the CGIAR CRP2 and the convening role of GFAR and the actions supported in the GCARD "forward thinking" initiative in creating a strategic platform between foresight initiatives that mobilizes a diversity of models, perspectives and analyses. The latter will be brought together with the development of critical analyses and research on specific issues that can be mobilized through the expertise of the CGIAR centers and mobilization of the funding available under CRP2, to address particular scenarios and their implications in different development contexts.

The Strategic Foresight Platform resources will

- articulate "plausible" sets of future trends in drivers of change and their potential interactions;
- assess the potential effects of those changes on food security, agricultural growth, welfare improvement, and the environment; and

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[3] This scenario, one of many potential "business as usual" scenarios, reflects median population and income growth projections, conservative assumptions about policy change and investment trends, and limited provision for the potential negative impacts of climate change, and water and energy scarcity.

[4] Such drivers may include population growth, rising incomes, urbanization, technical change, persistent poverty and insecurity, natural resource degradation and climate change, volatility in finance and energy markets, and their ensuing policy responses.

- identify policies and investments that will deliver the most beneficial outcomes while limiting undesirable tradeoffs.

This work builds on research that IFPRI and other CGIAR centers have conducted for more than a decade and that has already provided useful input into research agendas and policy debates. Many of the individual research activities comprising this subtheme are thus underway, but there has been limited integration across activities. **CRP2 provides the multi-institutional framework and funding levels required for true integration of scenario assessment methodologies and innovative data management and modeling to create the foresight platform.**

This subtheme is designed to help policymakers, researchers, and practitioners set priorities, formulate more effective policies, and better target agricultural investments and interventions in a context of rising variability, uncertainty, and risk. Overall, **the goal of this subtheme is to improve the design and cost-effectiveness of policies and investments** that can significantly improve future food security, human welfare, and natural resource outcomes at local to global scales.

Selected Research Questions

The initial set of research questions from which our core international public goods research agenda will be distilled is as follows:

- How and where will the socioeconomic, technological, and environmental drivers of global change affect future food security and human well-being?

- What stresses will this change impose on social, market, and natural resource systems? What are the implications for international agricultural research policies and priorities and strategic portfolio design, by system, theme, and region?

- Which regions and agroecosystems will be most exposed to change, and which food systems and groups of individuals (men, women, better-off, and poor) are most at risk?

- What combinations and sequences of enabling policies and agricultural investments hold most promise for advancing global development goals for growing populations under alternative future scenarios?

- How can the tradeoffs in meeting different development goals be minimized to promote more equitable, inclusive, and sustainable growth?

Proposed Research Activities

Building scenarios

Any foresight and scenario research must begin with a baseline. Research in this subtheme will therefore involve establishing and maintaining a comprehensive and coherent set of databases quantifying the baseline conditions and trends in key variables (for example, change drivers, evaluation model parameters, and variables and outcome indicators). Through this activity, researchers will forge strategic alliances with groups collecting primary data critical to modeling and impact assessment and invest in activities that fill critical data gaps. Examples of strategic data partnerships to be developed include sentinel data networks designed to generate data on critical policy-relevant indicators, such as the Longitudinal Village Studies of the International Crops Research Institute for the Semi-Arid Tropics; the World Bank's Living Standards Measurement Survey initiative for improved agricultural panel data for Africa (LSMS-ISA); and IFPRI's census-type survey of all the households in 26 natural villages in Guizhou Province, China, in 2005, 2007, and 2010. Global agricultural monitoring platforms (CIRAD, FAO) could also be important sources of data. Other strategic data partners will include, but not be limited to, the Consortium on Spatial Information (CSI), HarvestChoice, and Agricultural Science and Technology Indicators (ASTI).

Scenario building often involves many formal and informal and quantitative and qualitative approaches. It includes decisions about appropriate baselines, drivers of change, intervention options to be included or excluded, and a range of technical options conditioned by the specific analytical tool to which the defined scenarios will be applied. This activity will draw on the perspectives of all relevant stakeholders, not only to ensure that the right questions and expectations are being tested, but also to enhance engagement, ownership, and, ultimately, impact. One extremely relevant approach to development and documentation of scenarios (that includes climate change as a driver and technical change as an intervention) is currently being developed and tested by the Global Futures project, which will become part of CRP2.[5] Links through GFAR will also allow open linkage and evaluation of situations and scenarios by different methods such as comparison among diverse foresight evaluations and by cross—comparison with models examining the same questions, but based on assumptions beyond productivity, such as nutrition supply and sustainability. These latter may themselves create research needs in adding data, or locality context.

Assessing productivity responses to scenario dynamics

Biophysical models (for example, water resources, crop and livestock systems, soil carbon balance) will be used at a number of scales to generate more disaggregated and reliable insights into the marginal physical productivity and natural resource impacts of a range of R&D interventions. To decide on the required scope and operating scale of such models and ensure their appropriate calibration and validation, researchers will engage in dialogue and collaboration with other CRPs, seeking to maximize synergies across scarce, specialized capacities within the entire CGIAR portfolio (for example, cross-center crop modeling collaboration built into Global Futures and HarvestChoice initiatives). A key factor influencing inter- versus intra-CRP choices in providing modeling capacity is the required degree of coupling between the biophysical and economic models. For example, can the models be run independently or sequentially, simply sharing common data elements, or, as is increasingly the case, are they best dynamically linked in the simulation process? Such choices are also relevant across biophysical models (for example, optimum degree of coupling between crop and livestock productivity models). All major biophysical models will be formulated in a geo-referenced framework and will be harmonized as much as possible to make analytical results more coherent. For instance, they will draw from common databases on climate, soil, terrain, production, demographics.

To evaluate the economic, environmental, and welfare consequences of change, we will also apply a range of analytical approaches, from single-commodity, economic surplus models to multi-commodity, agriculture-sector-focused, global food projection models, and CGE models. The models of choice for addressing specific research questions will depend on, among other things, the geographic scale of relevance, the nature of the interventions to be evaluated, and the range of relevant outcome indicators required. This research will build on the current intercenter effort involving IFPRI, the International Maize and Wheat Improvement Center (CIMMYT), the International Livestock Research Institute (ILRI), ICRISAT, the International Rice Research Institute (IRRI), and others, through links with the Global Futures for Agriculture project and with the HarvestChoice project. Much of the research will involve better assessing environmental and welfare outcomes and analyzing gender-disaggregated impacts.

We will develop tools to improve our ability to assemble and compare scenario results and to examine the impacts on (1) different intervention goals, such as income growth, poverty reduction, food security, improved nutrition, and resource sustainability; (2) micro- versus macro-level interventions; and (3) key policy and investment strategies, such as public versus private, rural versus urban, and on-farm versus off-farm.

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[5] The Global Futures for Agriculture project will build an enhanced version of IFPRI's IMPACT model to more effectively evaluate potential research expenditures and their impact on the world's critical agricultural products and the people who produce them (http://www.ifpri.org/pressrelease/global-futures).

Setting Priorities

While short-term priorities will be based on commitments in the existing research pipeline, the strategic priorities of this subtheme will be increasingly aligned to delivering on the System Level Outcomes (SLOs) prescribed in the CGIAR *Strategy and Results Framework*, and new issues as they are identified, relying heavily on the consultative processes facilitated by GFAR as part of its contribution to the overall GCARD Roadmap. Within these system-level frameworks and mechanisms, we will regularly review research, outreach, and capacity-building priorities to ensure that available resources are being effectively used and that the Strategic Foresight agenda properly reflects changing client needs.

As a general principle, highest priority will be given to
- maintaining and developing baselines, driver scenarios, and foresight evaluations that address the strategic policy and investment knowledge needs of the CGIAR and its primary stakeholders;
- a Strategic Foresight Report and organizing a Foresight Conference on at least a biannual basis; and
- a web portal to deliver Foresight research products.

With higher levels of funding,
- a greater range of strategic evaluation studies would be conducted;
- more ambitious model, data functionality and reliability goals would be established;
- the Foresight Report and Conference would be delivered annually;
- outreach products would be more diverse, targeting different research, practitioner, and media audiences; and
- a more extensive set of user capacity-building products and services would be developed.

At all funding levels, high priority will be placed on partnering opportunities with the Foresight Academy proposed as part of the GCARD Roadmap. The Academy concept is aimed at fostering and accelerating professional growth of national and regional strategic planning capacities, and as such could represent a major tool for meeting the outreach expectations for this subtheme (GFAR 2011) (see section on Partnerships below).

Partnerships

As is the case for other subthemes and themes of CRP2, a range of client, partner, and stakeholder groups have important interests in shaping, co-implementing, or utilizing the core research outputs and findings of this subtheme. However, unique to this subtheme is the direct interest of other CGIAR-related bodies or processes in the Strategic Foresight activity and outputs:

- SRF: By definition, Strategic Foresight capacities and analysis are an integral part of the SRF process. Indeed much of the data and analysis used in the current SRF was supplied by members of the proposed Strategic Foresight team. The revised Consortium SRF that will be developed in the coming three to five years (SRF 2011) will play an even greater role in achieving a more effective Consortium agenda for delivering on the four SLOs. **Subtheme 1.1 will play a major analytical role in the development of all future SRFs.**

- ISPC: The ISPC has specific, mandated responsibilities with regard to CGIAR Strategic Foresight. It is tasked with providing the Fund Council and the Funders Forum with "foresight advice on trends and emerging issues, as well as potential strategies of addressing them related to the CGIAR Strategy and Results

Framework. In undertaking this role the ISPC will act as commissioner and coordinator of any required foresight studies, drawing on expertise within the Consortium and beyond, as appropriate, to undertake them." Early dialogue with the ISPC Chair and members suggest their focus will be in identifying key, emerging scientific issues and assess how best for the CGIAR to broach them. The ISPC will not have the resources to undertake its own modeling work and is more likely to commission studies to be undertaken by the CRP2's Strategic Foresight team. The IPSC sees the role of CRP2 as "evaluating plausible scenarios with regard to the impact of various research outputs on the SLOs, and then using these analyses to help guide and prioritize the CGIAR research portfolio, and the global research portfolio more generally" (Cassman, personal communication, April 18, 2011).

- GFAR: As part of the overall GCARD Roadmap, GFAR has identified several roles and goals related to improving national and regional capacities in strategic foresight. These are being taken forward as a collective action, including through CRP2 and IFPRI, termed the forward thinking initiative, this is supporting biannual meetings among those concerned with foresight studies, to enable specific common issues to be addressed from a variety of perspectives at global and regional levels. It will be crucial for the CRP2 Strategic Foresight subtheme to forge strong partnerships with GFAR, particularly in two areas: (1) CRP2 will take advantage of and contribute to the various stakeholder consultative forums that GFAR convenes and facilitates; and (2) CRP2 will play a role in GFAR's activities to develop strategic foresight capacities through, for example, foresight "academy consortia." CRP2 might, for example, help develop training modules, provide relevant data and analytical tools and support, or engage interns or academy students in evaluation studies. We plan early dialogue with GFAR to develop partnership ideas and plan for a set of strongly mutually beneficial outputs.

More broadly, the set of proposed partners can be summarized as follows:
- CGIAR system management and oversight entities responsible for planning, monitoring, and evaluating the priorities, investments, and impacts of the entire system (SRF, ISPC, and GFAR);
- other CRPs and other themes of CRP2 that need to undertake periodic strategic analyses from a more focused regional, thematic, commodity, or system perspective;
- participants in regional and international agricultural research and development processes and institutions, such as the Comprehensive Africa Agriculture Development Programme (CAADP), whether or not these are part of a formal GFAR process;
- foresight and strategic research groups in national agricultural research systems such as CAAS, Embrapa, and ICAR; and
- public and private funders of international agricultural research and agricultural development efforts (for example, bilateral donors, multilateral banks, private companies, and philanthropic organizations).

Research partnering with these groups will leverage and extend existing knowledge bases and experiences of CGIAR centers—for example, spatial targeting, systems productivity modeling and impact-assessment tools, databases, and expertise. **A new cross-center/cross-CRP Strategic Foresight community and mechanism, when established, will support strategic ex ante evaluation capacity**

development across the CGIAR (and appropriate partners) for the purposes of priority-setting, targeting, and investment decisionmaking.

Comparative Advantage of CRP2

The main alternative suppliers of CRP2 on Subtheme 1.1 are the following (in alphabetical order):
- Agricultural Model Intercomparison and Improvement Project (AgMIP)
- Agropolis – Agrimonde
- Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES)
- Center for Global Trade Analysis (GTAP)
- Food and Agriculture Organization of the United Nations (FAO)
- Food and Agricultural Policy Research Institute (FAPRI)
- Global Conference on Agricultural Research for Development (GCARD)
- International Institute for Applied Systems Analysis (IIASA)
- Joint Global Change Research Institute (JGCRI)
- Massachusetts Institute of Technology (MIT)
- Netherlands Environmental Assessment Agency (PBL)
- Organisation for Economic Co-operation and Development (OECD)
- Potsdam Institute for Climate Change Research (PIK)
- Wageningen University and Research Centre, LEI (WUR-LEI)

CRP2 will link teams and individuals working on foresight, targeting, and priority-setting issues across CRPs, and in so doing strengthen and deepen the Consortium's internal capacity to generate and act on strategic information in the planning and designing of its research portfolio. Thus, the knowledge, tools, and data generated in this process will not only serve to enhance the capacity of individual CRPs to better target and prioritize their own work, but will also provide consistent information for Consortium-wide evaluation. This cross-CRP evaluation platform that will be delivered by CRP2 can serve as a broad accounting framework for assessing the coherence and consistency of impact expectations across individual CRPs.

One example of how CRP2 will foster cross-CRP engagement and the nurturing of a Consortium-wide community-of-practice will be to convene (annually or biannually, depending on funding) a Strategic Foresight Conference that will bring together CRP specialists and their research partners working on these issues. They will present latest findings, review methods and data, and participate in this venue for technical capacity-building workshop sessions.

There are several reasons why hosting a world-class strategic foresight capacity and network in CRP2 makes sense compared to relying on external suppliers:
- It provides an ongoing platform for foresight and scenarios research to frame and analyze foresight and allocation questions for the Consortium.
- The cross-CRP evaluation platform provided by CRP2 will serve, as noted above, as an "accounting framework" and reality check across the expectations of impact from individual CRPs.
- CRP2 institutions have collaborated for a long time directly as partners with most of the leading alternative suppliers listed above.
- The strategic planning and strategic directions are understood and owned by the Consortium and its staff.
- CRP2 modeling tools are being regularly expanded and updated, have been used for many years by CG centers, and are contributing to other past and future global foresight exercises, including the Millennium Ecosystem Assessment, GEO-IV and GEO-V, the IAASTD, AgMIP, and others.

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Outputs, Outcomes, and Impacts

The **outputs** of this research will include the following:

- Relevant, documented, and accessible datasets and scenarios showing likely drivers of change in the coming decades; how changes are likely to affect future agricultural production, food security, and poverty; and which policies and investments will help deliver the most beneficial outcomes

- Analytical and capacity-building tools for scenario and foresight assessments of key partners in developing countries and regional and subregional organizations

- Qualitative and quantitative knowledge products, including peer-reviewed scientific publications that will advance understanding of strategic assessments in this complex global environment

- An actively supported Strategic Foresight community of practice, served by a web portal that continually provides information on strategic scenarios and global conditions, that will work in partnership with GFAR and will plan and support a biannual (or annual) Foresight Conference and Strategic Foresight Report

These outputs will provide a picture of the most serious challenges the world faces in combating food insecurity, poverty, and environmental degradation. The datasets, tools, and projections will help to guide strategic investment in the CGIAR and, through partnership with GFAR, in NARSs. They will thus make important contributions to the effort of developing effective policies and investments in a rapidly changing and risky environment at both global and national levels. **International development donor organizations have expressed demand for such data and projections on the priority needs and potential for agricultural research and other policy reforms, so we are confident that they will use the outputs of this work to increase the effectiveness of agriculture-related investments.**

The main **outcomes** of Subtheme 1.1 will be the following:

- Greater capacity of targeted decisionmakers and policy and investment practitioners to access, interpret, and use strategic foresight knowledge products and findings

- Growing influence of strategy foresight products and findings on policy and investment decisions

- Increasing interest and understanding of general audience and media

- Cohesive relationships and understanding of technical expertise among CGIAR centers and other partners

- Enhanced relationships and increased cooperation with the private sector and public donors

The contributions of Subtheme 1.1 to achieving impacts and contributing to the SLOs are described in Table 2.1 in Section 2.

Subtheme 1.2. Macroeconomic, Trade, and Investment Policies

Rationale

Macroeconomic, trade, and nonagricultural policies have important roles for sustainable and pro-poor agricultural growth in developing countries. The impact of these policies on food security and small producers' livelihoods has increased in recent years as a result of increased globalization, international financial crises, global macroeconomic imbalances, and differential growth patterns between industrialized and developing countries. Moreover, a critical constraint in promoting pro-poor agricultural growth remains lack of adequate public investment.

Thus, this subtheme will analyze both the general policy environment and the variety of country contexts in order to identify the macroeconomic, international trade, public and private investment, and nonagricultural policies that will maximize the contributions of agriculture and the rural economy to food security, poverty reduction and smallholders' incomes, and sustainable resource management in different types of developing countries. It will investigate how to better tailor domestic fiscal policy and public investments to include the agricultural sector as a key player in the development process, by reducing the bottlenecks faced by the sector, with a special emphasis on the rural poor and disadvantaged groups. This research will examine the complementarities between sound macroeconomic and trade policies, on one side, and government investment, on the other, through a series of strategically selected country-level studies. It will also examine options for prioritizing, sequencing, and financing public investments; test the effectiveness of public spending compared with other policy interventions; and support institutions in decentralizing public investment implementation. Equally important, this subtheme will address capacity building to improve the efficiency of the agencies that provide public goods and services, and develop tools for monitoring and evaluating public investment and strengthening capacity in the developing countries to enable them to conduct their own impact evaluations.

The CGIAR is uniquely positioned to address these issues. No other institution has the clear mission and the expertise to analyze how these macroeconomic, trade, and investment policies may affect global food security and small producers' income in an increasingly complex world.

Selected Research Questions

- How should national and global trade and macroeconomic policy agendas be shaped to ensure inclusive agricultural growth, poverty reduction and food security?

- What is the impact of international migration, foreign direct investments, and international cooperation on food security and poverty reduction?

- What role should agriculture play in economic growth, poverty alleviation, and food security in different types of developing countries?

- What are the priorities for public spending and the appropriate sequencing of public resources to achieve food security and improve small producers' income efficiently, and how do these priorities and sequences change over time and across space?

- How can institutional mechanisms and public finance responsibilities of different tiers of government be designed to ensure efficient use and effective allocation of public resources?

Proposed Research Activities

Identifying more effective international and national macroeconomic and trade policies

Macroeconomic factors (monetary, fiscal, trade, and exchange rate policies) and trade openness increasingly shape trade specialization and have consequences for poor people in developing countries. This research will examine their impacts and their interrelations with agricultural, climate change, and biofuel policies in developed countries. A dynamic CGE model including a large set of policy tools (macroeconomic factors, energy, land use, and trade) and accounting for household heterogeneity will be used to study how shocks in world markets affect households based on the structure of their consumption, the source of their income, and their dynamic reaction to these shocks (for example, migration, trade specialization and investment in education). Researchers will also use an enhanced model and database to examine the impacts of trade policies on men and women at the national and household levels. By providing objective analysis of how global macroeconomic and trade issues affect poor people in developing countries, this research will generate knowledge that can be used by developing-country delegates and other stakeholders in international negotiations and various arenas (G20, the World Trade Organization, the World Bank, the International Monetary Fund, and multilateral development banks).

This research will also identify (1) the policies and investments required to promote equitable economic development; and (2) the international institutional setting needed to support social inclusion. While other organizations focus on similar general topics (for instance, WTO on trade, IMF on macroeconomics, World Bank on development policies in general), CRP2 looks at these issues from the point of view of food security, poverty, and sustainable agriculture. It offers the unique combination of a specific mandate; a focus on research-based capacity building in the public, private, civil society, and academic sectors; institutional and political independence; adequate scale; and recognized research capabilities.

Researchers will explore how trade and trade policy can benefit developing countries by encouraging greater specialization or diversification. They will complement the consistent analysis provided by CGE modeling with more flexible models that deal with the heterogeneity of farms and households, and they will integrate detailed information on transportation costs[6] and value chains. Spatial, partial equilibrium models for key commodities will be developed to capture detailed information about specific value chains, drawing on data from commodity-specific research done in other CGIAR centers. Lastly, political economy models will investigate how endogenous processes have resulted in heterogeneous trade policies and how these policies affect poor men and women. Researchers will identify optimal country-level trade policies in situations where supply of agricultural products is constrained and provide new models and product or market-level parameter estimations that other researchers can use. Attention will be paid to the consequences of specific specialization patterns on gender and to the use of trade policies to mitigate gender inequalities. A global database of domestic trade margins and transportation costs within and across borders will be set up to support the modeling work. This research will be performed in close association with the work on value chains (see Theme 3) to improve understanding of the different stages separating the producer from the consumer. The modeling will assess how imperfect price transmission affects trade policy outcomes. These results will help to define infrastructure or competition policies that can reinforce the expected gains from, or mitigate the potential costs of, trade liberalization and accrue gains for consumers and producers.

Poor people have only limited capacity to respond to adverse shocks in food prices. Researchers will develop methodologies to identify excessive price volatility in global food prices, identify the groups likely to be most negatively affected by price volatility (Ivanic and Martin 2008; Robles and Torero 2010), and propose policies to mitigate excessive volatility and its impacts. The research team will

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[6] Domestic and international transportation costs, which can play a large role in the success or failure of agricultural development interventions, are poorly represented in CGE and partial equilibrium models. Moreover, there is minimal information on the differences in transport costs among products, by gender, and across farms and countries.

explore the definition and scope of volatility relevant for producers and consumers and develop methodologies to identify how price volatility is transferred from international markets to domestic markets. Researchers will also study the role of trade and trade policies in managing price fluctuations in agricultural markets to help design policies that balance the needs of agricultural producers, poor consumers, and industries that use agricultural products as inputs (Díaz-Bonilla, Diao, and Robinson 2004). We will also examine how a country's trade patterns and reliance on foreign markets affects domestic price volatility, and develop a stochastic analytical framework to capture these random shocks and the behavior of private and public agents in this context. We will take account of the policies (including export and import restrictions) set up by some countries to stabilize domestic prices, which potentially also export volatility to world markets and thus to smallholders in other countries (Bouët and Laborde 2010)—an important issue for ongoing global trade negotiations and governance.

Going beyond trade: International migration and foreign direct investment

In many developing countries, remittances of international migrants contribute significantly to household incomes and government revenues. Aside from remittances and impacts on labor markets, migration can also encourage trade flows arising from new social networks. International migration, differentiated by skill level and by gender, affects the supply of domestic labor and may have differentiated impacts on the agricultural, industrial, and service sectors. Research activities based on econometric estimation and global CGE modeling will involve investigating the mechanisms through which international migration of male and female workers and remittances affect household income and structure, the agricultural sector, and national economies through changes in domestic labor markets, income transfers, and their role in financing the current account deficit. The research outputs will include policy options that will help international migration to ensure income growth and stability for poor households and limit gender disparities. A global, gendered database on migration and remittances will be developed to support the analysis and provided as a public good to other researchers.

The proposed research will also analyze how foreign direct investment (FDI) (and its associated effects on macroeconomic variables) and technology transfer affect the agricultural sector in developing countries. Research will explore how FDI affects the economics and the political economy of trade negotiations and trade liberalization. Foreign direct investment in land and its consequences for land markets and the agricultural sector will also be examined. A global database on FDI will be developed from external data and linked to the global CGE model. The main output will be knowledge to guide policy formulation regarding the mechanisms through which FDI affects agricultural households, the agricultural sector, and developing economies.

Improving sectoral policies for broad-based rural growth

Lessons from cross-country comparative research will illuminate the different pathways and conditions of successful development approaches. Based on a **typology of developing countries**, we will examine the factors and strategies that have led to successful or failed rural and agricultural development outcomes in each type of country. We will investigate countries' patterns of adaptation and advancement, as well as how changes in demographic structure affect household agricultural production and labor decisions, agricultural productivity, technology use, and food security. Activities such as South-South learning workshops and field study tours will provide opportunities for researchers and government officials from African, Asian, and Latin American countries to discuss and compare development experiences.

The proposed research will further identify multiple pathways for the rural poor to move out of poverty traps. Building on CGIAR research on rural farm and nonfarm employment opportunities (Haggblade, Hazell, and Reardon 2007) and on a conceptual framework[7] to understand the policy options needed to promote sustainable rural employment, researchers will examine conditions and policies that

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[7] This framework is part of the "FAO: Rural Employment Assessment and Strategy" collaboratively prepared by IFPRI and FAO's Gender, Equity and Rural Employment Division.

broaden income generation and job creation for women, and the role of formal and informal sectors in this process. Through a macro-spatial, micro-integrated analytical framework, this research will identify constraints to creating employment opportunities for different types of countries and different household groups. It will also design growth scenarios based on agricultural growth targets at the sector or commodity level set by national governments or defined in commodity-oriented CRPs. A similar approach has been applied to selected African countries within the CAADP framework (for example, Diao et al. 2011).

Researchers will examine the role of small and medium-sized town development in rural growth and income creation, especially in agroprocessing and nonagricultural activities, and the policy options that facilitate the development of these activities. Besides, they will look at the role of migration and remittances in rural development and identify policies that support the expansion of pro-poor nonfarm activities, and especially that increase women's participation in nonfarm activities. Ways to develop regionally based public services, urban land-use planning, and rural infrastructure for water and energy will be identified. Finally, research will assess barriers to market entry for small enterprises in rural areas. The work will cover micro, spatial, and economywide aspects of rural-urban linkages in an integrated way.

Improving allocation, sequencing, and efficiency of public investments

Many governments and their development partners have expressed a need to prioritize their scarce public resources, but they lack the information needed to translate this principle into action.[8] Building on the expertise the CGIAR centers already possess, this research activity will conduct econometric analysis of the relative returns to different types of public investments in agriculture (for example, research, extension, and irrigation) and rural areas (for example, roads, energy, education, and health) at national, subnational, and regional levels. Based on these estimated returns, it will estimate the public financial resources required to achieve specific development impacts, such as reducing poverty by 50 percent or achieving an 8 percent yearly average rate of agricultural growth. This activity will also study the poverty and rural development implications of financing public investment from different sources. The current literature does not explain how decentralization reforms have affected the intergovernmental allocation of budgets for agriculture and how these allocations have affected performance in the sector. This activity will place particular weight on the role and impact of agricultural budgets in the context of decentralization reforms. It will also investigate the relative outcomes associated with the level or participation of women in the decentralization process.

To our knowledge, no analysis has been undertaken on the effect of disaggregated public spending on different sections of the income distribution in developing countries. Such analysis is critically needed to evaluate the quality of public spending as a pro-distribution instrument and in targeting the poor. This research activity will (1) measure the impact of the level and composition of public spending on income distribution; and (2) estimate various indicators of distribution within the household sector itself as a function of fiscal variables, while controlling for other factors. We will conduct critical studies of implemented policies on public expenditures to better understand potential underlying structural problems, to develop potential solutions, and to estimate the budgets needed to implement such policies.

The success of this research will ultimately depend on developing countries' capacity to implement effective monitoring and evaluation (M&E) systems for public investments. The types of partnerships that will be built for this research reflect the relative capacities in different subregions: in the subregions that consist of mostly small countries with relatively weak national capacities, regional and cross-country analyses and partnerships will be more cost-effective than country-by-country approaches.

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[8] The Government of Uganda, for example, has stated in its poverty reduction strategy document that it will rigorously prioritize its expenditures to provide taxpayers with value for money by shifting inter- and intrasectoral budget allocations in favor of those areas that will most effectively accelerate pro-poor growth, human development, and security (MFPED 2004). The document, however, does not provide any indication of how they will obtain the information needed to undertake this prioritization.

Methodologies developed in large countries with higher capacity, such as China and India (Fan 2008), will have to be refined and adapted. Tools and frameworks for data collection and M&E will be regularly updated, as will global databases on public and private investment in agricultural research and development (such as ASTI and Regional Strategic Analysis and Knowledge Support System, or ReSAKSS).

Setting Priorities

The research activities comprised in this subtheme are closely linked. In the event of a shortfall in funding, it will be important to maintain the ongoing research activities and prioritize the regions and countries identified in the typology.

The highest-payoff activities are
- **the role of global macroeconomic, trade, migration, and FDI on poverty and food security in developing countries;**
- **identifying the pathways through which domestic macroeconomic, trade, and nonagricultural policies affect agricultural growth, employment, food security, and small producers' income at the national, local, and household levels;**
- **prioritizing, sequencing public investment, and improving its efficiency.**

Many research activities have global relevance. In terms of regional priorities, this subtheme, like CRP2 as a whole, will focus on Africa and South Asia.

Partnerships

We plan to include various partners at different stages of the research cycle:
- institutions with experience on agricultural and rural development, which can contribute expertise in economic modeling, international trade, analysis of public investment, and gender analysis; potential partner institutions include African Growth and Development Policy (AGRODEP) modeling consortium, the Poverty and Economic Policy (PEP) Research Network, GTAP, and the African Union;
- researchers and policy analysts in developing countries, including Bangladesh, Brazil, China, India, and Vietnam among many others, at the national, regional, and subregional levels, with whom collaboration will generate the policy and contextual relevance of the research, as well as help to develop cross- and in-country analytical capacity;
- civil-society groups, intergovernmental institutions, and private-sector advocacy groups (for example, the Gender Responsive Budgeting [GRB] initiative of United Nations Development Fund for Women [UNIFEM], the International Budget Partnership, umbrella agricultural cooperative unions, and chambers of commerce), which are the primary targets of the research findings;
- government bodies, including ministries of finance and agriculture and parliamentary standing committees on agriculture, as well as donor agencies, particularly in CSSP countries; and
- international and regional development agencies, such as the World Bank, FAO, IFAD, ADB, African Development Bank (AfDB), and IDB, that can use findings in setting their investment priorities and improving the efficiency of their investments.[9]

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[9] IFPRI will be a key partner in the 2012 *State of Food and Agriculture* report on public investment in agriculture.

Comparative Advantage of CRP2

The main alternative suppliers of CRP2 on Subtheme 1.2 are the following (in alphabetical order):

- Centre d'Études Prospectives et d'Information Internationales (CEPII), France
- Centre for Advanced Training in Rural Development, SLE, Germany
- Cornell University
- Food and Agriculture Organization of the United Nations (FAO)
- Global Forum for Agricultural Research (GFAR)
- Humboldt University, Dept. of Agricultural Economics and Social Sciences, Germany
- Institute for International Trade Negotiations (ICONE), Brazil
- Institute of Development Studies (IDS), Sussex
- International Institute for Applied Systems Analysis (IIASA)
- Iowa State University
- Makerere University
- National Center for Agricultural Economics and Policy Research (NCAP), India
- Poverty and Economic Policy (PEP)
- University of Benin
- World Bank

The main comparative advantages of CRP2 with respect to these alternative suppliers are the following:

- A specific focus on how macroeconomic, trade and investment policy interacts with food security, poverty reduction, and agricultural and rural development
- Large datasets in global trade, economywide modeling and public investment related to agriculture, rural development, and food security
- History of building national capacity facilitated by large presence in and strong collaboration with national institutes in developing countries
- Ongoing direct research input and policy advice provided to G20 and WTO platforms and negotiations
- Existing collaboration with many of the alternative suppliers listed above

Outputs, Outcomes, and Impacts

Specific outputs and/or outcomes of each activity have been identified above. This research will provide the analytical basis and country-level capacity to support the design and adoption of macroeconomic, international trade, and nonagricultural policies, public investment, and fiscal policies that take agricultural growth and rural development into account for the more efficient functioning of the food, nutrition, and agricultural systems at the subnational, country, regional, and global level.

This subtheme will produce **readily applicable tools for developing-country governments**. These tools include (1) typologies to assess countries' deficiencies, opportunities and risks both at the international and national levels; (2) specific simulations to gauge the effect of macroeconomic and trade policies; (3) a body of studies pointing out where and how to invest scarce resources to boost the agricultural sector under alternative conditions; (4) methodologies and tools for monitoring and evaluating public investment, and (5) databases on public expenditures and investment in agriculture (for example, research, irrigation) and nonagriculture (for example, education, health, transportation, defense, social security) that will be made publicly available and downloadable via the ASTI, ReSAKSS, and AGRODEP websites.[10] Research results will be reported in scholarly and policy-oriented publications.

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[10] See http://www.asti.cgiar.org, http://www.resakss.org, and http://www.agrodep.org.

The results of this subtheme will inform developing countries on

- how to improve their trade negotiations through sounder evidence of the impact of different reforms;
- how to design macroeconomic, trade, and nonagricultural policies for pro-poor agricultural growth and for improving small producers' income including women farmers; and
- how to make investments more efficient, including better budgetary allocation policies across sectors and within agriculture.

Typically, in international negotiations, the interests of the poorest and most vulnerable are neglected. Sound research to reduce the asymmetry of information among stakeholders is a key element in shifting policies toward a more inclusive outcome and in ensuring that the concerns of the poorest are addressed directly or indirectly through specific redistributive policies. Although the global governance agenda will likely remain contentious in the years ahead, the research activities proposed and the evidence and options provided by the modeling innovations at the product- and country-level will play an important role in informing the debate and policymakers.

CRP2 will work closely with various national governments and stakeholders to ensure that CRP2's analyses on pro-poor macroeconomic and nonagricultural policies are used in formulating policies, strategies, and decisions for achieving pro-poor agricultural growth and increasing small producers' income. Partnerships with national collaborators and think tanks will ensure that research results are used by various stakeholders.

With regard to more efficient investments, the research outcomes will include positive influences on public finance policies in decentralized countries, such as policies affecting the revenue and expenditure assignments of different tiers of government (local, state, and central/federal) in agriculture and other sectors key to agricultural and rural development. These also include policies on the design of intergovernmental transfers and systems to monitor the spending performance of the different tiers of government.

The contributions of Subtheme 1.2 to achieving **impacts** and contributing to the SLOs are described in Table 2.1 in Section 2.

Subtheme 1.3. Production and Technology Policies

Rationale

As recently reaffirmed by the CGIAR Stripe Review of Social Sciences, the effort to enhance agricultural productivity has been and should remain at the core of CGIAR research, comparative advantage, and expertise. The goal of this subtheme is to increase productivity and sustainability of agricultural production systems[11] in Africa, Asia, and Latin America in the face of growing food demand; increasing scarcity of natural resources, particularly land and water; and other emerging drivers of global change. To contribute to this goal, research under this subtheme will identify production and technology policies that enable pro-poor, gender-equitable and sustainable growth in agricultural productivity. This work will also seek to increase research capacity related to food, agriculture, and rural development, in partnership with governments, the private sector, and civil society. Research activities will investigate policies that support aspects of sustainable agriculture, from germplasm to natural resource management. Using a variety of tools and data sources (see Section 6), researchers will look at market-agent interactions, biophysical-environment linkages, and institutional and policy constraints to assess and identify policies that support sustainable agricultural productivity growth. Given that land, water, and energy use are interlinked, and agricultural technology policies are often associated with increased energy use, our assessments of

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[11] Agriculture is understood here to include annual as well as perennial and tree crops, forestry, livestock, and aquaculture.

policies on sustainable agricultural productivity improvement will also consider the potential impacts on renewable energy sources. Because effective production and technology policies need supportive governance systems and institutions, research under this subtheme will build on Theme 2 research.

Selected Research Questions

We will answer the following critical research questions:

- What policies and strategies can facilitate the conservation, development, dissemination, and effective use and management of plant and animal genetic resources and improved crop cultivars and animal breeds?

- What policies and strategies can sustainably increase agricultural productivity along the land-water-energy-food nexus?

- What policies and strategies can increase technology dissemination, delivery, and adoption?

- What policies and strategies can expand opportunities to diversify agricultural and nonagricultural incomes while also sustaining the natural resource base and enhancing biodiversity?

In each of these areas, we will conduct ex ante and ex post impact assessments and analyze key factors such as the comparative advantage across locations and production systems; the roles of the public, private, and civil society sectors; and the contribution of farmers, communities, and consumers to the innovation process. We will also place particular emphasis on assessing the suitability of different technologies for women, producers in remote areas, landless farmers, and farmers without tenure security.

Proposed Research Activities

Policies and strategies that facilitate access to improved crop cultivars and animal breeds

Research activities on how to better develop, disseminate, exchange, use, and manage improved crops and animal breeds and neglected and underutilized species (NUSs) will continue to be conducted in collaboration with the commodity-based CGIAR centers and CRP3, within programs such as the Cereal Systems Initiative for South Asia (CSISA). Research will focus on both micro- and macro-level analysis of the development and deployment of improved cultivars and animal breeds—a fundamental part of the CGIAR mandate, a comparative advantage of the CGIAR network of centers and programs, and a historically proven success that requires continued attention on the policy side.

At the micro-level, the research will focus on understanding firm- and farm-level responses to the development and deployment of improved cultivars and breeds, and on the legal, regulatory, and policy frameworks that influence these responses. At the macro-level, the research will focus on the impact of national and regional policies on supply and demand for major agricultural commodities and NUSs and the food security implications of these policies. Given persistent low productivity in Sub-Saharan Africa, concerted efforts will be made to expand research in this region to enhance capacity and policy development with governments, NARSs, producer organizations, and public-private partnerships. National case studies and cross-country comparisons of activities related to commodity crops and NUSs derive lessons from experiences in Asia and Latin America and encourage knowledge transfer to Sub-Saharan Africa.

An important part of this work will be to support the sustainable conservation and use of NUSs.[12] This activity will examine the constraints faced by these species along the value chain, support policies

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[12] Calls for greater R&D efforts on NUSs (for a definition, see Padulosi and Hoeschle-Zeledon 2004), including tree crops and forest products (see Jaenicke and Höschle-Zeledon 2006; Smartt and Haq 2008), have been made by several international

that promote their cultivation and use, and study the roles of women in conserving, developing, using, and earning income from NUSs.

Another important component of this work will focus on improving policies related to the functioning of seed systems in Sub-Saharan Africa, South Asia, and Latin America and the Caribbean. In many countries, market liberalization has encouraged the emergence of commercial and nongovernmental seed producers alongside the entry of domestic and foreign technology seed developers. However, public policies and investments designed to encourage the movement of genetic materials, information, and technologies between public researchers, technology companies, seed producers, and farmers often fail to improve smallholders' access to improved seeds. Effective policies related to seed access, seed regulation, intellectual property rights, seed trade harmonization, fiscal incentives for research and development, management of public innovation, and compliance with the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) are critical. Our research will address this topic across a range of countries, regions, crops, traits, and technologies.

Policies and strategies that sustainably increase agricultural productivity along the land-water-energy-food nexus

In the coming years, given current projections for population and economic growth and climate change, maximizing agricultural output while minimizing resource input and adverse impacts on ecosystems and the environment will be crucial. This research activity will focus on policies in support of maximizing agricultural productivity under *all* natural resource constraints, including land, water, and energy, to increase food production sustainably. Up to now, most agricultural technology policies have incorporated only part of this nexus (for example, technology policies on land management might focus on the fertilizer-land productivity nexus but might not assess associated greenhouse gas emissions or water uses).

This research will identify policies that can shape the development, dissemination, and marketing of technologies to increase agricultural productivity using more resource-efficient methods and multifunctional technologies, as well as policies that will make these technologies more accessible to poor women and men. New research on low-external-input agriculture, integrated soil nutrient management, and energy-saving low tillage systems will study the productivity of these practices and their income potential in regions. Tradeoffs between sustainability and productivity associated with low-energy water-lifting and application devices will be identified and researched, in close collaboration with CRP5. Many of the technologies that reduce pressure on natural resources already exist—such as integrated soil fertility management, technologies and economic incentives to conserve irrigation water use, and policies and incentives to promote carbon-sequestering practices—but adoption rates are low. This research activity will therefore continue to identify bottlenecks that hinder technology uptake and strengthen capacity to enhance the adoption of combined, resource-use efficient land, water and energy management strategies.

This research will also assess how to reduce adverse impacts of sustainable renewable energy production, such as biofuels, on the natural resource base (land, water, and energy), and on national and global food security. Some studies have been ongoing in this area, such as the "Biofuels and the Poor" project, funded by the Bill and Melinda Gates Foundation, but more research needs to be done to assess the most effective policies in this area. Assessing the food-land-water-energy nexus also requires new research on policies to encourage consumers to promote on-farm fuelwood production and improved stoves as part of the shift from unsustainable fuelwood to sustainable biomass or modern fuels, as well as the cost of this transition. We will use experimental approaches and randomized controlled approaches to identify policies, investments, and innovative market and financing mechanisms that can help facilitate

organizations and agreements, including the CBD (http://www.cbd.int/recommendation/sbstta/?id=10689), the International Treaty for PGRFA (ftp://ftp.fao.org/ag/agp/planttreaty/gb3/gb3w16e.pdf), the FAO Global Plan of Action for PGRFA (http://www.globalplanofaction.org/id/gpa/), and the Chennai Platform for Action (http://www.underutilized-species.org/documents/PUBLICATIONS/chennai_declaration_en.pdf).

this transition. We will also consider the significance of this shift for agriculture, agroforestry, ecosystem health, and human health. This activity will work closely with CRP5 and CRP7. The research will be implemented in selected Asian countries where energy and resource use is high, as well as in selected countries in Sub-Saharan Africa where resource intensity is relatively low. Analyses will be implemented across scales, production systems, and regions—using econometric and simulation model-based quantitative analyses combined with qualitative analyses—and include the study of impacts and policy options for female producers.

Moving along the scientific frontier from biotechnology to nanotechnology, synthetic biology, and other advanced scientific applications allows for more rapid development of plant and animal varieties. Biotechnology and GM crop research is rapidly providing applications to enhance yields, nutrition, resistance to biotic and abiotic stresses, or other desirable traits. Similarly, nanotechnologies offer considerable potential for helping the poor—for example, by increasing plant input use, raising animal vaccine efficacy, and reducing postharvest losses. Synthetic biology and other advanced applications hold similar promise. However, gaps in research prevent their potential from being realized. These gaps include: weak biosafety regulatory systems in developing countries; a limited analysis of the constraints in access, knowledge, and affordability; insufficient investment in risk assessment and management; questions about market acceptance; and limited attention to intellectual property rights. This research will assess food- and nutrition-related science and technology policy, with attention to the socioeconomic opportunities and risks of advanced applications for resource-poor farmers, food-insecure consumers, biodiversity, and trade. It will emphasize innovations that are safe and accessible to poor people. The research specifically aims to identify and evaluate the benefits and risks of advanced applications for the poor, to analyze the distribution of risks and benefits by gender and occupation, and to help anticipate the emerging institutional and marketing challenges specific to these new technologies. Work will include (1) ex ante assessments and research prioritization of applications for the poor in specific countries or commodities (supporting NARS involvement); (2) ex post evaluations of agricultural and food technologies adopted in the emerging economies that are leading in this field (Brazil, China, India, and South Africa); and (3) analyses of the governance, institutional, and market constraints and solutions to enable the most promising high-benefit/low-risk technologies to reach and be used by the poor at a global, regional, national, or subnational level. For major staples, this work will be done in collaboration with CRP3, but we will also consider how the methods already in use for major crops can be applied to overcome constraints affecting NUSs. This work will also address the regulatory reforms necessary for farmers and consumers in developing countries to benefit from GM crops and other advanced applications, building on the integrated program of research, capacity development, and outreach of the Program on Biosafety Systems (PBS), and leveraging partnerships with advanced research institutes working on relevant applications. The project will examine gender-differentiated issues that may affect adoption and use of GM crops in developing countries.

Policies and strategies that enable and support the delivery and adoption of more sustainable agricultural practices

This research activity will assess the costs and benefits of alternative science, technology, and innovation policy and marketing strategies, including those related to biotechnology, high-input technology, conservation agriculture, mainstream agricultural practices, precision agriculture, organic agriculture, crop/livestock/tree interactions, enhanced use of NUSs, and associated standards and quality-assurance systems, such as certification methods. We will look into how to make such policies and strategies more accessible to women and low-income farmers by (1) analyzing their potential payoffs, in terms of yield growth and food security, taking into account the spatial variability of crop production, climate, soil, and projected climate change; (2) assessing the market-level consequences of broad adoption of these technologies and associated policies at a regional and global scale; and (3) identifying suitable governance systems and policy frameworks (in collaboration with Theme 2).

While this type of analysis cuts across several CGIAR CRPs, the activity described here is unique in scope. First, the activity addresses policy and institutional issues in a manner that is holistic and systems-based rather than crop specific, taking an integrated macro-level policy view of micro-level evidence on crops, traits, resources, policies, and institutions. This means that research on individual technologies will allow for analysis of interplays between policies on commodities (e.g., minimum support prices for food staples), policies on external inputs (e.g., subsidies on fertilizer, machinery and equipment), policies on seeds and traits (e.g., public and private investment in hybrids and GM crops conducive to ZT and RCTs), and so on. Second, this activity will provide more comprehensive and cross-cutting approaches across farming systems and technologies to identifying opportunities for women. While this area of inquiry has received some focus in the past, intensification and mainstreaming of gender-related analytical work will be an essential component of future work. Third, this activity builds on work conducted at IFPRI, other CGIAR centers, and partner institutions under programs such as the Agricultural Science and Technology Indicators (ASTI) initiative, which compiles, analyzes, and publicizes data on institutional developments, investments, and capacity in agricultural R&D at national, regional and global levels; Harvest Choice, which generates knowledge products to help guide strategic investments to improve the well-being of poor people in Sub-Saharan Africa and South Asia through more productive and profitable farming; and other established research initiatives. The integrated assessments described here will be implemented across all developing countries and regions. Partners include NARSs; private companies in biotech, hybrid seed, inputs, processing, and packaging; CGIAR commodity centers; government regulatory authorities and focal points; farmer organizations; women's organizations; trade organizations; and regional associations in Africa and Southeast Asia.

Historically, models of extension have typically been top-down and expensive to implement. More recent models are demand-driven and pluralistic (involving public and private sectors, NGOs, and civil society), and they focus on helping farmers learn how to obtain information on a wide variety of services rather than simply training them to use available production technologies. However, there is little systematic analysis of the effectiveness of these new models. Important questions remain about how extension and advisory services function and what roles different actors should play in supporting innovative extension approaches. More also needs to be learned about appropriate roles for public, private, and civil society organizations in pluralistic extension systems designed to support value-chain development—and how these roles vary by commodity, land use system, gender, and the target group's level of wealth. Anderson (2007) has called new extension approaches "a chronically under-researched field." This activity will make advances in five areas for which satisfactory outcomes have yet to be achieved in developing countries:

- Understanding how rural communities obtain and spread new technologies and information and how extension services can make the best use of existing individuals and networks

- Determining the key factors affecting the impact of innovative extension approaches, such as volunteer farmer extension programs, farmer field schools, rural resource centers, and short message service (SMS) information systems

- Assessing the impact of innovative extension approaches by commodity, land use system, gender, social setting, and region

- Identifying how extension systems can support value-chain development

- Identifying effective strategies for reaching both women and men and ensuring that they are able to obtain and use the information

This research will address the challenge of reaching female farmers. The number of female extension agents remains low, and extension services are often biased toward men. Even programs oriented toward women fail to adequately consider and address the heterogeneity of female farmers. Strategies need to be context-specific to reach women effectively and should involve a comprehensive diagnostic approach to identifying diversity among female farmers (Quisumbing and Pandolfelli 2010).

This activity will be implemented in two to three countries each in Latin America and the Caribbean, Asia, Sub-Saharan Africa, and the Middle East and North Africa (MENA), in close consultation with CRP3 and CRP6, the private sector, NGOs, farmer organizations, and NARSs, as appropriate. A key partner at the global level will be the Global Forum for Rural Advisory Services.

Expand opportunities for income diversification, while sustaining natural resources

Agricultural and livelihood diversification can be an effective strategy for improving food security, increasing incomes, and coping with risk and uncertainty, particularly in the face of climate change. This research will focus on what enterprise types and combinations (for example, NUSs, legumes, livestock, and trees) can improve poor farmers' incomes and identify the technology policy and capacity needed to support these enterprises. Economies of scale may dictate that greater efficiency and higher incomes are achieved when individual households and even communities specialize in particular enterprises. Therefore, the research will assess trade-offs between specialization and diversity by area, commodity, social setting, and degree of market access, and it will highlight the advantages of such strategies and policies for female farmers and the poor.

Other research will study the potential of private-public partnerships to facilitate nonfarm employment and agricultural income diversification and determine the key factors that contribute to effective linkages between the public and private sector and how they vary across space and by commodity. This activity will also assess approaches to implementing private-public partnerships and building trust and production and marketing arrangements that are mutually beneficial for both smallholders and private enterprises. Our assessments will cover partnerships involving local traders and processors and those involving multinational corporations, because both types can provide important benefits to the poor.

This research will also examine the lessons learned from experiences with sustainability standard schemes such as organic and fair trade products and payments for environmental services (biodiversity, freshwater resources, and carbon sequestration). It will assess how such schemes can best be implemented, their efficiency and equity impacts, and how the poor and women can gain better access to certified markets. Research will be implemented in Latin America and the Caribbean, Asia, and Sub-Saharan Africa, across a range of commodities (tree crops and annual crops; commonly grown crops and NUSs).

Key partners at the global level may include the Committee on Sustainability Assessment (COSA), a global consortium of institutions and UN agencies developing and applying innovative ways of measuring and understanding sustainability in the agrifood sector, as well as certification bodies, NGOs, and other entities facilitating the implementation of sustainability standards.

Setting Priorities

All four research activities in this subtheme are fundamental to CRP2's thrust to support sustainable pro-poor agricultural growth. They have been, and will remain, at the core of CGIAR research and comparative advantage and expertise (see CGIAR Science Council 2009). Besides, they are closely linked with other CRPs and CGIAR centers. Therefore, we have chosen to give them equal priority at this point. The priority-setting process described in Section 3 will probably lead to differentiation in priority levels between activities and regions for this subtheme, either in terms of funding allocation or in terms of sequencing over time.

Partnerships

To ensure that priorities for technologies are adapted to each region and country, research on policies and strategies that facilitate access to improved crop cultivars and animal breeds is undertaken with over 40 national agricultural research and extension institutions, in close collaboration with regional organizations such as APAARI, FARA, FORAGRO, and AARINENA, under the GFAR umbrella. Research on NUSs will involve collaboration with the Federal University of Para (Brazil); the Institute for Mankind and the Environment (IPHAE, Brazil); Fundación Promoción e Investigación de Productos Andinos (PROINPA, Bolivia); the Peruvian Institute for Amazonian Research; the Local Initiative for Biodiversity, Research, and Development (LIBIRD, Nepal); the M.S. Swaminathan Research Foundation (MSSRF, India); ICRAF; the International Center for Tropical Agriculture (CIAT); and the Center for International Forestry research (CIFOR). It will also build on the ongoing Fruta Amazonicas (FRUTAM) project in Brazil, Peru, and Bolivia. In Cameroon and the Democratic Republic of Congo, the University of Ghent, the National Institute of Agricultural Research (INERA, DR Congo), World Agroforestry Centre (ICRAF), and CIFOR will work on participatory domestication and conservation of indigenous tree species in the humid tropics.

The research on policies to promote carbon sequestration in agricultural systems will involve a range of applied organizations and initiatives such as the African Climate Policy Centre, the African Centre of Meteorological Applications for Development (ACMAD), the Climate Prediction and Applications Centre (ICPAC), AGRA, the World Wildlife Fund, the Katoomba Group, the National Research Conservation Center (NCRC-Ghana), the World Land Trust, Forest Trends, and the Clinton Foundation. This activity will also work closely with CRP7's agricultural mitigation theme.

To achieve goals in women's agricultural productivity, we will work directly with women's groups (such as the self-help groups in India and District Women's Associations in Zambia); farmer organizations; NARSs, both on the research and extension side; government departments; and the private sector. This effort will continue and increasingly engage directly with the private sector, given its large research development and dissemination budgets and the potential for increased engagement in poor areas. Furthermore, the active participation of community-based organizations is essential and will be promoted, for example, in work with the MSSRF, Professional Assistance for Development Action (PRADAN, India), or PROINPA. CRP2 will also disseminate its technologies, methods, and tools in socially and culturally acceptable ways to reach poor beneficiary groups.

Researchers under this subtheme will work very closely with several other CRPs (see Table 7.1. and Annex 2):

- CRP1: Collaboration with CRP1 will enable cross-country comparisons of multiple ecosystems, such as ICARDA's "Integrated agricultural production systems for dry areas," International Institute of Tropical Agriculture's (IITA's) "Integrated Systems for the Humid Tropics," and WorldFish's "Harnessing the development potential of aquatic agricultural systems for the poor and vulnerable."

- CRP3: Linkage with CRP3 will support cross-country analyses of various commodity systems, such as wheat and maize (CIMMYT); the Global Rice Science Partnership (of the International Rice Research Institute, IRRI); roots, tubers, and bananas (CIP); grains and legumes (ICRISAT); dryland cereals (ICRISAT); livestock and fish (ILRI); and tree products (CIFOR and ICRAF).

- CRP5: Collaboration with CRP5 will cover land, water, and ecosystems.

- CRP6: Collaboration with CRP6 will address certification and quality assurance issues.

- CRP7: Collaboration with CRP7 will look at climate change, agriculture, and food security.

Comparative Advantage of CRP2

The main alternative suppliers of CRP2 on Subtheme 1.3 are the following (in alphabetical order):
- Universities in both developed and developing countries (US land grant universities, European agriculture universities, and one to two universities in most of our partner countries in the developing world)
- Agricultural economics research organizations in many developing countries (for example, CCAP in China, ICAR in India, and ICASEPS in Indonesia)
- Private companies (seed technology, crop/livestock breeding companies, irrigation suppliers, etc.)
- Specialized technology-focused, extension and environmental organizations; for example, the Alliance for a Green revolution in Africa (AGRA), the William J. Clinton Foundation, Forest Trends, the Katoomba Group, M.S. Swaminathan Research Foundation (MSSRF), the National Research Conservation Center (NCRC, Ghana), Professional Assistance for Development Action (PRADAN, India), Foundation for the Promotion and Investigation of Andean Produce (PROINPA), the World Land Trust, and the World Wildlife Fund

CRP2's comparative advantages over these organizations include the following:
- Comprehensive and comparative assessment of policies across the globe (not restricted to a specific policy or geographic region)
- Close working partnerships with national governments and national agricultural research organizations
- Direct integration of CRP2 policy research with science research in the other CRPs and CGIAR centers
- Impartiality/neutrality of an international organization, compared to universities based in a specific country and/or the private sector
- Multidisciplinary teams of economists, sociologist, crop scientists, and water resource engineers
- Development of and access to household and village panel datasets in many countries

Outputs, Outcomes, and Impacts

The main **outputs** of research activities under Subtheme 1.3 will be the following:
- Synthesis of evidence on effective germplasm management systems for food and nutrition security
- Scenario analyses and interactive tools on food, land, water, and energy use;
- Design of policies, strategies, and capacity-building materials for resource-efficient technologies
- In-depth analyses of biotechnology and nanotechnology impacts, policy challenges, and knowledge gaps
- Platforms and other collaborative mechanisms for promoting neglected and underutilized species
- Assessments of key technology opportunities and extension modalities

- Decision-support tools for policymakers on strategies for sustainable intensification of agriculture
- Design of technology policies and capacity building for rural diversification, including nonfarm activities
- Innovative certification schemes for enhanced productivity, biodiversity, and rural incomes

These outputs should translate into the following **outcomes**:

- Improved smallholder access to better quality seeds
- Increased investment and improved regulatory systems to support biotechnology and nanotechnology
- Increased food security and income opportunities arising from local species
- Increased investment in public and private research and extension systems
- Improved access of rural poor to promising high-benefit/low-risk technologies
- Enhanced diversification of rural activities
- Increased adoption of policies that sustainably increase agricultural productivity
- Adoption of resource-efficient policies
- More effective policies in support of value chain integration for local agrobiodiversity

We will strive to make our research findings relevant and available to a wide range of people and groups who can effectively act on them. **We will make use of regional forums, GFAR, and universities to ensure that our data and findings are peer-reviewed and shared as widely as possible. Through our work with partners, we will strive to ensure that our research on raising agricultural productivity sustainably will be demand driven and owned by NARSs, governments, donors, NGOs, and the private sector.**

The contributions of Subtheme 1.3 to achieving **impacts** and contributing to the SLOs are described in Table 2.1 in Section 2.

Subtheme 1.4. Social Protection Policies

Rationale

The principal drivers for achieving the goals of this CRP—increased food security and incomes for the rural poor—are necessary to meet the CRP's objectives, but they are not sufficient in themselves. Certain groups may not be able to benefit directly from these activities—for example, households with low and nonexistent land endowments and individuals suffering from illnesses and disabilities. In addition, many of the world's poorest households live with great risk, related, for example, to weather and price variability and health. When health, climate, or price shocks hit, households may cut back on consumption, reduce investments in education, or sell productive assets. Even the potential of an uninsured shock has welfare costs if it discourages smallholders from adopting potentially more productive technologies. The malign effects of risk and the goal of ensuring that all households experience growing incomes while maintaining or increasing their asset bases provide the rationale for including social protection in this CRP.

Social protection refers to a set of benefits available from the state to the individual or household to reduce hunger, poverty, vulnerability to poverty, and other forms of deprivation. Social protection encompasses three broad sets of public action (see Figure 4.1):

- Social safety nets: Safety nets are targeted noncontributory programs that transfer resources to poor households, such as cash welfare payments, school feeding programs, subsidies to goods purchased by the poor, and public works schemes.

- Publicly provided state contingent insurance: Here, financial assistance is triggered by an event—for example, drought, illness, or unemployment. Eligibility and benefit levels are typically based on past contributions, not current poverty status.

- Elements of social-sector policies: Such policies complement social safety nets and include fee waivers for the use of primary healthcare facilities, interventions to prevent malnutrition in preschool children living in poor households, and free primary education.

Figure 4.1—Components of social protection
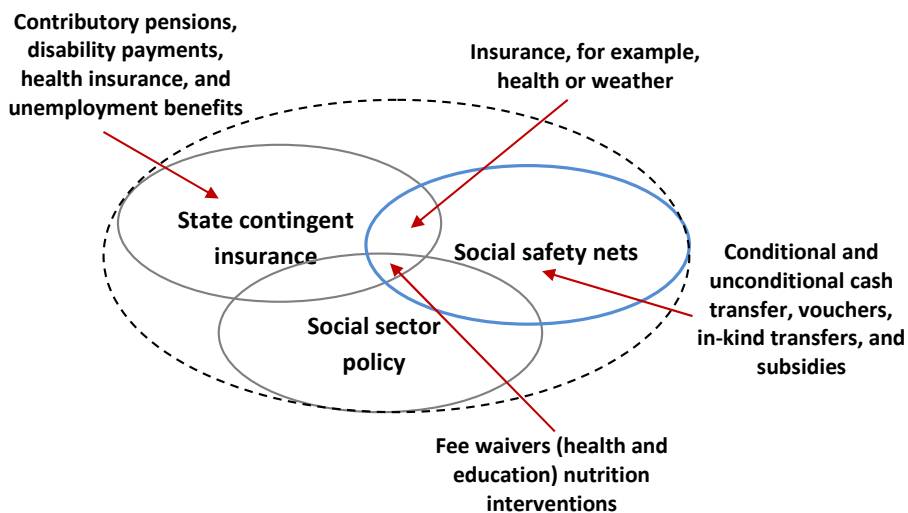
Source: Adapted from Gentili and Omano (2009).

Within the universe of social protection interventions, this subtheme will focus on social safety net programs and forms of state-contingent insurance relevant to poor people in developing countries. The goal is to clarify how safety net and insurance programs can promote agricultural development and increase rural incomes by creating assets, as well as reduce risk and protect assets from shocks so that the rural poor who cannot directly benefit from enhanced agricultural growth are not left behind. As such, it addresses two system-level outcomes—rural poverty reduction and improved food security—both through the direct impact of social protection on these outcomes and through its indirect impact on the ability of poor rural households to take up new agricultural technologies.

Work carried out under this subtheme will link to value-chain work within this CRP (to understand how risk can affect the adoption of new technologies and how these risks can be reduced or mitigated; see Theme 3) and on gender and assets (see Subtheme 2.4). The work on the effects of risk, the consequences of shocks, and the role of social protection in mitigating shocks will link with CRP7.

Selected Research Questions

- How are benefits from social protection interventions distributed across beneficiaries, in particular between men and women and within households?

- Under what circumstances does social protection stimulate agricultural income growth, asset preservation and accumulation? Which farmers benefit the most? Are these benefits gender differentiated?

- How can innovations in insurance markets provide better health and livelihood protection for poor households, and men and women and their assets? How can these innovations complement and strengthen publicly provided safety nets and existing semi-formal and informal insurance arrangements?

Proposed Research Activities

Targeting beneficiaries, distributing benefits, and assessing impact on assets

Social protection programs must be carefully designed if they are to deliver the greatest possible benefit to the neediest people in the most efficient way. Sound evidence can inform this design, and countries have shown themselves to be eager to adopt social protection programs that are backed up by such evidence (as in the case of CCTs). Many questions remain, however, about how best to design and implement social protection interventions for different populations and in different countries. This research will address how to target the beneficiaries of social protection interventions, determine the distribution of benefits across and within households, and assess the impact on food security, poverty, and asset protection and formation. Researchers will work with stakeholders, including governments, civil society organizations, and donors, to design and implement demand-driven evaluations of pilot programs. These evaluations will assess how the implementation modality affects asset creation and the targeting of benefits across and within households. Aspects to be assessed will include the form in which resources are provided to households (cash, vouchers, food items, or other in-kind goods), delivery mechanisms (subsidies, direct payments, use of ICTs, and other technologies), and whether the transfers are conditional or unconditional (that is, whether disbursement is contingent on specific behaviors, such as children's school attendance). Where feasible, researchers will assess multiple types of interventions—for example, those providing both food and cash—to facilitate comparative analysis. This work will also examine the interface between transfer modalities and the gender and generational dimensions of resource allocation within households—for example, the perceived and actual differences between transfers targeting women or children and those targeting households more generally.

The role and effectiveness of social protection interventions in Latin America are well understood, but their role in Sub-Saharan Africa is less well understood. In South Asia, some evidence exists on the impact of public works programs, but much less evidence is available on direct versus conditional transfers. For these reasons, we anticipate that the bulk of this work will be carried out in Sub-Saharan Africa and South Asia. Research activities will involve collecting socioeconomic data using both quantitative and qualitative methods. Where appropriate we will use double differenced randomized control trials (RCTs) or quasi-experimental methods (such as matching methods and regression discontinuity designs) combined with qual-quant process and operations research.

IFPRI and other centers have undertaken past work on social protection, but the focus here on the interplay between modality, gender, and impact is new. Initial work on this topic was funded externally in 2010. Because the transfer component of this work is expensive, we will continue to work with partners who will provide funds for both the transfer programs and the data collection. CRP funds will be used to support the analysis and dissemination of results.

Social protection and agriculture

Potential synergies between social protection and the delivery of agricultural innovations, including those that strengthen the value chain, are underexploited. Poor households often fail to adopt new innovations because they lack the necessary working capital to get started or are unable to risk failure. Conceptually, it is clear that combining agricultural innovations with social protection programs, particularly social

safety nets, can help overcome these constraints, but evidence of these complementarities and their implications for the design of social protection and agricultural interventions is lacking. An important aspect of this work will be the distributional consequences of such interventions. This work will involve dialogue at national and regional levels to inform policymakers of these potential synergies.

Interface between social protection and market mechanisms for addressing risk

Certain components of social protection, such as insurance, may be more efficiently provided by the market rather than the state. Under this research activity, we will work with private insurers to explore the design of affordable insurance contracts. We will also work with governments and the private sector to determine appropriate institutional arrangements for the provision of such insurance (whether reinsurance of publicly provided safety nets, the provision of individual insurance through public–private partnerships, or the provision of insurance for semi-formal and informal organizations). At the household and individual level, we will undertake survey and experimental work to determine the willingness and ability of poor households to pay for insurance products, such as health and livelihood insurance. Insurance itself is an innovation, so we will identify constraints that prevent or inhibit poor households from adopting or purchasing innovative financial products designed to reduce risk. Based on earlier analyses of the sources of risk of greatest concern to the poor, work will initially focus on the development of weather and health insurance, beginning in East Africa and South Asia, and thereafter gradually expanding to other parts of the developing world.

Setting Priorities

The three research activities are closely linked, so the successful implementation of this subtheme requires that all three activities move forward. Nevertheless, the first activity on targeting beneficiaries, distributing benefits, and assessing impact is better funded across the various institutions and initiatives, and its policy findings are more established compared with the activities on social protection and agriculture and social protection and risk mechanisms. **Hence, in the event that cutbacks are required, in order to scale up high-impact work on the last two activities, we will scale back the use of CRP funds for the first activity, expanding it more slowly than originally envisaged.**

Partnerships

Collaborators in implementing this research include developing-country governments at national, regional, and local levels, including ministries of finance and agriculture and those responsible for implementing social protection programs; international agencies such as the World Food Programme, IFAD, World Bank; regional banks such as ADB, AfDB, and IDB; civil society organizations; developing-country research institutes; and the private sector. These partners will supply the resources needed for the transfers (such as money and staffing), as well as collaborating in the design and implementation of interventions. In addition, these collaborators are the primary audience for the research outputs and outcomes produced.

Comparative Advantage of CRP2

The main alternative suppliers of CRP2 on Subtheme 1.4 are the following (in alphabetical order):
- Addis Ababa University
- Bangladesh Institute of Development Studies (BIDS)
- Bangladesh Rural Advancement Committee (BRAC)
- Cambridge University
- CARE
- Centre for Development Research (ZEF), Bonn University

- Catholic Relief Services (CRS)
- Ethiopian Development Research Institute (EDRI)
- Indian Institute of Technology (IIT), Mumbai
- M.S. Swaminathan Research Foundation (MSSRF)
- Overseas Development Institute (ODI)
- Oxfam
- Oxford Policy Management (OPM)
- University of California, Berkeley

The comparative advantage of CRP2 over these competitors takes several forms:
- Leveraging international experience to promote knowledge sharing across a wide variety of country contexts
- Designing and implementing interventions using randomized or nonrandomized methods
- Undertaking impact evaluation
- Performing quantitative/statistical analysis
- Creating policy dialogue and engagement
- History of long-term engagement with alternative suppliers

Outputs, Outcomes, and Impacts

Research in this subtheme will provide evidence that can be used to better design social protection and agricultural interventions and that will be communicated along all three impact pathways (informing research, influencing policy development, and providing policy recommendations, see Section 3).

Research **outputs** will focus on creating knowledge on
- the design of social protection interventions that more cost-effectively protect and increase the asset bases of poor households;
- the design of social protection interventions that reach neglected and vulnerable groups;
- improved understanding of linkages between social protection and agriculture; and
- improved understanding of the gender-differentiated impacts of social protection interventions.

Work on this subtheme will contribute to the following research **outcomes**:
- Interactions with governments, donors, and other development community stakeholders, combined with further dissemination of research outputs in newsletters, briefs, and materials understandable to project staff (as well as peer-reviewed publications), will contribute to improved social protection interventions and better integration of social protection and agricultural growth policies at the national level. We will engage with these actors during the development of specific interventions and as part of general policy discussions on the appropriate role and scope of social protection. These interactions and others that take place during process and impact evaluations will allow us to understand the needs of stakeholders, the constraints they face, and the most effective means of communicating new knowledge and its implications for policy.
- Evidence from this research will contribute to the design of new insurance products and services that poor households can use to protect their consumption and assets, based on interactions with both suppliers of insurance products (private

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companies, NGOs) and the demanders of these products (smallholders) during product development, implementation, and evaluation.

- Policy recommendations can improve the balance between components of social protection that can be provided by the market and those that can be cost-effectively provided by the state.

The contributions of Subtheme 1.4 to achieving **impacts** and contributing to the SLOs are described in Table 2.1 in Section 2.

Theme 2. Inclusive Governance and Institutions

Introduction

For new policy ideas to be translated into changes on the ground, two conditions need to be met: (1) policy ideas must be formulated into policies; and (2) policies must be adequately implemented.

Subtheme 2.1 (Policy Processes) will study research-policy linkages and policy implementation processes in order to increase the likelihood that science- and evidence-based policy options will be adopted into progressive reforms.

One major obstacle to policy implementation arises from the failure of governments and markets to provide rural services and infrastructure. Subtheme 2.2 (Governance of Rural Services) will address this issue by identifying governance arrangements suitable for providing critical rural services and for supporting effective and equitable farmer organizations, resource user groups, and producer groups.

Tenure security and capacity for collective action are prerequisites for reducing poverty and enabling more effective management of common pool resources and environmental services. Moreover, agricultural policy processes often suffer from the lack of voice of smallholder farmers and women, who make up so much of the agricultural labor force in developing countries. How can sound arrangements for property rights and collective action be achieved, and how can small-scale producers be empowered to increase their voice in policy decisions and to gain access to investment and market opportunities? These are the questions that Subtheme 2.3 (Collective Action and Property Rights) will strive to address.

Translating increased productivity and incomes into sustainable rural development requires ensuring that poor people are able to accumulate the tangible and intangible assets that will allow them to generate sustainable livelihoods. Such changes often go beyond single policies and require appropriate institutional structures. To address this challenge, Subtheme 2.4 (Institutions to Strengthen the Assets of the Poor) will focus on creating enabling institutions for the poor.

Although the focus of each subtheme is distinct, complementarities between the subthemes will be maximized by regular sharing of methods and results.

Partnerships for participatory action research between CGIAR research institutions and policy actors as well as implementing organizations will be used to improve the links between research, policymaking, and policy implementation. Theme 2 will also focus on capacity building in these areas. The theme is designed to distill lessons that can be adopted by a wide range of organizations involved in policymaking and implementation. By focusing on ways in which research can be used more effectively in agricultural policymaking and implementation, the theme will increase the overall institutional and policy impact of CGIAR research.

Methods and Data

CRP2 will use a range of methods to identify mechanisms for improving the policy processes and institutions critical to increasing agricultural incomes and strengthening the assets of poor people.

Quantitative methods will include surveys of individuals, households, users, and providers of infrastructure and services as well as actors involved in policy processes. Where possible, research will use longitudinal surveys and panel data to facilitate research on changes over time. Quantitative methods for analyzing policy processes will go beyond the existing political economy models developed in agricultural economics and apply innovative approaches to link political bargaining models with economywide models, taking into account the role of voting behavior, lobbying strategies, and belief systems (see Henning 2008; Henning, Saggau, and Hedtrich 2010). Quantitative methods for analyzing asset accumulation will include randomized allocation of interventions to control or treatment groups, propensity score matching to construct a counterfactual comparison group, regression discontinuity designs that exploit eligibility criteria to create the counterfactual, and instrumental variables approaches (see Ravallion 2008 for a discussion of program evaluation methods).

Experimental game methods and randomized experimental design will be used with infrastructure and service providers, as well as collective action groups. New applications of experimental games will enable us to study the effects of rule changes on cooperation and provide feedback to user groups to help them increase. Social network analysis will be applied to model, measure, and promote the inclusiveness and use of networks, including policy networks, to promote collective action, innovation, and use of best practices. Qualitative methods will enable evaluators to hear the impact of an intervention "in their own words," as well as to better understand the processes that underlie the success or failure of the intervention. Participatory assessments, participatory mapping methods such as Net-Map (Schiffer and Waale 2008), life histories, focus groups, and key information interviews are among the qualitative methods that will be applied to this theme.

Subtheme 2.1. Policy Processes

Rationale

Policymaking processes that are inclusive and based on evidence are an important dimension of good governance. However, agricultural policy processes are often dominated by vested interests and lack of inclusion and participation, which limits the voice of smallholder farmers and women in policymaking. Likewise, there are often weak analytical capacity and limited political incentives to use research-based evidence as a basis for agricultural policymaking. These factors constrain the effectiveness of policy research, including that conducted by the CGIAR. This subtheme specifically addresses this challenge. Only a better understanding of the strategies that can make agricultural policy processes more inclusive and evidence-based will enable us to create strong demand for our research products by policymakers and their advisers, which is an essential element of an effective impact pathway.

The political economy of agricultural policymaking has been subject to extensive academic research, mostly with a focus on formal models and cross-country regressions. A recent review by Swinnen (2010) points to the limitations of this approach and emphasizes the need to combine modeling approaches with detailed knowledge of individual countries and other methods such as analytical narratives. Here is where CGIAR policy researchers have a comparative advantage, thanks to their experience with modeling approaches on the one hand and their extensive country presence and involvement in policy processes on the other. Accordingly, this subtheme will combine innovative methods to model political decisionmaking processes (Henning, Saggau, and Hedtrich 2010) with innovative participatory approaches to engage stakeholders, including farmers' and women's organizations, in policy processes (Schiffer and Waale 2008). This research will also serve other CPRs by identifying the factors determining the political feasibility of policy options and improving our knowledge on the types of interactions and communications among researchers, stakeholders, and political decisionmakers that can promote effective policy changes. Special priority will be given to strategies that increase the voice of smallholder farmers, including women, in the policy process. The subtheme will also identify the political factors that promote policy implementation, considering that lack of political

incentives for implementation often undermines the effectiveness of policy change (Birner and Resnick 2010).

This subtheme can be compared to "constraints to adoption" research in technical fields: it will identify the factors that facilitate or limit the uptake of policy research findings.

Selected Research Questions

Key questions include the following:

- What are the determinants of political feasibility of agricultural policies and policy reforms?
- How can participatory policy processes and research-based evidence contribute to pro-poor policy change?
- Which factors promote the effective implementation of pro-poor policy decisions?
- Which factors increase the performance of the political system in responding to opportunities and challenges for pro-poor agricultural development?

Proposed Research Activities

These research questions will be investigated from a comprehensive perspective of the overall agricultural and food system, taking into account where decisionmaking and rule-setting power lies and acknowledging that the state formal institutions often play a limited role in determining policy outcomes. Consequently, research under this subtheme will address the interactions between the state and civil society (local and international NGOs and associations), the private sector, and donor agencies, all of whom play an important role--especially in the context of weak states. This research will explore diverse levels and types of policies and will also address the influence that international and regional policymaking has on national and subnational policy choices. Research will focus on three new areas, which are particularly important for increasing the effectiveness of CGIAR research.

Country-specific research on the politics of supporting smallholders and women in agriculture and natural resource management and promoting institutional reforms in this area

Since smallholder producers, and especially women smallholders, have limited political voice, agricultural policies generally fail to support smallholder agriculture or are biased in favor of larger commercial enterprises. Examples are agricultural input subsidies or concessions for forest and fisheries exploitation. Institutional reforms that aim to empower smallholder producers and resource users face particular political obstacles because they involve the devolution of state authority. Other areas of CRP2 and the policy research in other CRPs focus on identifying the policies and institutional reforms that are most suitable to support smallholder agriculture, building on existing CGIAR research. We will increase the effectiveness of this research by analyzing the political economy of formulating and implementing such policies under this new priority area. We will place emphasis on collaborating with CGIAR centers' research activities on institutional reforms, such as the devolution of authority for managing irrigation systems, forests, fisheries, and rangelands to community-based organizations, agricultural research and extension systems and livestock services, and agricultural market reforms. Research will focus on political factors that have been relatively neglected in the existing agricultural economics literature on agricultural policies, such as the role of leadership and policy beliefs.

Political participation and research-policy linkages

Political participation is a key topic for pro-poor politics—both in terms of understanding which mechanisms allow for effective and efficient collective political action and in terms of studying the role of participation through voting behavior via institutions of representative democracy, such as parliaments.

Other avenues of participation comprise informal mechanisms of social accountability, social movements, civil society advocacy, and the media. Because of long experience in leadership of this type of research, the research team, from IFPRI and other CGIAR centers, has a comparative advantage in conducting research on the political participation of smallholder farmers and resource users, including women. Action research will play an important role in this activity, by organizing platforms linked to the other major research activities of the CGIAR and beyond where policymakers, stakeholders, and researchers can interact effectively over time

Analysis of community and local government political processes

Decentralization, devolution, and community-driven development approaches have created new spaces for political participation at the local level, and important decisions related to agricultural development are now made at that level. Local political processes often offer special opportunities for women in policymaking, especially in countries that reserve seats for women in local councils. Ensuring that local politics are pro-poor is a challenging task, owing to widespread problems of elite capture and limited capacity. While research on local governance is undertaken by a wide range of research institutions, relatively limited attention has been paid to specific agricultural policy issues in this context, an area where the CGIAR has a clear comparative advantage because of their extensive expertise on agricultural policy and field experience and presence including Country Strategy Support Programs.

Setting Priorities

The three research activities described are presented in order of priority. As already explained, this research not only provides valuable information on its own, but it has been specifically designed to complement other CGIAR policy research. The full budget proposal includes standalone research on the policy process; if budget constraints apply, the research will initially focus on and integrate with projects that complement other policy research under CRP2. This integration will allow research in this area to be conducted with lower budgets.

Partnerships

For this research subtheme, CRP2 will build partnerships with research organizations specializing in political science and agricultural policy analysis, including institutes in the US, Europe, and Australia, such as the Kennedy School of Government, Harvard University, the LICOS Center for Institutions and Economic Performance, the University of Leuven, Belgium, and departments dealing with agricultural policy analysis at the Universities of Kiel and Hohenheim, Germany. These partnerships will allow for synergies between the specific political science expertise of these institutions and the expertise of the CGIAR in agricultural policy as well as its close involvement with partner institutions and policy processes at the country level. Equal emphasis will be placed on partnerships with university institutes and political science think tanks in the countries where the research is being conducted, such as the Department of Political Science at the University of Ghana, Legon, the Department of Political and Administrative Studies at Chancellor College, University of Malawi, and the Center for the Study of Law and Governance at Jawaharlal Nehru University, New Delhi.

Given the nature of this research subtheme, partnerships with policymakers and stakeholders are particularly important as well. Apart from staff in ministries and departments of agriculture, who have traditionally been strong partners of the CGIAR, new partnerships will be developed with elected political representatives, ranging from parliamentarians to local council members, and with civil society organizations, including farmers' and women's organizations. In the work on policy processes, researchers will intensify their collaboration with FAO, and especially FAO's country-level representatives, who are typically strongly connected to agricultural policymakers and stakeholders in the respective countries. Partnerships will also be developed with the associations that represent small-scale

private sector organizations engaged in agribusiness. Finally, to strengthen the capacity of the partners for participatory and evidence-based policy-development, researchers will work with institutes that train elected representatives, policymakers, and civil society organizations.

Comparative Advantage of CRP2

The main alternative suppliers of CRP2 on Subtheme 2.1 are the following (in alphabetical order):
- Center for Development Research (ZEF)
- Center for the Study of Law and Governance (CSLG), Jawaharlal Nehru University, India
- Department of Political and Administrative Studies, University of Malawi
- Harvard University, John F. Kennedy School of Government
- Humboldt University, Berlin
- Institute of Development Studies (IDS)
- Institute of Environment and Economic Development (IEED)
- Institute of Policy and Strategy for Agricultural and Rural Development (IPSARD), Vietnam
- Political Science Departments of Cornell and Texas A & M Universities
- University of Hohenheim
- University of London

CRP2's comparative advantages with respect to these organizations include the following:
- The presence of research teams in partner countries and well-established, close links to the policymaking process at the country level
- Specific expertise and focus on policy processes related to agriculture, food security, and rural development

Outputs, Outcomes, and Impacts

Outputs include the following:
- Case studies documenting how public policies and investments are made, and what drives the choice among alternative policies

- Improved understanding of the political feasibility of different agricultural policies and food policy reforms

- Identification of factors that promote effective implementation of pro-poor policy decisions

- Synthesis of evidence on causes for the limited political voice of the poor to shape agricultural policies in their favor, and recommendations on how their voice can be enhanced

Outcomes include the following:
- Better understanding of the pathways from research to policy and the capacity of CRP2 researchers to undertake research outreach

- Effectively and constructively integrated CRP2 research in policymaking processes

- Improved processes leading to policies and investments by reflecting insights from research under this subtheme

- Greater role and voice of women, smallholders, and the poor in formulation, design, and implementation of policies affecting them

IFPRI's Country Strategy Support Programs will provide a platform for dissemination and outreach such that evidence-based research results can facilitate public dialogue on key issues at various levels of government, civil society, and the private sector. In addition to direct work with stakeholders in the research under this subtheme, another avenue through which outputs of policy process research will be used is by informing other policy research, including other subthemes of CRP2. Regular communication with other research teams in CRP2 will therefore be an important channel for increasing application of this research.

The contributions of Subtheme 2.1 to achieving **impacts** and contributing to the SLOs are described in Table 2.1 in Section 2.

Subtheme 2.2. Governance of Rural Services

Rationale

Smallholder-based agricultural development depends on the effective provision of many types of services (such as agricultural research and extension, finance and insurance, land administration, and food safety regulations) and rural infrastructure (such as rural roads, electrification, postharvest processing, and commodity storage). Efforts to improve rural service and infrastructure provision in recent decades have included governance reforms that, for example, involved local communities and the private sector in providing services and assigned a coordinating, regulating and facilitating role to the state (World Bank 2007). These efforts have often had limited success, and there are persisting knowledge gaps about which governance arrangements best fit a specific situation. For example, it is unlikely that the rural poor will benefit from better access to inputs and services unless there is better knowledge of how to develop well-functioning commercial input supply systems or successful farmer-driven extension systems. In view of its geographical and subsectoral coverage, the CGIAR is in a unique position to promote cross-country learning on what governance arrangements work best where and why.

Against this background, the goal of this subtheme is to contribute to the formulation of more effective, poverty-oriented, and gender-sensitive policies and governance arrangements that can support the provision of services and infrastructure essential for crop and livestock production, forestry, and fisheries. To reach this goal, the research will

- identify innovative institutional arrangements to provide services and infrastructure, involving the public sector, the private sector, and civil society organizations; and
- identify and enhance governance reform strategies that strengthen the capacity and the incentives of the organizations involved in implementing agricultural policies and regulations.

Selected Research Questions

- Which governance arrangements ensure that agricultural research, extension, and education systems and other institutions in the agricultural innovation system are effective in promoting innovation in agriculture, especially among male and female smallholder farmers?
- Which governance arrangements are most appropriate to ensure effective regulatory services in agriculture, such as biotechnology, biosafety, food safety

regulations, quality control of inputs, regulation of agrochemicals and veterinary drugs, and standards and labels?

- Depending on context-specific factors, what is the appropriate institutional set-up for managing rural infrastructure[13] in support of smallholder agriculture? How can such institutions be more inclusive in terms of gender and marginalized groups?

- What are the appropriate regulatory frameworks for agricultural finance and insurance to ensure that the different risks facing rural lenders (such as banks) are recognized and that the soundness of lending institutions, including the protection of deposits, is assured?

- What are the most appropriate governance structures for the institutions in charge of land administration and management, including conflict resolution regarding land?

Proposed Research Activities

A wide range of academic institutions and think tanks are studying governance reforms such as liberalization, decentralization, and public sector reforms, but this research often fails to address the application of governance reforms to agriculture and natural resource management—the specific area of focus of this subtheme. This is an area in which the CGIAR has a clear comparative advantage.

Public sector reforms and strategies to create an enabling environment for the private sector and civil society

Public sector reforms are essential for (1) creating an enabling environment for the private sector and NGOs; and (2) effectively providing the services and infrastructure that allow markets to function. Research in this area will focus on the governance reform strategies for ministries, departments, and agencies responsible for agriculture, livestock production, fisheries, and forestry, including public sector research, extension, and education organizations; regulatory agencies; agencies in charge of road management; and agencies in charge of land registration and management.

Decentralization

Agriculture depends on a mix of centralized and decentralized services. Since some subject areas, such as food security and the prevention of crop and livestock diseases, require central coordination, some services are most effectively organized at the level of agroecological zones or the national level. Others, such as extension services, can be decentralized to the community level. Countries may also benefit from delegating some agricultural subjects, such as agriculture-related regulations, to the supranational level. The appropriate level of political, fiscal, and administrative decentralization or regional integration for agricultural services also depends on a range of country-specific conditions, such as government capacity and scope for elite capture at different levels.

Public sector management reforms

Better service and infrastructure provision also requires management reforms in the areas of financial and human resource management, to strengthen capacity and staff incentives, improve the working environment, and reduce undue political interference. Research in this area will focus on innovative approaches, including e-governance (for example, for land registration and program implementation), to resolving these longstanding problems that affect the performance of agricultural institutions.

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[13] Comparable work will be done for the management of irrigation institutions in CRP5.

Farmers' empowerment

In all governance reforms relating to agriculture, it is essential to build the capacity of farmers to demand better services and infrastructure and to hold providers accountable. Such "demand-side" governance reforms include ensuring that farmers—whether male or female, large-scale or smallholders—are represented in organizations providing infrastructure and services. Empowerment strategies include participatory planning, monitoring and evaluation methods, participatory budgeting, citizen report cards, complaint mechanisms, social audits, and right-to-information approaches. Farmers' organizations can also be empowered to award service contracts and become service providers themselves--for example, in the case of dairy cooperatives. Research in this area will focus on the factors that influence the success of such reform strategies, paying special attention to strategies that build the capacity of inclusive farmers' organizations representing the voice of smallholders and both male and female farmers.

Setting Priorities

Within this subtheme, the highest-payoff activities are those that deal with services that support agricultural innovation, land administration, and management of rural infrastructure.

Partnerships

Activities under this subtheme will involve policymaking and implementation organizations in order to catalyze changes along the impact pathway. At the policy level, it will be important to work with actors involved in policy processes, such as parliamentarians, members of the executive, policy planning units in the relevant ministries, elected and administrative members of local governments, producers and agribusiness organizations, and the media. A range of advocacy groups, including women's and indigenous people's groups, will be targeted to enhance the influence of research outputs on policies that shape service provision.

To pilot and evaluate new institutional arrangements, CRP2 researchers will seek partnerships with providers of services and infrastructure in the public and private sectors and civil society organizations. Examples of these types of organizations include agricultural research, education, and extension organizations; land administration institutions; forestry agencies and forest user groups; agricultural banks and insurance companies; regulatory agencies; and NGOs and farmer organizations, including cooperatives. Because these organizations are directly involved in service provision, engaging them in the research process will facilitate the transfer of knowledge so that they can in turn deliver better services to their clients. Special attention will be paid to working with institutions that train agricultural service providers and strengthen the capacity of service users, especially in terms of women's ability to hold agricultural service providers accountable. The CGIAR will also collaborate with international organizations that support governments in their efforts to improve agricultural service provision, such as FAO or OIE. Another set of partners will consist of development partners and international financial institutions that finance reform processes for agricultural services and infrastructure. An example of this collaboration between the CGIAR and other global organizations in the field of agricultural governance is the newly established Global Partnership for Land Governance Assessment, which includes FAO, IFAD, UN-Habitat, the World Bank, and IFPRI (with IFPRI housing the partnership secretariat).

Comparative Advantage of CRP2

The main alternative suppliers of CRP2 on Subtheme 2.2 are the following (in alphabetical order):
- Agricultural Economics Departments of US Land Grant Universities
- Center for Development Research (ZEF), Bonn

- Center for the Study of Law and Governance (CSLG), Jawaharlal Nehru University, India
- Centre for Study of Social Exclusion and Inclusive Policy (CSSEIP), India
- Department of Political and Administrative Studies, University of Malawi
- Humboldt University, Berlin
- Institute for Social and Economic Change, Bangalore
- Institute of Local Government Studies (ILGS), Ghana
- National Center for Agricultural Economics and Policy Research (NCAP), India
- Overseas Development Institute (ODI)
- Pakistan Agricultural Research Council (PARC)
- School of African and Oriental Studies (SOAS), University of London
- University of Hohenheim
- University of Kiel

Areas of comparative advantage for CRP2 are:
- Research closely linked to the policymaking at the country level in rural service provisions
- Specific focus on the governance of rural services
- Presence of research teams in partner countries
- Well-established links to public sector and civil society organizations that provide respective services at the country level
- Close links to agencies that fund rural services
- Close collaborations with both alternative supplies of such research and demand for it

Outputs, Outcomes, and Impacts

The research outputs in this subtheme will provide a range of policy options for delivering more effective and equitable services to smallholders and the rural poor. Research will identify key factors that influence the suitability of different governance arrangements for agricultural service and infrastructure provision and provide tools for assessing governance arrangements, including arrangements for controlling corruption and creating a conducive business environment in agriculture. The research activities will generate learning among the implementing organizations by facilitating collaboration among the public and private sectors and civil society organizations involved in providing infrastructure and services. These partnerships will promote capacity development and cross-country learning, thereby promoting institutional change at the implementation level and leading to efficient infrastructure and service provision in response to the needs of the rural poor. For example, the Global Partnership for Land Governance Assessment convenes panels of national experts to undertake land governance assessments, which engage high-level policymakers to identify priorities for improvement in land governance services. This leads to identification of priorities for research, with findings taken up not only within the countries of the research, but also internationally through the network of other organizations in the global partnership. The effectiveness of the research under this subtheme will be measured in terms of recipients of infrastructure and services based on defined quality per unit of investment.

Additionally, this research will facilitate collaboration with institutions in charge of training, service delivery personnel employed at universities, civil service colleges, local government training institutes, and vocational training institutions for agriculture. In addition to the specific research outputs derived from the activities outlined above, the findings of the research will be integrated into training modules and material used by these organizations to increase the multiplier effects of the research.

List of **research outputs**:

- Evaluations of the determinants of effective and efficient delivery of public services to smallholder farmers and the rural poor, and of the determinants of access to these services

- Innovative methods to design rural services that improve the productivity and welfare of the poor

- In-depth analyses and insights on how public services can be more gender-equitable, using innovative gender-disaggregated data collection methods

- Practical tools and materials for assessing the suitability of different governance arrangements for providing agricultural services and infrastructure

- Development of typologies of land governance and of a framework to assess the quality of land-related services

- Virtual platforms and in-person workshops to increase adoption of evidence-based good practice guidelines on the governance of rural services

List of **research outcomes**:

- Improved quality, quantity, and effectiveness of rural services and infrastructure

- More equitable access to rural public services between men and women

- Stronger targeting of rural services to the poorest households and to vulnerable groups (including lower social strata)

- More allocatively and technically efficient use of resources in the delivery of agricultural and rural services

- Stronger public sector capacity to appropriately adapt governance systems to country conditions for better results for the agricultural and rural poor

The contributions of Subtheme 2.2 to achieving **impacts** and contributing to the SLOs are described in Table 2.1 in Section 2.

Subtheme 2.3. Collective Action and Property Rights

Rationale

Farmers, fishers, pastoralists, and forest-dependent communities are struggling to maintain and improve their livelihoods in the context of intensifying resource competition. A number of trends are jeopardizing these producers' livelihoods, including increased integration of international agricultural markets, increased investments in agricultural resource assets and natural resource extraction, growing populations, a shrinking and degrading resource base, new markets for environmental services including carbon sequestration, and the growth of biofuel at the expense of food crops. Producers need secure access to land and other natural resource assets (forests, rangelands, water, and fisheries) to achieve sustainable natural resource use and agricultural production systems, because property rights give producers incentives and authority for long-term investment. At the same time, coordination is needed to manage resources and develop livelihood strategies beyond the individual farm level (Meinzen-Dick et al. 2002). Collective action and property rights provide a fundamental basis for managing natural resources, addressing climate change, and reducing resource-based conflict. Collective procurement of agricultural inputs and services and collective marketing of produce can lower transaction costs for smallholders and

address market failures. Thus tenure security and capacity for collective action are prerequisites for reducing poverty and making local livelihoods more resilient in the face of rapid economic and ecological change. How can sound arrangements for property rights and collective action be achieved? Applied research for development can help strengthen appropriate institutions, from local to regional scales, and derive lessons that will catalyze institutional and policy change in other areas (Ostrom 2007).

The goal of this subtheme is to strengthen appropriate property rights and collective action institutions that contribute to sustainable natural resource management and reduce poverty. Research under this subtheme will engage multistakeholder networks through the CGIAR Systemwide Program on Collective Action and Property Rights (CAPRi) to

- increase security of resource tenure for small-scale producers;
- enable more effective management of common pool resources and environmental services; and
- empower small-scale producers to increase their voice in policy decisions and to gain access to investment and market opportunities.

CRP2 researchers will work jointly with multistakeholder networks that articulate a focused demand for learning to influence policy and institutional reform. Empirical research conducted in collaboration with CRPs 1, 5, 6, and 7 will support poverty reduction and sustainable agricultural and natural resource-based livelihoods (in dryland, coastal, aquatic, watersheds, and forested systems, etc).

Selected Research Questions

- What are effective ways to strengthen the access and tenure security of poor men and women to land, water, trees, and other critical natural resources in the face of increased and globalized competition for resources, particularly in multiuse landscapes?

- What combinations of property rights are needed for small-scale producers to improve environmental management, enhance production, and be active participants in value chains?

- What community and state actions are needed to secure rights to, and effectively manage, common property (for example, water, rangelands, forests) and environmental services (for example, genetic resource conservation, water and watershed management, pest management, carbon sequestration), especially for smallholders, pastoralists, fishers, indigenous peoples, women, and the poor?

- What interventions increase the effectiveness of collective action and its inclusion of women and marginal groups? What measures help reduce gender and other inequalities in accessing, participating, and leading collective action institutions?

Proposed Research Activities

Property rights and tenure security

As resources become scarcer, strategies are needed to minimize conflicts. Yet many programs to formalize property rights have ignored the multiple overlapping uses of resources that are vital to the livelihoods of the poor. This research will go beyond "ownership" as defined by state title to consider the entire bundle of rights derived from customary and statutory law. Methods include action research to strengthen the property rights of marginalized groups (for example, indigenous peoples, women); intrahousehold surveys, focus groups, and key informant interviews to identify the strength and impacts of rights held by different actors; and factors that strengthen property rights of marginalized groups. Case studies of large-scale agricultural investments and projects for biofuel development or environmental service payment programs that increase land value will identify ways to ensure that poor people share the

benefits rather than lose their resource rights. These case studies will seek innovative tenure measures to secure private, collective, and common property. This research builds on prior CAPRi work on legal pluralism and a set of four case studies on securing access to natural resources, as well as studies of carbon payments and tree tenure conducted under CRPs 6 and 7. CRP2 will carry out new studies on investor pressures and identify cross-cutting lessons.

Property rights, collective action, and improved management of resources

This research examines the interactions between various property rights with productivity and environmental sustainability, considering not only private lands, but also shared land, water, and biological resources and environmental services. Action research and the study of decentralization programs, such as joint forest management or fisheries co-management, will identify what is needed to establish effective organizations at the local level, explore the feasibility and potential outcomes of expanding local authority over natural resources, and determine the necessary state support for such efforts. Studies of programs for payment of environmental services will identify the need for collective action or certain types of property rights among smallholders for participation and how such programs can be more inclusive of the poor. Partnerships between research organizations (CGIAR, agricultural research institutes, and NARSs) and implementing organizations (NGOs and governments) will ensure that research findings are linked to national policies, donor initiatives, and international conventions seeking technical advice. These partnerships will promote the inclusion of local institutional development and secure poor people's access to development policies and programs, and identify how to measure the effectiveness of globally coordinated systems, including indicators that measure benefits delivered to the poor. Although past studies of these issues have been conducted at the local level (through CAPRi and others), new research will address these issues at a broader scale, particularly in the context of growing vulnerability due to climate change.

Collective action and empowerment of small-scale producers

Research to help small-scale producers claim their voice in policy decisions and gain access to markets will include action research involving producer organizations, NGOs, and national and international development programs designed to increase the effectiveness and inclusiveness of collective action. Cross-cutting lessons will be identified through ongoing case studies and new comparisons of the performance of hundreds of groups, meta-analysis, and agent-based modeling (Poteete, Janssen, and Ostrom 2010). New applications of experimental games provide a tool for studying the effect of rule changes on cooperation and for giving feedback to user groups to increase their cooperation. Researchers under CRP2 will work with producer, fisher, and pastoralist organizations in value chains, women's organizations participating in agriculture, and federations engaging in policy advocacy. Activities will coordinate with research conducted by CRPs 1, 5, 6, and 7, as well as CRP2 Theme 3 on collective action for agricultural production and value chains. The research will look at fisheries, rangelands, forests, water, watersheds, genetic resources, and climate change programs, providing methods and research tools; continuing CAPRi's work in learning across different types of groups through conceptual frameworks, methodologies, and meta-analyses; and commissioning new cases to fill critical gaps.

Setting Priorities

The highest-priority research within this subtheme is the expansion of work on property rights and tenure security, which feeds into the current window of opportunity in land tenure reforms, such as FAO's Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests and the African Union's Land Policy Initiative. This work will also have a heavy focus on Africa, where customary tenure is most prevalent and most insecure. Within other regions, areas with a high proportion of indigenous people and marginalized groups will receive priority because they are likely to face greatest tenure insecurity. Ongoing and new work under property rights, collective action, and improved

management of resources will also receive priority in order to address the institutional underpinnings of payment for environmental services so that they can be scaled up to help poor producers cope with climate change. Funding cuts would mostly affect activities related to collective action and empowerment of small-scale producers, which would be limited to working with and synthesizing studies under other themes and CRPs, without commissioning any new empirical work.

Partnerships

Issues of collective action and property rights are relevant wherever people manage natural resources or work together in agriculture, but the emphasis of empirical work will differ by region and agroecological zone. In Africa, interaction between customary and statutory property rights is particularly important, especially in the context of foreign investment in agriculture. In Asia and Latin America, distribution of property rights and access to resources for poor households is relatively more important. Latin America has stronger farmer movements and more gender integration of groups. Postsocialist countries, such as in Central and Southeast Asia, have experienced changes in property rights, and previous forced collectivization has often disrupted voluntary cooperation.

The research process to address these issues requires collective action across disciplines and types of organizations. CGIAR researchers work with NARSs to conduct all research, often involving top faculty in Organisation for Economic Co-operation and Development (OECD) universities and their students in the field work. Research will be conducted in close collaboration with producer organizations, NGOs, and national and international development programs.

Research and outreach will influence the formation and implementation of policies that deal with natural resource access and allocation, especially land tenure policy, at both national and international levels, to strengthen the resource tenure of women, pastoralists, fishers, and secondary resource users. Researchers participate in key networks, including the African Union Land Tenure Initiative, the International Land Coalition, and the Global Land Tools Network. Work on conditions for equitable partnerships between agricultural investors and local land users will link to initiatives by the World Bank, FAO, the International Fund for Agricultural Development (IFAD), and the United Nations Conference on Trade and Development (UNCTAD) to develop a code of conduct for agricultural investment. It will contribute to the initiative by the International Land Coalition (ILC), ActionAid, and regional farmers' organizations to widen the dialogue on large-scale land acquisitions and their alternatives. And it will seek to influence private investment trends through corporate social responsibility norms and programs in the area of property rights for the poor.

An example of this engaged mode of action research is a CAPRi project led by the WorldFish Center in Cambodia's Tonle Sap (see Box 4.1).

Box 4.1—Action research in action: A fisheries project in Cambodia

The partnership joins the key government agency, the leading domestic policy research institute, and the most important grassroots network of small-scale fishers to jointly assess the sources of competition and conflict over fishery resources and identify opportunities for building collective action across sectors to manage such competition equitably. Because all key stakeholders, including community leaders, the police, and local and provincial government officials representing a range of sectoral agencies, are analyzing the problem and exploring options jointly, solutions emerge on the spot. Because the commitments these actors make are reinforced by local mechanisms of social accountability, the action research process is catalyzing institutional change processes. Even before the project has concluded, community fishery representatives are reporting improved enforcement of local regulations that combat destructive fishing and ensure access by the poor to fishing grounds, as well as more effective resolution of tenure disputes with the commercial sector. The civil society network is maturing beyond its former adversarial relationship with government and is empowered with new capacity to work with government in seeking joint solutions. The government's recent halting of all fisheries concessions pending resolution of such issues indicates a willingness on the part of the government to address the identified problems.

Most development programs involve some type of group in managing resources, delivering services, or marketing products, but these programs often do not recognize the collective action and associated institution building necessary for success. Therefore, in addition to working directly with programs to strengthen collective action on the ground and implement decentralization policies, CRP2 researchers will share lessons on how to strengthen inclusive collective action with governments, NGOs, bilateral and multilateral donor agencies, and producer organizations.

This subtheme will bring interest groups together across sectoral or institutional boundaries to identify and support innovation and action. Input from government and development agencies, NGOs, and civil society/producer organizations will provide clear demands for analysis and capacity building in support of policy and institutional reform. Partnerships with universities will ensure that research teams learn from the most recent academic findings and that the results of this research strengthen the capacity of a new generation of researchers, who will be encouraged to go into applied research, whether in the academic, public, private, or NGO sectors. These partnerships with universities will target university curriculums, involve students in dissertation research, prepare training materials from research, and offer interdisciplinary training workshops in each region. Links with professional societies, including disciplinary associations, the International Association for the Study of the Commons (IASC), and networks such as the International Land Coalition, will ensure that findings reach broader audiences.

Comparative Advantage of CRP2

The main alternative suppliers of CRP2 on Subtheme 2.3 are the following (in alphabetical order):
- Arizona State University
- Associates for Rural Development
- Centre de coopération internationale en recherche agronomique pour le développement (CIRAD)
- Humboldt University, Berlin
- Institute for Poverty, Land and Agrarian Studies (PLAAS), University of Western Cape
- Landesa
- Phillips University, Marburg
- Property Rights Group at Norwegian University of Life Sciences, Institute for Poverty, Land and Agrarian Studies

- Workshop on Political Theory and Policy Analysis, Indiana University

CRP2's comparative advantages with respect to these organizations are the following:
- CAPRi's strong reputation for bringing together collective action and property rights research of high caliber
- Conceptual frameworks and application of best practice methods
- Close collaboration with alternative suppliers
- Ability to link theory and research to practical applications
- Strong networks with NGOs and policy agencies (governmental and international) to ensure application of research findings

Outputs, Outcomes, and Impacts

The research strategy includes exchange among multiple stakeholders to create conditions for implementing policies, laws, and institutional reforms in a manner that serves the interests of poor resource users and marginalized groups. The research will use several impact pathways to ensure that research translates into effective and inclusive collective action and tenure security for people who depend on natural resources for their livelihoods. The most immediate pathway is active engagement with user groups and government or NGO programs to improve capacity for collective action or security of tenure for the poor in the study areas. Researchers will also promote findings from studies and impact assessments of programs to help governments, NGOs, and donor agency partners address collective action in their programs. By feeding research results into discussions on international conventions, CRP2 will promote the inclusion of local institutional development and secure access rights. By articulating corporate social responsibility norms, CRP2 will influence private-sector investment to respect the customary property rights of farmers, herders, fishers, forest-dwellers, and women. Policy briefs, presentations, films, and other outreach materials will be used to share findings with other government, NGO, and donor organizations. Peer-reviewed publications will ensure the quality of research findings and feed these back to universities and NARSs. Multistakeholder networks of which CAPRi is a member—such as the International Land Coalition and the Global Land Tools Network—will provide opportunities for dissemination and uptake of research results and recommendations. This research activity will also develop and document research methods and provide capacity-building materials to ensure that a new generation of applied researchers can apply this research in new areas, creating a multiplier effect.

This research will contribute to the greater effectiveness of at least 5,000 collective action groups through direct engagement in action research and results applied by NGOs and government agencies, and to the creation in five to six subregions of robust institutions that link producer organizations and national and regional policy networks to effectively advocate for access rights for millions of resource-dependent people. By using the research results, governments will be better able to create or strengthen policies that provide security of rights to land, water, trees, and fisheries for poor and resource-dependent women and men. These policies will also contribute to achieving other poverty reduction goals, such as increased incomes and greater asset accumulation, reduced vulnerability to risks, including environmental shocks, and improved health and nutrition. Research findings, repackaged as products oriented toward policymakers and practitioners, will contribute to the creation of effective intermediary institutions advocating for the provision of secure rights to resources and highlighting the important role of local institutions, such as producer organizations, water user groups, and civic associations, in helping improve local livelihoods.

Outputs of Subtheme 2.3 include the following:
- Case studies and experimental games identifying factors leading to effective collective action groups

- Identification of effective ways to strengthen inclusive collective action and coordination for managing natural resources
- Studies of large-scale land-based investments to identify ways in which such investments can be made without loss of property rights for women and poor local populations
- Identification of effective ways to strengthen property rights to commons and customary rights
- Capacity-building materials for producer organizations and NGOs

These outputs should be translated into the following **outcomes**:
- Creation or strengthening of intermediary institutions advocating for access rights
- Programs to improve tenure security that pay particular attention to the needs of the poor, women, and marginalized groups
- Strengthening of associations of women and smallholders for improved voice in decisionmaking and market access
- Enhanced capacity of government and NGOs to work with collective action institutions (and vice versa)

The contributions of Subtheme 2.3 to achieving **impacts** and contributing to the SLOs are described in Table 2.1 in Section 2.

Subtheme 2.4. Institutions to Strengthen the Assets of the Poor

Rationale

Raising people's stock of assets has been shown to be a more enduring contributor to reducing poverty than increasing incomes alone. Like income, assets can be converted to cash, but they are also multidimensional. Assets both store wealth and can increase in value; they can act as collateral and facilitate access to credit and financial services; they help deal with unforeseen contingencies and smooth consumption streams. Their flexibility provides security through emergencies and opportunities in periods of growth (Deere and Doss 2006, 1). Increasing ownership of, and control over, assets also helps provide more permanent pathways out of poverty compared with measures that focus on increasing incomes or consumption alone. Sabates-Wheeler's (2006) review of the relationship between ownership and control over tangible assets and agricultural productivity concludes that the combination of asset inequality and market failure has a negative impact on growth and that inequalities tend to reproduce inequalities. Ownership and control of agricultural assets—physical, human, and social capital--is also highly correlated with the adoption of new agricultural technologies, including environmentally sustainable farming practices (Meinzen-Dick et al. 2002; Deininger, Ali, and Yamano 2008; Deininger et al. 2008). Agricultural development projects that seek to increase the asset holdings of poor people not only contribute to sustainable poverty reduction, but also help promote socially desirable and empowering behavior by both individuals and marginalized communities. Asset-based approaches view well-being as a cumulative process, resulting from a lifetime of stored efforts and accrued wealth (Sherraden 1991). Savings and stored wealth (assets) are necessary for the kinds of cushioning and security needed to exit poverty (Carter and Barrett 2006). This is especially true for poor women, who typically have lower levels of ownership and control over assets than men, but whose assets contribute to their empowerment and the education and health of children, reducing the intergenerational transmission of poverty (Quisumbing 2003).

Although there is increasing evidence that assets matter for moving out of poverty in the long term, we know less about the role that institutions play in enabling the poor to accumulate assets, protect them from shocks, and transmit these assets to future generations. These institutions include property rights institutions (encompassing customary and statutory laws), social protection institutions (both

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formal and informal), and inheritance laws. Social and cultural institutions, including gender norms surrounding or concerning asset ownership, as well as political institutions that determine individuals' ability to participate in and benefit from decisionmaking at the local and national levels, are also important. The role and importance of institutions is context-specific. Because institutions are not "given" but evolve in response to external factors and internal change processes, it is important for the CGIAR to know how institutions can be made more conducive to reducing hunger and poverty. The argument that attention to assets—as well as to the distribution of those assets within the household—is key to attaining better development outcomes implies a shift in the "theory of change." The conceptual framework underlying this theory of change is found in Meinzen-Dick et al. (2011). The goal of this research is to identify mechanisms and institutions to strengthen the portfolio of those assets that enable the poor to be agents of their own development, to protect those assets from adverse shocks, and to increase their stock of other assets. These assets include natural capital (rights to land, water, trees, livestock, and biodiversity), financial capital (credit, savings), physical capital (especially tools and technologies), human capital (education, health, nutritional status, extension services, knowledge of agricultural environment, and information, including access to and use of information and communication technologies), and social and political capital.

CRP2 will work with action research programs under CRPs 1, 4, 5, and 6, which seek to strengthen poor people's assets—including education, health, nutritional status, livestock, water, fisheries, agrobiodiversity, and associated natural resources—to draw out lessons related to the questions above. Because assets are multidimensional and because the relevant institutions that constrain or facilitate asset accumulation are context-specific, mixed-method approaches using quantitative and qualitative techniques will be used in a representative set of countries and regions in order to reach general conclusions.

Selected Research Questions

Differences in resource endowments and institutional settings across regions make it imperative to strive for regional balance in the research portfolio. Because gender norms and gender disparities are also quite different across regions, each region may have to develop a specific policy focus, but with comparable methodologies to enable the creation of international public goods. For example, asset poverty traps have been documented only in Sub-Saharan African societies with missing markets, particularly in capital and labor (for example, Carter and Barrett 2006). Evidence for these types of poverty traps has not been found in Asia (see Naschold 2006; Quisumbing and Baulch 2009), possibly because of the existence of well-functioning credit and labor markets. A broad question with cross-regional implications would be why the conditions and institutions that give rise to poverty traps are present in one region but not in the other. Another issue would be the different roles that control of assets play in men's and women's livelihoods. In Sub-Saharan Africa, one possible focus might be women's access to and control of assets as agricultural producers and the interaction between customary and statutory law, particularly with respect to land rights. In South Asia, where labor markets are active, the focus might be on the role of assets and access to financial services in enabling women to participate in nonagricultural enterprise and labor markets. The following are selected research questions.

- What kind of assets do poor men and women hold, how do they acquire them, and what can be done to help them build up and protect their stocks? Which assets, not typically held by poorer people, act as critical constraints to self-improvement in different contexts?

- What is the effect of trends such as increases in agricultural productivity and land values, migration, the increased role of the nonagricultural sector in the economy, and the growth of alternative financial service delivery mechanisms (such as microfinance) on poor women's and men's abilities to acquire, protect, and realize returns to assets?

- What types of human assets have been most critical for poor men and women in increasing the returns to their other assets, and what policies and programs are needed to build and enhance those types of human assets?

- What role do different types of assets play in enabling men and women to escape poverty traps, participate in agricultural and nonagricultural growth, and protect their productivity and well-being against shocks? Do the roles of assets in fulfilling these functions differ for men and women and for poor and nonpoor households?

- What are the institutional arrangements that contribute most effectively to building the assets of the poor? Of women? What existing or proposed programs or policy reforms have the potential to strengthen the assets of the poor, and reduce gender asset gaps? What institutional arrangements need to be in place to support these programs? How can action research contribute to learning about the appropriate institutional arrangements that support asset accumulation by the poor?

Proposed Research Activities

Mapping asset portfolios and understanding asset accumulation and disposal

Small-scale producers and the poor in general face serious financial constraints and are unable to obtain credit easily. They face difficulty in building their asset base. This research activity will use quantitative techniques (a household survey) and qualitative techniques (participatory assessments, life histories, focus group discussions) to ascertain the assets held by poor men and women in different country and regional contexts. The activity will adopt an inclusive definition of assets (natural, financial, physical, human, social, and political capital) and examine not only the quantities or levels of assets held by men and women, but also their quality, importance, and possible substitutability or complementarity at different stages.

CRP2 will econometrically analyze large-scale surveys and panel data, ideally with information on individuals within households, to (1) identify how broader trends and policies (such as migration, rural-urban linkages, the process of structural transformation, and the changing landscape of financial services) affect poor women's and men's abilities to acquire and protect different forms of assets; and (2) study the economic returns and other impacts (for example, empowerment, reduction in vulnerability) of assets held by women and men. Attention will be paid to the legal and political bases for asset ownership and the extent to which property rights regimes and contextual factors (including cultural practices) assist or hamper asset accumulation by the poor (this activity complements Theme 1). Attention will also be paid to the evolution of institutions that support accumulation of different types of assets by the poor--for example, microfinance institutions (the use of social capital, such as group liability, to obtain access to financial capital and thus enable the accumulation of physical capital) or conditional cash transfers programs and school expansion (interventions facilitating the accumulation of human capital). This research will look into regional comparisons between Sub-Saharan Africa and South Asia, the two areas of the world with the greatest concentration of poor people, which also have very different resource endowments and sociocultural institutions. This component will include continuous panel data collection in key countries in order to analyze the consequences of asset accumulation and disposal for managing food security, risk, and vulnerability.

Understanding the roles of assets in men's and women's livelihoods and pathways from poverty

Most analyses of the role of the different types of capital and their relationships to livelihoods strategies have been conducted at the household level. This research will examine the role of assets for different household members in moving out of poverty. It will investigate whether poverty traps exist at the household and individual levels and whether particular individuals are more likely to be trapped in poverty.] Yet, because risk is not shared equally within the household (Goldstein 1999; Dercon and

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Krishnan 2000; Duflo and Udry 2004), and because men and women may have different perceptions regarding risk (Doss, McPeak, and Barrett 2008), shocks affect men's and women's assets in different ways. In Thailand, women tend to keep more of their individual assets in tangible forms (such as jewelry), because this gives them more control over asset use (Antonopoulos and Floro 2005). Men and women may also use assets in different ways to move out of poverty. In the Philippines, where sons inherit land and daughters are favored in schooling, daughters have been able to acquire nonagricultural jobs, migrate to urban areas, and send remittances to their parents (Quisumbing, Estudillo, and Otsuka 2004); these patterns are different in other countries where men and women hold different types of assets. In Ghana, for example, where returns to schooling in the nonagricultural sector were still low, women's incomes would increase more when they were given equal access to land than when they were sent to school. (Note that new funding would be used to expand country coverage through the collection of new gender-disaggregated datasets, which could also build on impact evaluation work.)

Understanding the role of risk management and insurance in protecting assets

Evidence from life histories (see Krishna 2010 on India, Kenya, Peru and Davis 2006 on Bangladesh) suggests that asset accumulation is gradual and incremental, but shocks such as death and illness can lead to a rapid depletion of assets. Both formal and informal safety nets that enable the poor to smooth consumption (publicly provided health insurance; credit, whether formal or informal; credit-cum-insurance schemes; food-for-work) may protect the poor from temporary shocks that could otherwise lead to a permanent depletion of asset stocks. This research activity will examine the range of risk management and insurance mechanisms available to the poor, the extent to which poor men and women avail themselves of such mechanisms, and the effectiveness of such mechanisms in protecting consumption and assets after shocks. These mechanisms will include not only formal social protection mechanisms, but also informal mechanisms (migration and transfers) and local institutions that poor rural communities use to manage their biological assets, such as seeds, seed systems, and other components that contribute to risk reduction and livelihood improvement. Findings will inform the design of social protection mechanisms that enhance the ability to manage risk without displacing indigenous social protection systems.

Evaluating programs and policies to strengthen assets of the poor

This subtheme will undertake rigorous impact assessments of a range of development interventions and institutional arrangements that seek to strengthen different types of assets or increase the returns to assets held by the poor. It will use a mix of quantitative and qualitative methods. To maximize the effectiveness and uptake of lessons learned from these evaluations, researchers will undertake them jointly with implementing agencies—not just government agencies, but also civil society organizations—and will elicit views from a diverse range of stakeholders. Attempts will be made to choose projects with regional balance, with the priority given to Sub-Saharan Africa and South Asia. Quantitative methods can include randomized allocation of interventions to create randomly assigned control or treatment groups, propensity score matching to construct a counterfactual comparison group, regression discontinuity designs that exploit eligibility criteria to create the counterfactual, or instrumental variables approaches (see Ravallion 2008 for a discussion of program evaluation methods). Qualitative methods will enable evaluators to hear from beneficiaries about the impact of the interventions in their own words, as well as to better understand the processes that underlie the success or failure of the intervention. Data collected in these evaluations will be gender-disaggregated. The evaluation of alternative implementation modalities will be an explicit focus of the research. By involving a range of stakeholders and employing qualitative and quantitative methods, this research will avoid the dichotomy between action research and academic research and will generate knowledge useful for identifying and scaling up programs that help poor people build assets. (Note that funding to assess the gendered impact of agricultural programs on assets has recently been obtained [2010] and can cover impact assessment of eight projects in Sub-Saharan Africa and South Asia).

Setting Priorities

Given that partial funding for both impact evaluation and data collection (in line with impact evaluation, as well as other projects) has already been obtained for this research program, priority should be given to these newly funded efforts so that activities remain on schedule. If budgets are cut, analytical work on mapping asset portfolios and understanding the context of asset accumulation would be delayed, but the impact evaluation and risk management work would have generated datasets that can be used to undertake this analysis at a later time. Funding would eventually be raised for this cross-cutting analytical work.

Partnerships

This research program will involve not only NARs and researchers from developing-country universities, but also government and civil society organizations. Many of the organizations that have undertaken innovative programs to transfer assets to the poor are civil society organizations (for example, the Grameen Bank, BRAC International), and action research programs that pay specific attention to implementation modalities and scaling up will be important to distill the lessons learned from these initiatives. Action research programs can be undertaken in partnership between development institutions and CGIAR research institutions so that rigorous and replicable research designs can be used, which can yield benefits directly to program implementers. Attention to implementation issues and capacity building will help researchers distill lessons beyond the specific program being evaluated. CRP2 researchers will also actively collaborate with networks of researchers and academics in universities in developed countries. For example, CGIAR researchers in this area already work with, and are supported by, collaborative research support programs (CRSPs) funded by the U.S. Agency for International Development, such as the livestock and assets for market access CRSPs, and research networks and universities in the United Kingdom and European Union.

Comparative Advantage of CRP2

The main alternative suppliers of CRP2 on Subtheme 2.4 are the following (in alphabetical order):
- Assets and Market Access CRSP
- BRAC Research and Evaluation Division (RED)
- Center for Development Research (ZEF)
- Centre for the Study of African Economies (Oxford University)
- Duke University
- Innovations for Poverty Action (IPA)
- International Center for Research on Women (ICRW)
- Landesa
- Abdul Latif Jameel Poverty Action Lab (J-PAL)
- University of California, Berkeley
- University of California, Davis
- Yale University

CRP2's comparative advantage includes:
- Ability to work in a number of countries and regions on common themes to arrive at cross-regional/cultural perspective
- Ability to consider a wide range of assets
- Use of mixed qualitative and quantitative methods (including experimental and quasi-experimental methods)
- Strong emphasis on gender and poverty reduction across all studies

Outputs, Outcomes, and Impacts

Outputs of this research will consist of

- mixed-methods approaches to improve our understanding of the factors, processes, and institutions that enable poor men and women to accumulate assets, protect them from shocks, and use them to move out of poverty;

- a set of country case studies documenting different ways that men and women accumulate assets and use them to move out of poverty, including synthesis and comparative analysis across country case studies;

- a set of action research studies or impact evaluations, using mixed-methods approaches, that document the impact of policies and interventions (including changes in institutional arrangements) on assets of the poor and recommend best practices to increase and/or protect assets of the poor; and

- gender-disaggregated datasets generated by the project and a set of best practice recommendations for gender-disaggregated data collection.

Outcomes of the research will include

- the use of asset-based indicators to evaluate project and program impacts on the poor;

- use by project implementers of promising approaches and best practices to reduce gender-based constraints affecting the control and ownership of key productive assets in agricultural development programs; and

- recognition by research managers, donors, and NGOs of the importance of reducing asset disparities and explicitly targeting them in their programming.

Key elements of this subtheme's strategy to ensure translation of outcomes into outputs include (1) working with project implementers to evaluate the impact of their interventions on assets and identifying ways of strengthening the long-run asset accumulation by women and the poor;[14] (2) strengthening the capacity of NARSs and NGOs to undertake such studies themselves; (3) sharing information with key government agencies, donors, and land rights and women's advocacy agencies to document positive outcomes of asset accumulation; and (4) ultimately, working to create a "paradigm shift" to give greater attention to long-run strategies of gender-equitable asset accumulation.

These outcomes should result in the following **impacts**:

- increased assets held by the poor;

- reduced asset inequality;

- reduced gender asset disparities; and

- achievement of better development outcomes related to agricultural productivity, food security, and nutrition as a result of the inclusion of assets as well as income in the development paradigm from an income to an assets focus;

- ultimately, poverty will be reduced as the asset base of such groups is strengthened and made more secure against shocks, enabling greater productivity and reduced vulnerability (see Table 2.1).

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[14] Experience with this approach indicates that such collaboration with implementing agencies creates receptiveness to evaluation findings and encourages the agencies to build asset-building strategies into future programming.

Theme 3. Linking Small Producers to Markets

Introduction

Establishing competitive and efficient markets is a central challenge of achieving economic growth. Among the most severe constraints are those related to costs (such as direct and indirect costs, opportunity costs, transaction costs, and others). The high costs to farmers and other actors of poor infrastructure, lack of information, insufficient credit, and policy distortions reduce the efficiency of value chains and impede producers' ability to connect to market systems. A value chain is the sequence of interlinked agents and markets that transforms inputs and services into products with attributes for which consumers are prepared to pay. Millions of low-income people, a large proportion of whom are women, participate in agricultural value chains as producers, small-scale traders, processors, and retailers. Many millions more, including the great majority of the developing world's poor, participate in value chains as consumers. Improving the performance of value chains therefore stands to benefit large numbers of people (Aramyan, Lansink, and van Kooten 2005; Lohman, Fortuin, and Wouters 2004; Lambert and Pohlen 2001; Beamon 1999). This theme identifies key constraints and opportunities in value chains; evaluates options for upgrading value chains; and provides tools, strategies, and policy approaches for achieving development change that is pro-poor, sustainable, and gender sensitive.

Few tools have been developed to design and implement economics- and management-based change within value chains. Moreover, the tools that are in existence suffer from the lack of unifying theory and performance metrics that enable consistent data collection and analysis. Taken together, these conditions mean that value chains have been subject to little consistent and constructive research but offer an excellent platform for research activities and communication of results. This is the opportunity that Theme 3 exploits. Filling this research gap will involve tracing impact pathways via their commercial linkages and developing more advanced economic tools that measure impacts in a consistent way. Value chains research, as proposed here, would broaden the analysis from the farm level to the level of the agricultural and rural sector. The CGIAR and other partners in CRP2, including NARSs, GFAR, and IFAD, have a strong comparative advantage in this research, partly because it combines knowledge of technology and policy, and the value chains theme maximizes complementarity with Themes 1 and 2 and commodity CRPs. GFAR has been mobilizing collective learning and knowledge sharing around experiences and best practices in linking smallholder farmers to markets for a number of years and this theme has strong ownership among regional forums and farmers' organizations alike. The research capabilities of the CRP2 offer the chance to look across learning among regions with an analytical lens and analyze underlying trends, rationales and solutions that could be readily transferrable elsewhere to increase the speed of change and better benefit poor farmers as they struggle to organize for large scale markets.

The goal of Theme 3 is to create **an overarching theoretical framework to understand and address problems and opportunities in agricultural value chains as they relate to the poor, and to apply this framework to understand and improve the efficiency and access to value chains by small producers**. It will target productivity increases and marketing changes that are not only location- and product-specific, but also relevant across products and locations. Theme 3 provides a framework for compiling existing knowledge as a precursor to formulating prototypes for field testing, stimulating learning processes, and disseminating findings with other CRPs and other initiatives. Such initiatives include the GFAR/FAO/CGIAR initiative, Coherence in Information for Agricultural Research for Development (CIARD) initiative, which identifies what works where, for whom, and promotes its dissemination. Targeting of locations and specific chains will be carried out as participatory activities with partners, facilitated where appropriate by other CRPs' activities. Further complementarities to commodity CRPs is provided by CRP2's capacity for analysis across multiple commodities, specifically in key constraint contexts, such as innovations in institutional arrangements (vertical and horizontal coordination), infrastructure, and information flows.

Value-chain analysis provides a vital aspect of evidence-based policy advice. This theme provides an understanding through value chains of the market performance portrayed in Theme 1 on prioritization of value chains, policies and investments, households' participation in those markets, the roles played by public and private actors, and the public investments required to upgrade value chains. The governance and institutions of the public and private actors are, in turn, analyzed in Theme 2, by understanding how to structure number of interventions specific to problem and opportunity identification, and three cross-cutting activities featuring gender, extension, and knowledge sharing. This theme's focus on value chains is intended to complement and extend research carried out in the other themes of this CRP and in other CRPs. Research within this theme will

- define the value chain for analysis, measure its performance, and evaluate the benefits and costs associated with upgrading options;

- identify opportunities for smallholders to benefit from rising demand for high-value commodities and gain access to the available retail structures, including modern retail chains, based on the different policy scenarios simulated in Theme 1; and

- foster institutional and infrastructure innovations to generate equitable and sustainable benefits—including the mitigation and management of risk—for value-chain actors.

Research activities can be described in terms of the location within the value chain and the type of commodity. With respect to the location within the value chain, research activities can be distinguished between those that focus on inputs, including agricultural technology, and those that focus on output markets. With respect to type of commodity, one way to distinguish commodities is high- and low-value crops. Low-value commodities (such as staples) are those that generate a relatively low economic return per unit of land or labor. Markets tend to be insensitive to quality, whereas large market volumes and the poor consumer base magnify sensitivity to price. Key policy research issues concern how to reduce marketing and processing costs to raise producer prices, while ensuring consumer affordability and access. High-value commodities, by contrast, feature quality-sensitive demand, with associated requirements for grading and standards in serving income-responsive markets. Policy research issues include market failure in information flows, capacity building, postharvest action, and market access and response.

In both high- and low-value commodity value chains, commodity-specific CRPs address technical issues that will be complemented by CRP2 (see Annex 3). Of particular policy interest is the potential for upgrading value chains through postharvest activities as a way to help women generate value added. Such benefits are associated with chain coordination, particularly linkages with traders, and the research in this theme will identify predisposing factors and optimal intervention strategies.

Theme 3 includes
- **research on innovations to foster opportunities for smallholders across the value chain (Subtheme 3.1) and**
- **research on impact evaluation to measure the costs and benefits of options for upgrading value chains (Subtheme 3.2).**

As these two subthemes are deeply interrelated, the "Selected research questions," "Priority-setting," "Partnerships," and "Outputs, outcomes and impacts" sections are common to both subthemes.

Methods and Data

CRP2 will apply a mixed set of methods to identify constraints and opportunities in the value chain and evaluate interventions for improvement. This research will require engaging actors along the value chain and refining existing methods to identify and define performance. To complement Theme 1's examination of alternative objectives in models, CRP2 will examine alternative value-chain performance measures. Moreover, the recognition and measurement of variables associated with innovation, governance, and risk will complement Theme 2's work addressing transactions.

Value-chain methodologies have in the past focused on participatory data collection for point estimates of prices. These methodologies are good practice for consulting firms, serve the needs of many commercial actors, and are well supported by handbooks and examples from the World Bank, FAO, the German Agency for Technical Cooperation (GTZ now part of GIZ), and others. CRP2 will use research, rather than consultancy, methods: innovative sampling techniques of mobile market agents such as traders, margin calculation for diversified and seasonally affected producers and traders, definition and measurement of whole-chain performance (by financial and social numéraires), assessment of intrahousehold equity in the context of value addition, power relationships related to defining and achieving standards, and many other measurement issues. The use of these innovative research methods will allow to identify generic measures (for example, on equity issues, or as return on working capital), while also expanding context-specific measures (for example, risk factors associated with delays in cultivation, or in delivery).

The value-chain approach allows close examination of issues related to transmission of consumer preferences regarding food safety and quality, impacts of market related policies, incentives to reduce postharvest losses, and risks. Research will draw on existing biophysical and detailed household survey data to estimate the efficiency of local farmers and rural workers given certain conditions such as climate, topology, prices, and their own economic and demographic characteristics, using a stochastic profit frontier.

Contact with value-chain agents will necessarily be participatory, and a major challenge faced by past research has been quantification of this qualitative research for rigorous analysis. Methods applied in CRP2 will therefore complement other CRPs' work, suggesting variables to observe and means to measure them, and feeding back benchmarked values of performance. Participatory approaches will support a key objective by creating the awareness, capacity, and opportunities for farmers to become more positive, informed actors in the market chain. They will also provide an unprecedented opportunity to address gender-related issues and ensure increased empowerment and equity for female farmers and other women through increased participation in the value chain. CRP2 will collaborate in this regard with the emerging global Gender in Agriculture Partnership (GAP) spearheaded by GFAR, FAO, Agropolis-Foundation and AWARD with support from United States Agency for International Development (USAID) and the CGIAR Consortium.

To further exploit opportunities posed by current commercial momentum, researchers will use randomized and quasi-experimental interventions to examine the value-chain role of improving access to market information using mobile phones and other information and communication technologies. They will identify sustainable delivery systems for training and certification related to value chains, and they will examine mechanisms to promote formal and informal business networks (such as lead farmers and trader-driven networks) to optimize potential knowledge spillovers. Cost–benefit analysis will be used to compare the cost of quality assurance systems to farmers, traders, or processors with the benefits accruing to farmers and consumers.

Value-chain studies of input distribution systems will evaluate the effects of market imperfections and policy interventions (for example, subsidies) on input distributors. They will identify ways to improve access to inputs and reduce farm-level costs, particularly by studying internal chain arrangements and assessing the impact of different marketing policy interventions on the behavior of traders and processors. For this work, researchers will use state-of-the-art behavioral economics techniques. Finally,

agriculture-sector models will be used to evaluate the impact of interventions on production, consumption, prices, and trade in agricultural markets. Stochastic simulation models will be used to study the impact of alternative policies to stabilize prices and farm income.

Selected Research Questions

The following questions will be addressed by activities in both Subtheme 3.1 and Subtheme 3.2. In general, the analysis emerging from the activities proposed below will integrate the different actors, components, and interrelations across the value chain.

- What are the key market failures that constrain agricultural input markets and the adoption of new technologies and resource management practices? What is the impact of government policies on agricultural productivity, and how does the operation of value chains shape their impact?

- What are the effects for smallholders of new or changing industry strategies and structures in agricultural input markets?

- How can missing markets, market failures, and bottlenecks across the different value-chain components be overcome in ways that make markets more accessible to the poor?

- How can the public sector and public–private initiatives promote institutional change that enhances those income opportunities for poor people that are associated with the growth of modern value chains?

- What are the prospects for the poor in chains for staple commodities targeted to local markets relative to chains for staples targeted to formal sector retail? What about chains for high-value perishables relative to chains leading to food manufacture?

Subtheme 3.1. Innovations across the Value Chain

Rationale

This research subtheme will look at innovations across the value chain for making commodities markets function for the poor by removing constraints to participation and enhancing benefits from participation through five key channels: reducing transaction costs; managing risk; building social capital; enabling collective action; and redressing missing markets (see Table 4.1). CRP2 will address these themes initially by compiling existing knowledge and experience and subsequently by undertaking participatory engagement of partners and stakeholders. Further targeting criteria on specific value chains and constraints will emerge from policy analysis requirements for Themes 1 and 2 and through interactions with other CRPs.[15]

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[15] In select regions and countries we will take advantage of the availability of extremely rich biophysical and detailed household survey data to estimate the efficiency of local farmers and rural workers given certain conditions, such as climate, topology, prices, and their own economic and demographic characteristics, using a stochastic profit frontier. By estimating local efficiency levels and the factors influencing them, regional potentialities and bottlenecks can be identified and used in the construction of a typology of microregions to better target the priority research themes and to assure potential scaling up of the different solutions to the bottlenecks identified across the value chain (see Elias, Maruyama, and Torero 2009).

Table 4.1—Roles and types of research activities

Constraint to participation	Research to remove constraint will focus on:
Concentrated input-market structure	Regulatory mechanisms to diffuse market power
	Resource management systems
Significant transaction costs	Market information and intelligence systems
	Auctions and exchanges
	Grades and standards
Incentive problems on collective action and reduced social capital	Producer marketing associations and cooperatives
	Industry groups and willing buyers
Market risk	Forward and options contracts
	Vertical integration schemes
	Innovations in insurance
Missing markets for credit	Warehouse receipt systems
	Contract farming
	Credit guarantee systems, credit and savings cooperative societies, and cooperative banks

Proposed Research Activities

Addressing concentrated input market structure

Given the importance of **value chains in inputs, technologies, and resource management systems**, this research activity will seek out and identify innovative methods to disseminate information on effective organization and management of public agricultural research and extension organizations and on the role of private firms, NGOs, farmer associations, and partnerships in access and provision of inputs, technologies, and resource management systems across the value chain. The activity will require in-depth research on (1) policy incentives to facilitate the participation of the private sector in delivery systems; (2) strategies to target vulnerable groups to increase their access (small-scale, vulnerable, or female-headed farm households); (3) promotion of rural innovation and provision of information to communities on inputs , technologies, and resource management systems through the public, private, and civil society sectors; (4) the appropriate division of responsibilities among government, private sector, and others in accelerating pro-poor, value chain–led development; and (5) policy analysis of specific interventions (seed law, input subsidies, social safety nets linked to food, gender targeting) and their effects on value-chain development.

Particular attention will be paid to **market structure and market power in fertilizer industry at the international and local levels**. Given the global and local characteristics of the fertilizer market, this research activity has two objectives. First, it will examine global trends in production and trade for major nitrogen, phosphate, and potash fertilizers and evaluate the effects of increased market concentration on international prices. This research is particularly important given the increasing dependence of developing countries on imported fertilizers. Because of economies of scale in production (and procurement), concentration may result in cost efficiencies, but may also lead to exertion of market

power and tacit collusion among firms. According to Integer Research, leading fertilizer producers have achieved record profits in recent years (with total revenues over US$50 billion). Market power exertion may allow firms to fully transmit price spikes in raw materials (for example, natural gas for the production of ammonia) to fertilizer prices and to take advantage of any increase in grain prices by also raising fertilizer prices. A time-series analysis will be used. To evaluate tacit collusion, researchers would track leading fertilizer producers and their range of operation in order to uncover potential pricing patterns among them. The second objective of this activity is to examine the structure of supply chains in specific developing countries in Sub-Saharan Africa, Latin America, and South Asia with different characteristics (for example, net importers or exporters, coastal or inland, featuring high or low levels of government intervention, and with different size markets). Researchers will analyze procurement and distribution costs and market margins at the production, import, wholesale, and retail levels to examine price differences between markets within a country (whenever possible) and between countries within a region. They will identify the components of the supply system in each country and collect cost and price data through visits, interviews, and surveys of different market participants. This analysis for some key countries will help identify factors—beyond market power exerted at the global level—that drive prices up in particular developing regions and reduce their fertilizer intensity use. Countries using small quantities of fertilizers are expected to pay higher prices for the product because of economies of scale, but other factors at the country level might influence prices, such as a lack of competition among suppliers and distributors, a poor dealer network, high transportation costs, and the cost of finance.

This research activity will also examine the **impact of alternative marketing policies**. The performance of agricultural value chains is strongly influenced by agricultural policies, particularly marketing policies. Although direct government participation in agricultural processing and marketing has declined since the 1980s, many governments continue to intervene in markets for selected inputs and crops. In response to the global food crisis, numerous countries have reintroduced fertilizer subsidies, expanded food security stocks, and increased efforts to stabilize food prices, including some protectionist measures. The crisis has renewed interest in staple food self-sufficiency to insulate domestic food prices from the uncertainty and volatility of world markets. Research is needed to determine whether these policies are meeting their stated goals and how they affect different types of farmers and consumers. This activity will involve applied research, using a range of methods (as noted above), on key policy issues such as fertilizer or other subsidies and other aspects of marketing policy. The research outputs will be country- and global-level guidance on the effects of marketing policy interventions on agricultural markets (production, consumption, trade, and prices), as well as the distributional impacts on different types of households. The guidance will contribute to more well-informed marketing policies, leading to a more efficient and pro-poor marketing system.

Reducing transaction costs

An important aspect of this research activity relates to **high-value agriculture and value-added activities**. Income growth and urbanization in developing countries are contributing to the transformation of diets in which consumers are shifting from basic grains and other staple foods toward high-value commodities, including animal products, fish, fruits, and vegetables. At the same time, international trade and foreign direct investment are creating opportunities for farmers in developing countries to take advantages of the demand for high-value agricultural commodities in other countries. Finally, the modernization of the food industry, including the rise of supermarkets, large processors, and exporters is changing the nature of agricultural supply chains. The effect of these transformations of agricultural supply chains on small-scale farmers in developing countries is mixed and requires a systematic assessment. One of the main challenges in seeking greater public investment in agricultural research and extension in high-value agricultural commodities is the perception that staple food self-sufficiency is necessary to achieve food security. In addition, there is a perception that high-value commodities are grown mainly by better-off farmers, so that improving horticultural markets, for example, will not contribute to reduction in rural poverty (Reardon and Timmer 2007). Analysis of existing data can be

used to challenge and test these assumptions. Based on experience in some countries, it seems likely that (1) farmers who have a diversified mix of rice and high-value crops can achieve a higher level of food security than those who seek rice self-sufficiency, (2) high-value crops can make a significant contribution to the income of poor rural households, and (3) diversification into high-value agriculture contributes to rural income growth and poverty reduction. If these hypotheses can be confirmed in systematic research across countries, it will assist the advocacy efforts to increase public investment in high-value agriculture. The challenge of this research activity is to test these assumptions and to identify the policies, regulatory environment, public investments, and institutional innovations that will ensure that these transformations have a pro-poor impact.

Another important component of this research activity will be to investigate **farmers' information needs and mechanisms to supply it**. Much of the value added in agricultural marketing depends on the processing of information—for example, about the availability, location, and prices of products on farms and in markets and about what product attributes consumers value. Information is subject to market failure in that it is difficult to sell (the buyer does not know its value until after it is "purchased") and easy to reproduce (making it hard for the "producer" to recover costs). One policy research question concerns private-sector underprovision of information and the government's role in providing directly information or promoting more provision of information by the private sector. In the value-chain context, information flows enable value-chain actors to add value through branding and certification schemes, for which many examples exist but no repository of developing-country–relevant knowledge is yet available (Torero and von Braun 2006; Aker 2008; Goyal 2010; Jensen 2007). This research activity will provide that knowledge and engage partners in producing and testing prototypes for application across a range of applications. As such, it will complement the CIARD initiative and the global platform on linking farmers to markets being established through GFAR and provide an internationally relevant research methodology and set of analytical principles that can be used in support of all sectors.

This research activity will bring three major opportunities: (1) improving the flow of information in value chains in different countries across regions through the implementation of market information systems (we estimate that the project could reduce marketing margins between 2.5 and 5 percent, reducing the incidence of poverty in 2 to 3 percentage points for almost 2 million people affected by the project); (2) identifying the best practices in designing and implementing pro-poor market information systems and disseminating these recommendations; (3) designing and scaling up a framework for proposed information and communication technology interventions. Within each selected country, the project will identify the regions of intervention based on an index combining the following four criteria: (1) market potential (revealed comparative advantage); (2) high rate of poverty; (3) accessibility to major markets; and (4) level of information and communication technology development in rural areas. This selection framework will allow us to estimate the potential impact of scaling up the intervention to the entire country or to other countries based on the four dimensions specified. Researchers will identify and promote methods for generating, delivering, and transmitting information such as prices (outputs and inputs), standards, and cross value-chain production innovations and solutions. Activities will include randomized and quasi-experimental interventions to improve access to market information using mobile phones and other information and communication technologies; the identification of sustainable delivery systems for training, certification, and promotion new technologies and inputs; and the identification of mechanisms to promote formal and informal business networks (lead farmers, trader-driven, and so on) to optimize potential spillovers. This research will have a direct effect on poverty in the areas where it carries out interventions because improved market information will reduce marketing margins, increase farmgate prices, and boost the incomes of rural households. The key outputs will be (1) characterization of the key information needs of each actor in the value chain; (2) a database of existing management information systems and the information included in them; (3) a set of best practices in designing and implementing market information systems that maximize pro-poor impact; and (4) detailed plans for scaling up the proposed ICT interventions (produced together with our NGO implementation partners).

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Recognizing that marketing **infrastructure** strongly affects the cost of getting agricultural commodities from the farmer to the consumer, as well as the degree of competition at each stage in the value chain, this analysis will improve knowledge about the impact that complementary investments in rural infrastructure (water, sewerage, roads, electricity, and telecommunications) and postharvest infrastructure (storage facilities, processing equipment for home and market, market facilities, certification, and sanitation facilities, and so on) may have on market development, reduction of postharvest losses, and poverty reduction. It will identify investments with the largest multiplier effects; design institutional strategies that provide adequate access to the public infrastructure necessary to enhance the environment for private sector activity; and identify infrastructure investment opportunities across the food value chain that generate the largest multiplier effects and attract public and private rural-sector investments. Researchers will consider how to raise the private and social profitability of executed investments and identify which bottlenecks (physical or institutional) impede the attainment of maximum potential investment potential in rural infrastructure. The key outputs of this research will be (1) a systematic review of existing information on infrastructure provision best practices (this review will consider not only hard infrastructure, but also postharvest infrastructure, freight capacity, airport capacity, and sanitary and phytosanitary facilities); (2) research that overlaps development domains with economic corridors identified for infrastructure development (particularly for Sub-Saharan Africa) to increase the economic return of infrastructure investments; (3) identification of a framework for prioritizing infrastructure investment, taking into account development domains; (4) identification of ways to forge public–private partnerships based on competitive funds best practices (as the telecommunication and electricity rural funds) as a way to minimize the use of public resources ; (5) measurements of the gains in coordination of different types of infrastructure investments; and (6) identification of best practices in infrastructure provision through solid impact evaluation.

Finally, this research activity will also address **standards/certification**. Quality assurance systems are mechanisms for verifying to consumers the quality, food safety, or production methods of food products, while providing signals to farmers regarding production practices that will be rewarded in the marketplace. Examples are grades, standards, and certification systems, including those organized by private firms, associations, and public agencies. Quality assurance systems are particularly important for perishable high-value commodities, where they are usually organized by private firms or associations. They are also relevant to low-value staple crops, where both public and private systems exist. For example, grades for food grains facilitate long-distance trade and can eliminate the need to inspect lots personally before purchase. The rise of quality assurance systems raises a number of important research questions: How and under what circumstances can quality assurance systems help small-scale farmers (particularly women and the poor) get access to new markets? What are the lessons from established quality assurance systems? What is the appropriate mix of standards, grades, and labeling that will improve product quality and farm income without unnecessarily restricting the market? What methods can firms, associations, and public agencies use to evaluate the usefulness of a quality assurance system ex ante? The outputs of this research will be (1) recommendations regarding the feasibility of quality assurance systems for specific commodities in specific countries; (2) guidelines regarding the situations in which grades, standards, or certification systems are likely to be successful; and (3) best-practice guidelines concerning the design of effective quality assurance systems, including the appropriate combination of grades and standards, the conditions under which certification is best provided by a third-party company, an association of producers, and a government agency. The audience for this research includes private firms, associations, and public regulatory agencies. Finally, the development impact of this research will be to create new opportunities for small-scale farmers to tap into growing markets for quality-sensitive, high-value foods and to facilitate a better match between agricultural supply and demand.

Incentives for collective action and building social capital

This research activity will focus on **organizations to improve vertical and horizontal coordination**. Poor, rural farmers are often left out of the market. They may not be able to compete with larger farmers who can provide firms with consistent quantities of high-quality products. These barriers to entry for small farms may be due to the fact that they cannot exploit economies-of-scale in production. Farmer associations and other ways of collective action can help to address this problem in production and marketing, contracting, and other interventions, such as quality assurance. However, these elements of market entry have not been assembled in a chain-relevant package that is widely applicable to collective action (for example, Minot and Roy 2006; Coulter, Goodland, and Tallontire 1999; Wibonpoongse et al. 1998; Boselie, Henson, and Weatherspoon 2003; Delgado, Narrod, and Tiongco 2003; Dolan and Humphrey 2000). While Theme 2 provides guidance on designing organizations to achieve pro-poor collective action, this theme formulates value addition interventions that use vertical integration and collective action to correct scale- and capacity-related market failures.

The related field research tests and validates innovative marketing arrangements (including contracts) to solve the problems of barriers to market entry faced by small farmers, particularly those growing high-value crops across different regions and countries. This research will (1) undertake randomized and quasi-experimental interventions to improve market access through contract farming, outgrowing schemes, or a combination of horizontal and vertical coordination; (2) evaluate methods and tools for improving development interventions that build the business capacities of farmer association; (3) seek to understand the costs and benefits of organizational models, identifying best practices; (4) evaluate alternative incentives for improving or learning from collective models (cooperatives, producer associations, and other farmer groups); (5) evaluate vertical and horizontal arrangements relative to other institutional designs, such as farmers' becoming shareholders in for-profit firms; and (6) evaluate the role of women, youth, and excluded populations in horizontal and vertical coordination arrangements and the potential for members of these groups to serve as enterprise leaders.

Outputs from this research will help design new institutional mechanisms that give smallholders access to dynamic markets through efficient contract farming arrangements, horizontal coordination arrangements, and improved business capacity, improving the welfare of the poor. Consequently, in addition to scholarly contributions to the topic, we will target policymakers in ministries of agriculture, development practitioners in NGOs, and key private-sector buyers, among others, through forums and policy-relevant bulletins. CRP2 researchers will develop series of documents on optimal strategies for contract farming arrangements, horizontal coordination, and business capacity development, including policies and strategies that institutions can use to improve market access for smallholders. The ultimate beneficiaries of the research project are poor, rural men and women who will have better access to dynamic markets. It is anticipated that the tested mechanisms will be replicable elsewhere in Sub-Saharan Africa, Asia, and Latin America and will be able to be expanded to different crops, including those used for biofuels.

Another important aspect of this research will be **developing willing buyers through improved private-sector business practices**. Research in the CGIAR typically focuses on increasing farm productivity to leverage improved livelihoods for smallholder farmers and their families. A value-chain approach encompasses additional actors and opens an additional area of inquiry, recognizing that many of the organizational and institutional rules that constrain or permit rural poverty reduction are not formulated at the farm level but rather by private actors. The previous themes have focused on building farmer capacity to become good partners for business and on providing an enabling environment to achieve solid linkages. This theme, in contrast, focuses on providing information and inputs to private-sector firms to influence them to adopt pro-poor business practices to support successful market linkages for smallholders. The rationale behind this theme is the increasing importance of organizational and institutional decision-making by firms, often well removed from the reality of smallholder agriculture in the developing world. As market chains formalize into more modern configurations, firms choose to

implement private standards and higher-value differentiated products become more relevant. As a consequence, the decisionmaking nexus and power shifts toward the buyer's end of the chain. Unfortunately this power shift often occurs in an information vacuum in which buyers may make decisions that have unintended negative effects on smallholders in these value chains. Despite the often negative consequences of this shift, previous work by CIAT[16] and CIP (such as the "Papa Andina" platforms) has shown that targeted research can influence private sector decisions in a way that supports rather than undermines the position of smallholders. The opportunity, therefore, is to identify effective mechanisms that firms can apply or adapt to help include smallholder farmers in value chains with special emphasis in agricultural products important for the poor.

The principle objective of this research is to identify cross-cutting principles that underpin sustained business linkages between smallholder farmers and buyers, thereby contributing to rural poverty reduction for women and men. We will conduct comparative case studies using both qualitative and quantitative methods to examine issues such as chain-wide collaboration and innovation, social intermediary models, fair and transparent governance, risk and cost sharing, and access to services as they pertain to lead-firm business models. This research will be conducted with private-sector firms, international NGOs, and multistakeholder forums, such as the Sustainable Food Laboratory, Sustainable Agriculture Initiative Platform, and the World Business Council for Sustainable Development, among others. Outputs from this theme will include (1) a regional series of in-depth case studies of successful and failed attempts at building links between smallholders and large buyers that evaluate the impact of business mode changes on household outcomes in terms of smallholder livelihoods; (2) regional and global comparative analysis to identify key principles for effective linkages and to evaluate the impact of changes in private sector practices on poor women and men; (3) a toolkit to design and consistently measure the outcomes from improved business practices on smallholder livelihoods in a gender-differentiated manner; (4) scholarly and applied publications on inclusive design principles and evaluation methods and tools; and (5) continued participation and engagement in multistakeholder forums to ensure a clear linkage between research demands and end users.

Reducing market risk

This research activity will explore access to two key **financial services**--financial markets and insurance mechanisms--for the different players in the value chain. It is well known that access to financial services is important but often inhibited by imperfections in the credit markets. In low-income rural areas, contracts are difficult to enforce and the problem of adverse selection is acute. Banks face high risks and lend conservatively. They lack appropriate, well-developed, and suitably designed credit-scoring models that can help identify suitable borrowers and significant asymmetries of information. Research on access to financial markets will study institutional designs that can reduce the problems of adverse selection and lack of collateral. Such designs might include, for example, a certified warehouse receipt system for staple crops; innovative contract farming arrangements; and a credit-scoring system for rural lending. Absence of a well-developed credit-scoring system both restricts access to credit and prevents the growth of differentiated borrowing options (for example, a menu of choices involving interest rates, loan terms, and loan amounts).

Researchers will also investigate three approaches designed to overcome weaknesses of current market-based insurance products that have been hypothesized to explain low pick up rates of the existing insurance mechanisms, as follows:

- Reducing the complexity of insurance products offered. Many of the weather-based index insurance products currently offered are complex, and some observers suspect that low take-up rates may result in part from farmers' limited understanding of the products (see in particular the results from Malawi presented

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[16] See, for example, http://www.sustainablefoodlab.org/filemanager/download/7393/, and https://www.sustainablefoodlab.org/article/view/14202/1/2370/.

in Gine and Yang 2007 in which take-up rates for uninsured loans were higher than take-up rates for insured loans). Increasing demand for these new products may require designing a simpler version, even if it results in more basis risk for an individual farmer. Researchers will analyze the potential success of fairly simple mechanisms that can closely replicate a standard lottery. Our hypothesis is that a simple, more familiar mechanism will result in a faster learning process for farmers and therefore a faster adoption rate. Research on the specific design of the proposed lottery-insurance mechanism will be undertaken--in particular, analysis of indicators that will guide the underlying lottery. The definition of "losing" and "winning" events must be clearly identified based on indicators highly correlated to the source of risk one wants to insurance against. Experiences with weather-based index insurance schemes in developing countries will be analyzed to draw lessons

- Designing mutual savings products as opposed to insurance products. Throughout Sub-Saharan Africa informal insurance arrangements closely resemble mutual savings arrangements. The concept of insurance offered through these arrangements is quite different from the concept of insurance offered in market-based schemes. A disconnect between the types of insurance currently understood and used and the types of insurance offered by the market, may explain disappointing take-up rates. Researchers will examine whether offering a mutual savings product may encourage a higher rate of adoption.

- Providing insurance through a trusted intermediary. Entering into an insurance contract requires trust that the other party has correctly portrayed and explained the terms of the contract and that they will honor the terms of the contract in case a claim is made. Improving the level of trust in the provider of insurance may improve the take-up rate, particularly if insurance can be provided to individuals by groups that already currently insure them. Offering weather insurance through traditional insurance networks builds on the knowledge of insurance provision these groups already have. In addition, providing insurance through groups may reduce the cost of insurance and helps ensures that the new forms of insurance provided do not weaken these groups that are already effective at dealing with some types of risk. The key outputs of this research activity will be the development of innovative mechanisms to improve smallholders' access to credit and insurance.

Comparative Advantage of CRP2

The main alternative suppliers of CRP2 on Subtheme 3.1 are the following (in alphabetical order):
- Brazilian Agricultural Research Corporation (Embrapa)
- Centre for the Study of African Economies (CSAE)
- Cornell University
- Inter-American Institute for Cooperation on Agriculture (IICA)
- Indonesian Center for Agricultural Policy and Agribusiness Studies
- Indonesian Center for Agriculture and Socio Economic Policy Studies (ICASEPS)
- Institute of Development Studies (IDS)
- Katholieke Universiteit, Belgium
- Michigan State University
- Overseas Development Institute

- United Nations Development Programme (UNDP)
- University College London
- University of Oxford
- Wageningen University

CRP2's main comparative advantages are the following:
- It combines knowledge of technology and policy, and Theme 3 maximizes complementarity with Themes 1 and 2.
- It plays the role of a platform to bring the technology improvements from other commodities by creating an overarching theoretical framework.

Subtheme 3.2. Impact of Upgrading Value Chains

Rationale

This research activity will prepare a comprehensive strategy for evaluating and assessing the impact of different interventions in upgrading value chains under Subtheme 3.1 and across different CRPs. It will identify appropriate indicators and a combination of methods to monitor the performance of different projects, evaluate their effectiveness, and assess their impact on the poor and other target groups, including women. The strategy will describe indicators and methods best suited to the needs of the different interventions on science and technology (CRP1), productivity (CRP3), market access (CRP2), and nutritious content in value chains (CRP4). The design of the methodology will draw on partners experienced in designing and implementing qualitative and quantitative impact evaluation, in designing and using monitoring systems, and in validating different measurement tools for different purposes.

Proposed Research Activities

This subtheme will

- develop sets of indicators to monitor and evaluate the impact of the full range of interventions across CRPs in upgrading value chains;

- design cost-effective yet rigorous methods for measuring the impact of different types of interventions on the selected indicators; and

- implement impact evaluations and document best practices and feed them into knowledge clearinghouse in coordination with existing initiatives.

The first step will be to identify the impact pathway of the intervention, defined as the expected causal chain of events leading from project activities to outputs to changes in the target population to the achievement of project objectives. For example, a project to assist agro-input dealers may be based on the following sequence of events: the money is allocated, training and credit are provided to agro-input dealers, the dealers sell more fertilizer (especially to women and poor farmers), farmers apply more fertilizer on their crops, and the farmers get better yields, which leads to higher income and reduced poverty.

One or more indicators should be selected for each of the main steps along the impact pathway. In this way, the indicators may serve as a diagnostic tool, identifying the place in the impact pathway where the chain was broken. For example, if indicators reveal that agro-input dealers are getting credit and training but they are not able to expand sales or only increase sales to men or better-off farmers, then the project team may want to revise the training or examine other constraints to fertilizer sales. In contrast, if sales are increasing but yields are not responding, the project team may want to reexamine its fertilizer recommendations.

Two types of indicators will be developed:

1. **Process indicators** to measure the inputs and outputs of the intervention itself. These indicators would include the number and distribution of farmers trained or the amount of credit provided. Because they can be easily and inexpensively collected, they can be monitored on a continual basis. Examples include the value of plant breeding, the number of agro-input dealers trained, the area under new micro-irrigation schemes, and the number of modern-input packages delivered to farmers, disaggregated by gender of farmer recipients.

2. **Impact indicators**, which refer to the range of effects of the project on the intended beneficiaries. Impact indicators are usually collected through household or business surveys. Because these surveys are more expensive and time-consuming, and because impact often takes time to achieve, impact indicators are usually collected less frequently than other indicators. Intermediate impact indicators include the share of farmers using improved seed varieties, the number of farmers able to obtain fertilizers, and average yields for staple crops. They will vary according to the project to be evaluated. Final impact indicators might include the incidence of poverty, the proportion of farmers that experience hunger periods during the year, and the nutritional status of children.

Researchers will include gender-disaggregated data wherever possible, both to assess the effectiveness of programs and to strengthen the availability of information on the extent of the gap in assets and services between men and women. Two common measures of problems in targeting are the rate of undercoverage (the proportion of the target group that does not benefit) and leakage (the proportion of beneficiaries that are not in the target group). Indicators also vary according to the level of aggregation.

Finally, the impact evaluation will be designed using different methods according to the specific type of intervention. Value-chain interventions pose particular challenges to impact evaluation techniques, so we propose using both qualitative and quantitative techniques to address this problem. To effective evaluate the impact of value-chain interventions, researchers will integrate qualitative and quantitative methods and use operational research methods (for process evaluation and monitoring). They will also use experimental and quasi-experimental approaches for impact evaluation, as well as innovative sampling techniques across the value chain. They will build appropriate counterfactuals to address issues related to (1) confounding factors, and (2) selection biases (Habicht, Victora, and Vaughan 1997). In our view, the use of mixed methods in monitoring and evaluation is necessary not only for the triangulation of findings, but also for achieving a thorough understanding of the different design, operational, or contextual factors that may have fostered or hindered the achievement of expected impacts. This need will imply significant innovation in the designs and techniques used.

Comparative Advantage of CRP2

The main alternative suppliers of CRP2 on Subtheme 3.2 are the following (in alphabetical order):

- Abdul Latif Jameel Poverty Action Lab (J-Pal), Massachusetts Institute of Technology
- Cambridge University
- Centre for the Study of African Economies (CSAE)
- Cornell University
- International Growth Center (IGC) with Oxford University and the London School of Economics
- Katholieke Universiteit, Belgium
- Michigan State University
- Overseas Development Institute (ODI)
- Oxford Policy Management (OPM)

- University College London
- University of California, Berkeley
- University of Oxford
- Wageningen University
- World Bank

CRP2's main comparative advantages are the following:
- It brings together a unifying theory and performance metrics that enable consistent data collection and analysis.
- It brings together state-of-the-art tools on impact evaluation to identify best practices in upgrading value chains across different commodities.
- It offers a unique platform for research activities and communication of results.

Setting Priorities

Theme 3 features a core set of interrelated activities that might receive priority, although it could also be assigned to "low-hanging fruit" opportunities or to problems of evident and persistent magnitude. Engaging all three criteria, the research program has identified the following priority areas for Theme 3:
- Core input to other CRP activities: work on transaction costs and infrastructure and on risk in the value chain;

- "Low-hanging fruit": development of a knowledge clearinghouse and of research methodologies surrounding value-chain performance, both of which would be addressed in partnership with extension services; and

- Evident problems: improved market access through partnerships and research on input provision.

Partnerships

Efforts devoted to reducing rural poverty have traditionally focused on small-scale farmers trying to increase their competitiveness within the market chain by augmenting productivity through new technologies and organizational strengthening. Despite these efforts, some challenges cannot be overcome through a farmer level approach alone. The market chain encompasses diverse actors ranging from small-scale producers to modern supermarket chains or restaurants, including wholesalers and processors. These actors live in distinct geographical areas and cultural settings, and sometimes have never met or have only informal relationships characterized by lack of trust and strong competition. They lack the capacity to identify common interests and joint opportunities, and to innovate to overcome hurdles at different levels of the market chain. For innovation to occur, new patterns of interaction and new institutional arrangements among the diversity of actors involved in the value chain are necessary. These interactions and arrangements need to focus on adapting scientific expertise to the local context, paying special attention to the socioeconomic, environmental, technological, and market-driven dimensions, while ensuring strong linkages to policy development and incorporating public–private partnerships.

CRP2 recognizes the significant potential for drawing on existing work that addresses the developed world's food systems, and which has analyzed and presented the achievements of transition and rapidly advancing economies. The creation of a knowledge clearinghouse, in combination with Theme 1's Strategic Foresight Platform, will catalyze this exchange of experience and bring a range of new partners to the value-chain research, including the Abdul Latif Jameel Poverty Action Lab (J-Pal) from Massachusetts Institute of Technology, University College London, and the International Growth

Center with Oxford University and the London School of Economics. The key partner types for the markets and value-chain research include

- public, private, local, and international development agencies and the farmer associations they support;[17]

- national and multinational private-sector firms that purchase goods from the rural poor;[18]

- national and subnational public-sector agencies that set the rules of the game and decide on infrastructure investments;[19] and

- key public and private donor agencies and investment funds, which fund the above.[20]

The use of learning alliances will be a key mechanism for developing successful partnerships. Learning cycles provide opportunities to promote interaction, social learning, social capital formation, and collective activities with partners from the private sector, development NGOs, public-sector agencies, Southern and Northern research centers, other CRPs, and donor spheres. CRP3 will have its own commodity-specific learning alliances that will interact with the CRP2 regional learning platforms, providing feedback on technological, market and organizational innovations and contributing to the development of policies and approaches for effective public–private partnerships.

The strategy will build on experiences of existing partnerships in different commodities. Over the years, the centers have invested both direct funding and human resources into different forms of partnerships. Good examples of partnership found in CRP3-RTB include Banana Regional R4D Networks (global), the Sweetpotato for Profit and Health Initiative-SPHI (Sub-Saharan Africa [SSA]) and the Latin American and Caribbean Consortium to Support Cassava Research and Development. In relation to staple crops, IFPRI, IRRI, CIMMYT, and ILRI all participate in CSISA in collaboration with the NARSs of South Asia; private crop-science, seed, and agricultural input companies; farmers' organizations, and NGOs. This partnership seeks to prioritize value-chain development in the context of inputs, technologies, and resource-management systems, and aims to decrease hunger and malnutrition, and increase food security among resource-poor, small-scale farm families in South Asia. IFPRI also partners with COMESA to conduct a series of policy seminars and training courses on various topics related to staple food marketing in the region, in addition the value-chain theme will be directly linked to CAADP Pillar 2, which focuses on value chains for SSA.

Various partnerships also promote linkages between farmers and high-value markets. This would include the University of Bonn's Foodnet efforts toward supply-chain excellence, Monash University's Centre for Retail Studies, and a host of others spanning promotion of contracting to the establishment of high-value direct sales to the consumer. Similarly, the research theme will continue partnerships with the Mathematics, Computing, and Technology Faculty of Open University and with University College London and Wageningen University. The International Center for Tropical Agriculture (CIAT) partners with IFAD's Latin America and Caribbean Division to develop systematic ways for IFAD, as a donor agency, to support market linkage programs between private-sector enterprises and smallholder farmers in innovative and effective ways. IFPRI also has partnerships with IFAD and with the World Food Program

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[17]Their role is to co-develop methods and approaches in collaboration with the CGIAR to build the capacities/access to infrastructure of poor farmer associations to function as effective and attractive business partners in ways that contribute to reducing poverty.

[18] Their role is to co-develop methods and approaches in collaboration with the CGIAR that develop and move more inclusive private- sector policies (purchasing, payment, grading, and so on) toward the mainstream of national and multinational business practice.

[19] Their role is to co-develop methods, approaches, and good practices in collaboration with the CGIAR to identify and implement efficient investments in critical social and productive infrastructure that benefits the rural poor.

[20] Their role is to co-develop methods and approaches in collaboration with the CGIAR that are more effective at promoting equitable and sustained economic and social growth for the rural poor.

(WFP) in linking farmers to markets (in the case of WFP, the key partnership will be with the Purchase for Progress program). In addition, IFPRI partners with the University of Adelaide, the Indonesian Center for Agriculture and Socioeconomic Policy, and the Indonesian Center for Agricultural Policy and Agribusiness Studies to evaluate horticultural value chains in Indonesia. In partnership with the Bill and Melinda Gates Foundation, the World Bank, FAO, and the National Bureaus of Statistics and Livestock Line Ministries, ILRI has created a large-scale project involving piloting improvements to the database for livestock production and marketing systems in Mali, Tanzania, and Uganda.

Many of these partnerships focus on capacity-building around the world. IFPRI partners with the Regional Unit of Technical Assistance of Central America (RUTA), with the Brazilian Agricultural Research Corporation (Embrapa), the Economic Commission for Latin America and the Caribbean (CEPAL), and the United Nations Development Programme (UNDP). CIAT also participates in the Sustainable Food Laboratory, which is a coalition of private companies and international NGOs that focuses on increasing the sustainability of the global food system in themes related to smallholder inclusion, social equity, and rural development.

Outputs, Outcomes, and Impacts

In addition to the outputs described at the research activity level, Theme 3 will establish a web-based information and knowledge clearinghouse. This clearinghouse will serve as a fully-accessible repository linked to the GFAR/CIARD portal for all the existing and future products developed through the markets theme of CRP2 for use by other CRPs working on global and local market issues impacting on smallholders (that is, CRP1, CRP3, CRP4, and others), as well as the broader research and development audience. The ethos of the clearinghouse will be that of "Creative Commons" (in contrast to materials under "copyright"), where all products are made available as quickly and widely as possible under the stipulation that authorship be respected although changes can be made and shared. Specific products in the clearinghouse will include

- a common toolbox of methods for use by other CRPs or other research and development partners built around CRP2 prototypes;
- best practices from CRP2 and components of other CRPs focused on markets;
- quality and attribution methods and tools, which will be provided through the impact evaluation activities of Subtheme 3.2; and
- results from quality and attribution testing under diverse crop, market, and policy conditions and cross-cutting analysis.

These research results will provide the analytical base and country-level capacities to provide smallholders with access to dynamic markets. The key research **outputs** will be

- tools to optimize and prioritize investment in institutional arrangements and value-chain infrastructure;
- best new practices to upgrade value chains across CRPs and through institutional innovations on CRP2, increasing the adoption of best practices through the knowledge clearinghouse and collaborative partnerships; and
- identification of policies for creating an environment for willing buyers and the enabling sustainable linkages between capable farmers and willing buyers.

Key **outcomes** will be

- improving access to markets for smallholders at better prices and with lower transaction costs; and
- upgrading value-chain governance and equity.

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These research outcomes will have a direct impact on equity and poverty because improved market access, technical innovation, information, and improved efficiency will reduce marketing margins, increasing farmgate prices, expanding labor opportunities for women and the landless, and boosting the incomes of rural women and men. In addition, the research will reduce the risk to farmers through the promotion of risk coping mechanisms, and increase the quality of produce, thereby improving food security. **Working with partner organizations that complement the strengths of the CGIAR centers and that focus more on the implementation of the proposed innovations is a key aspect of this theme's strategy for ensuring uptake of outputs. We will promote collaboration with ministries and other public-sector agencies to take into account political and administrative constraints in value-chain recommendations, and to ensure buy-in of the results. Cooperation with NGOs with a strong field presence will be useful in understanding farm-level problems and mobilizing participation to solve them. Working with local universities and research institutes will enable us to draw on local expertise, as well as to develop local capacity to undertake policy-relevant research on agricultural value chains. By design, the evaluation component of Theme 3 (Subtheme 3.2) directly contributes to ensuring that outputs are translated into outcomes and impacts.**

5. STRATEGIC RESEARCH ON GENDER

Farmers and other rural actors are not a homogeneous group. In the developing world, their access to resources and their abilities to initiate and expand agriculture-related businesses are frequently shaped by access to resources according to their gender roles and responsibilities. Neither opportunities nor risks are shared equally within the household (see Subtheme 2.3); men and women may have different perceptions of risks, such that both entrepreneurial efforts and shocks can affect men's and women's welfare in different ways. Furthermore, there is a growing body of evidence that increasing the resources under women's control is likely to increase their bargaining power and improve their children's nutrition and health. Accordingly, for the CGIAR to deliver on its mission—achieving sustainable and positive change for those who need it most—its approaches to agricultural research and development must engage, empower, and invest in women, not only to correct gender inequities, but also to achieve more effective development.

This has been widely recognized as a critical and high return, issue to address in agriculture and rural development, most recently in the FAO 2011 *State of Food and Agriculture* report and the GCARD 2010 Conference and subsequent agreed GCARD Roadmap. Following the GCARD 2010, extensive discussions have continued, through the collaborative mechanism of the Global Forum on Agricultural Research, between the CGIAR, FAO and GFAR's other constituent forums, institutions and networks. The outcome is now an initial agreement to pursue a collective global partnership among these institutions to address (1) strengthening the role of women in agricultural research for development institutions and (2) a more effective gender-based focus on agricultural research prioritization and delivery to better meet the particular innovation needs of women farmers. We will continue to work with GFAR and the regional agricultural research organizations, as well as individual NARS institutions, to promote appropriate attention to gender in agricultural research and extension, and contribute materials for capacity strengthening on gender-responsive agricultural research.

CRP2 will ensure that gender issues are not only integrated into preexisting research programs, but also that critical gender issues become a focus of R&D in their own right. In CRP2, experiences with gender analysis under individual projects will be collected, compared, and contrasted to uncover broader lessons on gender integration in its research.

An overarching aspect of the three themes of CRP2 will be **addressing constraints to collecting and analyzing gender-disaggregated data** so that they can be used in all aspects of agricultural policy research. In some cases, no data have been collected, or data are incomplete or inconsistent. In other cases, where gender-disaggregated data are available, they have not been adequately analyzed to identify key gender relations and their influence on agricultural productivity or poverty reduction. Examples include agricultural censuses in Africa that have applied new methods of collecting intrahousehold data, which in many cases have yet to be analyzed, and longitudinal datasets (for example, ICRISAT's village-level surveys and IFPRI's datasets on Bangladesh, Ethiopia, and Kenya). In such situations, relatively low levels of funding for gender analysis can yield valuable insights. Further linking gender-disaggregated data to geographic information systems (GIS) can ensure that gender is integrated in strategic foresight research, to better identify, for example, who are the key decisionmakers and stakeholders who will be affected by technology innovations or climate change.

The CGIAR has internationally-recognized research capability in this area and has particular capability in studying the implications of gender in relation to agricultural research and its role in development. Researchers will both develop methodologies and analyze existing data collaboratively with in-country partners (especially NARSs), providing an opportunity for mutual capacity building. That is, CGIAR researchers can help strengthen NARSs' capacity to collect and analyze data while themselves learning more contextual information about local gender relations from their partners in country.

The output of this activity will be strengthened information systems on gender in agriculture, including better methods, data, and analysis. Gender-disaggregated datasets will be documented and made available on the web so that they can be used in training courses and student theses. Synthesis studies on

gender in agriculture will provide evidence on how and why it is important to pay attention to gender in agricultural projects. This work will feed into major global reports and processes, including providing information for the next World Bank *World Development Report*, which will focus on gender. The impact will be seen in public investments and agricultural research systems that meet the needs of both women and men.

Research will also explore the role of technology policies in gender relations. As part of a larger, regular set of evaluation activities, researchers will formulate and test a range of hypotheses relating to (1) gender imbalances in access to assets, technology, and support services; (2) gender differentials in agricultural productivity and incomes (Alene et al. 2008); and (3) intrahousehold distributional impacts of technological and institutional innovations. Specific steps will be taken to leverage this knowledge to inform technology development and delivery systems so that both men and women benefit. Although the conceptual frameworks for each theme will differ, each will examine how contextual factors, assets, activities, and outcomes may differ for men and women, as well as examining the degree of "jointness" within households. During R&D interventions, in-depth baseline studies will initially be conducted on the roles, livelihood strategies, constraints, and preferences of male and female farmers (including the roles of female-headed households and female farmers within male-headed households). The results will be used to improve on the design of R&D interventions in ways that increase participation among disadvantaged groups and achieve an informed and balanced emphasis on empowering women and strengthening their assets.

Evaluations of technical and institutional innovations will be designed to allow researchers to systematically assess gender-differentiated technology needs, choices, and constraints and to test mechanisms for targeting and delivering technologies for greater impacts among both men and women. Farmer participatory research and extension approaches will be used to promote participation of women and other marginalized groups in developing and disseminating technologies, as well as in evaluating programs, as called for under the GCARD Road Map (GFAR 2011). By expanding the range of gender-disaggregated analyses of potential and actual technology adoption and the impacts of alternative innovations, the program will increase awareness and use of gender analysis in agricultural research and extension. Special emphasis will be given to enhancing female farmers' capacity to obtain information, credit, and technologies and to integrating them into input and output markets to strengthen their assets and incomes.

In addition, a number of the subtheme descriptions have identified how they will investigate gender issues as a cross-cutting theme.

Research on the impact of technology policies on gender, health, and nutrition that will build on an irrigation technology evaluation on health, gender, and nutrition project conducted in Kenya and Tanzania. The "Gender and Health Impacts of Genetically Engineered (GE) Crops in Developing Countries" project will examine the interdynamics of these three topics.

Research on policy processes will pay particular attention to the formal and informal institutions that can increase women's voices in agricultural policy processes through capacity development and work with leaders to improve their awareness and knowledge of the issues. Another example is the research on governance and institutions will identify strategies to make the provision of infrastructure and services more gender sensitive. These strategies will target public administration (such as promoting gender targets for extension services and training frontline service providers—both women and men—to address gender-based constraints), local political institutions (such as promoting women in local councils), and community-based organizations (such as examining gender dynamics in producer organizations and involving women's groups in service delivery). Research on property rights and assets will identify ways to strengthen women's tenure security and narrow the gender–asset gap to reduce present and future poverty.

Research on value chains will promote increased opportunities for women and greater gender equity in value-chain development and operations. This work will consider ways to ensure that commercialization does not transfer control of assets from women to men, while improving the representation of women as actors throughout the value chain.

Prioritization of gender work overall will emphasize areas in which gender disparities are greatest, notably in Africa and South Asia. A context-specific strategy of engagement and outreach on gender, including a training and communications strategy, will ensure that outputs serve the needs and capacities of women as clients and partners. CRP2 will, for example, include women in research teams, work with women's producer organizations, and address gender attitudes among managers, NGOs, aid administrators, and other key actors in the agricultural field. We will also build on our close collaboration with FAO and IFAD on gender issues to influence broader development policy and practitioner audiences. Continued close interaction with the other organizations brought together through GFAR at global and regional scales will ensure mutual synergies with the regional agricultural research-for-development networks and constituencies of farmers, NGOs, private sector and national government research, extension and education institutions, maximizing the impact of the gender research and capacity strengthening in CRP2.

6. NEW TOOLS AND METHODS, AND DATA DEVELOPMENT

Developing new tools and methods will be one of the hallmarks of CRP2's approach. Following the CGIAR Science Council's advice on the importance of using social science methodologies in interactions between social and biophysical scientists (CGIAR Science Council 2009), CRP2 will draw on the social science expertise of the CGIAR system and of other advanced research centers as well as on the unique knowledge of NARSs and local partners to assess existing policies, institutions, and investments.

Box 6.1 summarizes the range of innovative and interdisciplinary methodologies that form the foundation of the research themes and subthemes described in sections 4 and 5 of this proposal. CRP2 will use cutting-edge research designs. These designs will include randomized experimental design to evaluate the impact of policy reform, institutional change, and marketing innovations; action research linked to comparative analysis; digital survey methods to ensure rapid turnaround; and GIS analysis of marketing networks and market accessibility. Experimental economics will incorporate farmer behavior into the testing of value-chain analysis and identify ways of strengthening farmers' organizations, as well as provide feedback to organizations to foster collective action. Various techniques for understanding gender differences, such as the collection and analysis of sex-disaggregated data and information on social norms, will be integrated into each research theme.

Research on policy processes will be based on innovative quantitative methods, such as combining political economy modeling with computable general equilibrium modeling, and on innovative qualitative methods, such as the participatory influence mapping method, Net-Map.[21] To understand how policy change can occur despite political obstacles, researchers will apply analytical concepts in new ways. These possible lenses for analysis include the Advocacy Coalition Framework and the concepts of political capital, policy beliefs, and policy discourse. CRP2 will also apply creative methods for analyzing governance arrangements, such as empirically measuring the transaction costs incurred by farmers in accessing inputs and markets. Researchers will develop special assessment tools and indicators, such as gender-disaggregated governance indicators for agriculture and natural resource management.

CRP2 promotes interdisciplinary research, another facet of its innovative approach to agricultural science. CRP2 researchers will use an economywide approach to integrate different policy and institutional topics within a particular region and to assess and compare the effects of alternative policy and institutional reforms on agricultural growth, income generation, poverty reduction, food security, and nutrition improvement. Although focused on agriculture, the policy work will examine links to other types of policies. Collaboration with biophysical scientists will enhance the synergy between technology and institutional innovations on the ground. Systematic comparative analysis of the economic and environmental impact of new technologies under alternative policy regimes across agroecosystems will enhance the understanding and impact of these technologies.

To ensure policy relevance, CRP2 will work closely with other CRPs to ensure that the new technologies for accelerating agricultural growth that they are developing will reach small producers and the rural poor through the formulation of appropriate policies, effective and equitable governance structures, and efficient markets.

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[21] See http://netmap.ifpriblog.org/about/.

Box 6.1—Novel CRP2 research approaches and methods

Drawing on the expertise of the CGIAR system, we will apply a diversity of approaches and methods to research activities under CRP2. The analyses will be informed by state-of-the-art theoretical and conceptual frameworks and methods, a few of which are described here.

- **Econometric methods** including cross-country panel data analyses, multilevel estimations, cross-community estimations, and intrahousehold and microeconometric approaches will be used to analyze the poverty and income distribution impacts of different policies.
- **Model-based simulation analyses** will be used to assess the national and global impact of policies. Economywide models, such as CGE models, will be used in conjunction with farm/household and spatial models to assess these impacts at the household and local level. CGE models and agent-based models will also be combined with political- economy models to facilitate a better understanding of policy processes.
- **Strategic foresight assessments** will be formalized on an ongoing basis for scenario analyses, using state-of-the-art modeling tools combining economic and biophysical models with geo-referenced physical data.
- **Social network analyses** will be used to model, measure, and promote the inclusiveness and use of networks to encourage collective action and to better understand the innovation process, from discovery to development to delivery, emphasizing key decision points in the network. Data collection methods for network analyses include both gender-disaggregated questionnaire-based survey techniques and mapping techniques.
- **The value chain component** will use innovative mixed methods to identify constraints and opportunities in the value chain. These methods will include sampling of mobile market agents, such as traders and across the whole value chain; margin calculation in diversified and seasonally affected producers and traders; definition and measurement of whole-chain performance; and industrial organization tools to measure power relationships. Experimental and pseudo-experimental methods will be used to understand consumer preferences regarding food safety and quality and the impacts of policies.
- **Qualitative analyses** will be used by a range of subthemes. Techniques used will vary by subtheme (see Section 4) and will include participatory assessments, gender analyses, life histories, focus group discussions, interviews, ethnography, participant observation, and content analyses. Particularly in the work on collective action, the research will use a legal pluralism (Merry 1988) and polycentric governance (Ostrom 1999) approach, that recognizes both customary forms of cooperation, as well as those introduced by government and projects; thereby going beyond "ownership" as defined by state title to examine the entire bundle of rights derived from customary and statutory law.
- **Participatory action research** will be used to improve the links between research and implementation and to catalyze institutional change. Engaging program implementers in action research will draw the focus to implementation modalities and the potential for scaling up. Action research also helps in the identification of gender-related constraints to participation and in testing ways to overcome these constraints.
- **Country Strategy Support Programs** will be used to assist in collecting long-term household panel data, observing and understanding the development process, testing and experimenting with policy options, and building strong national capacity through collaborative research (see Box 3.3).
- **Experimental approaches and randomized controlled approaches** will be used to evaluate impact and test policy options. Such approaches will be used to study the effect of rule changes on cooperation in collective action groups and to provide feedback to the groups to help them increase cooperation.
- **Gender and intrahousehold analysis** will use the gender-disaggregated data collection mentioned above, integrating information derived through the different methods to understand how intrahousehold relations shape the outcome of policy or institutional changes. Analysis will go beyond unitary or bargaining household models to examine the separate assets, activities, income, and welfare of women and men, as well as what is shared within the household, based on age and gender differences.
- **Data banking and access** will be developed, including long-term panel datasets and advanced web-based knowledge and information. This activity is further described in this section (CRP2 Data Strategy), and details specific to themes can be found in Section 4.

Innovation Fund Window

In addition to directly undertaking novel research, CRP2 will seek to encourage innovative research practices more broadly. Therefore, CRP2 proposes **an annual competitive grants program** to promote innovation among researchers in both developed and developing countries. This competition will focus on top-priority research gaps identified by CRP2 research each year.

The objective is to identify the most innovative and high-potential projects on the specific priority themes identified by CRP2 research. Grant funds will be used to implement the chosen projects at the pilot level and to carefully evaluate them. This program will help to identify simple solutions to complex problems to strengthen food security and incomes for the rural poor—best bets to be further researched and scaled up.

The call for proposals will be widely announced at the beginning of the year and a committee of recognized researchers will identify the top five proposals. The key criteria for ranking the proposals will include their policy relevance, their potential to inform a methodologically rigorous study, innovativeness, and the degree of groundwork and preparation conducted for the pilot work.

The best proposals will be accepted for funding, with the funding level and number of projects to be determined during the implementation phase. The selected researchers will have to deliver the results by the end of the year, and these results will be a key input into CRP2 research. In addition, the winning researchers will become part of the network of CRP2 researchers, which will facilitate joint research activities and generate additional benefits through technical and logistical support as well as fundraising assistance and joint publications.

Within this network, CRP2 will organize technical meetings and outreach forums to promote scientific exchange between the winning researchers, experts, and policy practitioners. Interactions with policymakers will take place in collaboration with leading organizations at the regional and continental level. We expect these activities to help build research capacity in developing countries.

CRP2 Data Strategy

There is a high level of synergy between world-class research and world-class information systems, which means that data should be treated as a corporate research asset. The quality, credibility, and cost of CRP2 research, the program's capacity to develop timely, relevant, and accessible research products and services, and its ability to respond to evolving research priorities, will all be highly conditioned by CRP2's data strategy. Therefore, the development of integrated data and knowledge management platforms is a priority of CRP2.

CRP2's data strategy aims to reduce research costs, enrich analytical opportunities for CRP research partners, and deliver a major international public good in the form of an open-access data portal, which will foster broad opportunities for innovation beyond CRP2 by both the public and the private sectors. These objectives go well beyond existing practices for data management and sharing within and across CGIAR centers.

Although there is still room for progress, a number of significant data sharing and networking examples within the CGIAR can serve as models for future success. Among these is the CGIAR's Consortium for Spatial Information (www.cgiar-csi.org), a grassroots, scientist-to-scientist network for spatial data and knowledge sharing. The CSI has been very successful in engaging the spatial community of the CGIAR in collaborative efforts to generate and share new data products, and has worked with partners within and outside the CGIAR to convene a flagship annual African Agriculture GIS Week that increasingly engages African students and young professionals as well as the private sector in fostering advances in the use of spatial data in African agricultural development. A second example is the ICT-KM program, which has promoted awareness and adoption of a broad range of new communication technologies for improved data sharing among CGIAR scientists. Other examples include the spatial data portal capacities of IWMI and the recently convened multicenter Trial Sites effort to harmonize and share technical data from CGIAR field trials and experiments.

CRP2's holdings will include a wide range of spatially-explicit GIS data, secondary statistical and census/survey data, and primary datasets collected as part of CRP2's own field work, e.g., long-run panel household and village data collected to support analysis of how changes in policies, institutions, and markets are impacting food security and poverty at the micro-level. Examples include ICRISAT's Village Level Surveys and IFPRI's China, Ethiopia, Ghana, and Nigeria surveys. Other components of CRP2's shared data resources include access to key bibliographic source material underpinning CRP2 research themes, as well as a very large and continually expanding set of analytical results (e.g. output data from scenario runs for CRP2 Strategic Foresight models such as IMPACT, MIRAGE, crop models, and DREAM).

Three start-up action items are planned for the initial implementation of the CRP2 data strategy:

1. **Commission a CRP2 data, tool, and specialist resource inventory.** To provide a detailed scoping of the initial range of CRP2 data and tools as well as of the CGIAR and partner specialists who develop, manage, and apply those assets, a draft CRP2 data, tool, and specialist resource inventory will be compiled within four months of the launch of CRP2. In addition to providing key information to guide the startup priorities of the Data Systems Team (see item 2, below), the inventory will feed into the deliberations of the Data Strategy Task Force (see item 3) and guide the program management on filling gaps in the availability of relevant data expertise in each CRP2 center. The inventory will be posted on the CRP2 data portal/website. The ongoing maintenance of the inventory will become a key responsibility of all CRP2 staff with data responsibilities.

2. **Form a CRP2 Data Systems Team**. This would entail recruiting a web/cloud-oriented *data systems leader*, reporting to the CRP director, whose responsibilities would include the initial design and implementation of cross-center and cross-partner data and metadata management systems, tools, and sharing protocols to support data access and sharing (initially aimed only at the needs of researchers in CGIAR participating centers). The focus will be on software systems, tools, and logical data structures that facilitate acquisition, management, and sharing of core datasets identified by the CRP2 inventory activity (see item 1). The physical and networking infrastructure required to support these "soft" systems will be obtained by contracting existing CG center ICT or third-party ICT service providers, whereas the Data Systems Team will focus its efforts on developing data management, access and interoperability as well as necessary project management tools.

3. **Convene a Data Strategy Task Force** (1 year mandate). Within six months of approval of CRP2, a Data Strategy Task Force will be convened and mandated to develop a staged vision of a CRP Data Systems Design and Implementation Plan. This plan will provide an ambitious two to three year work plan for the Data Systems team, including initial program level goals and milestones. Task Force members will partly be drawn from constituent CRP2 CGIAR centers and partners, but will also include external specialists and thought leaders in data and knowledge management (for example, the CGIAR's ICT/KM program and Consortium for Spatial Information (CSI), Google, and Tableau). Other recommendations will include best-practice standards for research data documentation and for data release and data sharing policies, that will be factored into the design and costing structure of CRP2's research investments.

Ultimately the data strategy will be deemed successful if (a) it provides a means of compiling, harmonizing and sharing data resources and tools amongst the distributed CRP2 research teams, and (b) it provides a range of external users with deep and flexible access to CRP2's core data collections and analytical results and, increasingly, to tools that add value for specific user needs.

Some objectives of the data strategy are listed here:

- Evaluating and adopting innovative, more reliable, and cost-effective data collection and validation technologies and best practices: such as low-cost household/community data recording devices; natural resource, production, and

price monitoring systems; use of nanotechnology; satellite-based remote sensing; mobile phone infrastructure; and crowd-sourcing approaches

- Using ICT tools to accelerate the two-way transfer and built-in consistency and validation checking of data between collection and use locations

- Adopting interoperable database management structures to ensure cost-effective management, and efficient cross-theme integration of survey, statistical, spatial, and other data as well as CRP2 model results

- Better sharing of research data, analytical results, and modeling tools among research partners using advanced metadata and data-networking technologies and practices

- State-of-the-art data query, mining, and integration platforms and tools to deliver data and knowledge aggregation products targeted to the needs of key CRP2 clients and audiences: building, for example, on the initial efforts of such CRP2 components as HarvestChoice, Global Futures, ASTI, the Food Security Portal, MacMap, Global Futures CASE maps, Public Spending Database (SPEED), and ReSAKSS

7. PARTNERSHIPS

CRP2 sets out an ambitious agenda for research and impact, and achieving it will require concerted collective effort. The CGIAR centers have long provided crop varieties and other agricultural technologies that address many of the problems smallholders face and that have the potential to push the boundary of agricultural productivity. CRP2 will help ensure that these technologies can take root in a policy, governance, and market environment designed to support their use and exploit the enormous potential of agricultural growth to improve human well-being.

CGIAR researchers not only can draw upon expertise in a number of social and natural sciences, but also have strong ties to governments and other stakeholders that play a critical role in these institutional aspects of development.

Of course, the CGIAR centers cannot do all of the research, or even less achieve impact, alone. Meeting the research and implementation objectives requires close partnerships with conventional research partners from universities and NARSs, but also with a range of stakeholders, such as farmer organizations, research and advisory institutions, governments, development agencies, donor agencies, and the private sector, at the national, regional, and global levels. As documented in Annex 64, the CGIAR centers participating in CRP2 currently collaborate with more than 500 partner organizations. Examples of specific partnerships are provided in this section and in the descriptions of the research subthemes in Section 4.

Three Types of Partners for CRP2

CRP2 has three types of partners: (1) research partners; (2) policy and practitioner partners; and (3) knowledge-sharing partners.

Research partners will participate in the design and conduct of CRP2 research. Research partners include the CGIAR centers, universities, NARSs, and research institutes in OECD and developing countries. Specifically, key strategic partners for CRP2 include, among others, the Chinese Academy of Agricultural Science (CAAS, where the IFPRI China office is located), Brazilian Agricultural Research Corporation (Embrapa), the Indian Council of Agricultural Science (ICAR), and the Nigerian Agricultural Research Council, among many other NARSs. For example, over 40 NARSs are already involved in Subtheme 1.3's work on science and technology policy, to identify the priorities that are adapted to each region. See Box 7.1, Box 7.2, and Box 7.3 for examples of partnership with NARSs.

Existing partnerships with regional and subregional organizations—including AARINENA, APAARI, CACAARI, CAADP, the Forum for Agricultural Research in Africa (FARA), the Sub-Saharan Africa Challenge Program, and many others—will be further strengthened, both through direct collaboration and by working through GFAR.

Other CRPs will also be key research partners, as described at the end of this section, in Table 7.1 and in Annex 2.

Government agencies, NGOs, farmers' organizations, and private sector firms may also be research partners when they help design interventions or surveys or collect and analyze data. These partnerships will help achieve jointly defined research objectives more effectively than a single entity could on its own. The development of strategic research partnerships will be mutually beneficial because it will facilitate access to expertise, models, data, and cross-country experiences; developing-country research programs, thereby increasing understanding of development processes; and new funding opportunities.

In each of the subtheme descriptions (Section 4) we list the major alternative providers of this research and present CRP2's comparative advantage over them. For convenience, this material has also been compiled into a table (see Annex 5) which includes an expanded list of alternative suppliers. Of

course, the list of alternative providers and the list of research partners overlap, since we are collaborating with most of the institutions working on the same areas as CRP2.

Box 7.1—Collaboration with NARES: The example of the Ethiopia Strategy Support Program

Close collaboration with local research institutes has been at the heart of the IFPRI's Ethiopia Strategy Support Program (ESSP), which began in 2004. ESSP has worked with the Ethiopia Institution for Agricultural Research (EIAR) on reviews and analyses of seed, fertilizer, and agricultural extension in Ethiopia as well as various policy seminars and training courses. ESSP has also worked closely with its main institutional counterpart, the Ethiopian Development Research Institute (EDRI), to engage in joint research and training on determinants of changes in agricultural productivity, cereal price movements, economywide implications of agricultural investments, and rural poverty dynamics. This work includes a major rural household survey. Another major study, about the delivery of agricultural extension across administrative regions, was conducted with researchers of the Ethiopian Economics Association. In addition, ESSP has supported the Central Statistics Agency through GIS training and production of the Atlas of the Rural Economy and a Population and Housing Census Atlas, as well as disseminating the underlying comprehensive spatial databases.

Box 7.2—Collaboration with NARES: The example of the partnership with Makerere University and Uganda National Agricultural Research Organization (NARO)

IFPRI started collaboration with Makerere University and NARO in 1999, when a project office was opened under the Policies for Improved Land Management in Uganda project. Since then, IFPRI has maintained a very strong working relationship with both NARSs to implement more than 10 research projects. This collaboration has involved research, capacity building, and policy influence.

Research work included collection of primary data involving mainly students from Makerere University, who were trained as enumerators or as research collaborators. (More than 1,000 students from Makerere University have been involved in IFPRI studies in these positions.) Research done by IFPRI in Uganda has produced about 85 IFPRI publications, most of which have Ugandans as co-authors.

In terms of capacity building, IFPRI staff posted in Uganda have been offering guest lectures on applied economics and research methods used by IFPRI at Makerere University. Between 1999 and 2011, two IFPRI research fellows gave guest lectures for four full semesters. IFPRI staff have also been serving as external supervisors/examiners to graduate students from the university.

IFPRI research has been used in numerous government publications and has contributed to the shaping of agricultural and environmental policies in Uganda. These include "State of the Environment" (published by the National Environmental Management Authority every 2 year), "The National Development Program 2010/11-2014," and "Agriculture for Food and Income Security Agriculture Sector Development Strategy and Investment Plan: 2010/11–2014."

Box 7.3—Collaboration with NARES: The example of the partnership with the Center for Chinese Agricultural Policy (CCAP)

The Center for Chinese Agricultural Policy (CCAP), Chinese Academy of Science, is the premier agricultural policy and research institute in China. CCAP's mission is to undertake rigorous strategic and applied research that helps to analyze the problems and challenges facing China's agricultural policymakers and producers. It has four major research programs: agricultural science and technology policy; resources and the environment policy; rural development and poverty alleviation; and commodity market, food security, and decision support systems. In past five years, CCAP has led or coordinated more than 50 research projects related to agricultural and rural development, funded by both the Chinese government and international donors. Findings of CCAP studies have not only generated significant publications in international journals, but have also played important roles in China's decisionmaking in agricultural policy.

CCAP has had relations with CRP2 partners, particularly with IFPRI, for more than 15 years. The close relationship started when Jikun Huang, now professor and director of CCAP, spent one year at IFPRI to develop a supply-and-demand modeling framework to assess challenges to food production growth in China along the lines of IFPRI's International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT), a key player in global food markets. The relationship has continued with joint research and outreach work over the years, covering topics including the future of Chinese agriculture, biotechnology policy, water institutions and management policy, food demand and supply modeling, public investment in agriculture, impact of biofuels on agriculture and poverty, economic and health impact of biofortification, as well as ecosystem services in agriculture.

Policy and practitioner partners refer to those organizations that are not directly involved in the research itself but have a direct stake in its outcomes. Examples include government agencies that request policy advice; donor organizations that seek advice on new strategies or priorities for investment; governments or NGOs implementing programs that are being evaluated by the research projects; farmers' organizations that work with researchers to identify ways to strengthen their capacity; and private sector actors that participate in value-chain innovations to help small-scale producers reach high-value markets. These partners are called upon to work with the researchers to set priorities and identify the key questions to be addressed. They will also be associated with implementing projects in various ways, such as facilitating research, participating as respondents, discussing and giving feedback on emerging findings, and using findings to improve policy and program design and implementation. As active partners during the research, they are also likely to apply the research findings in their ongoing work, thereby contributing to translating research outputs into outcomes. An example of such a partnership is provided in Box 7.4.

Existing partnerships with the Common Market for Eastern and Southern Africa (COMESA), West and Central African Council for Agricultural Research and Development (CORAF), and South Asian Association for Regional Cooperation (SAARC) will be further strengthened, both through direct collaboration and by working through GFAR.

Box 7.4—The IFAD-IFPRI Strategic Partnership Programme

Policy research institutions such as IFPRI have the capacity to identify and promote innovative, research-based policy options for rural poverty reduction. However, pro-poor policy innovation must be tested on the ground and negotiated with all stakeholders before becoming concrete and effective solutions. IFAD has the capacity to design and finance projects through which developing countries can test and implement such innovative solutions on various scales.

The overall goal of the IFAD-IFPRI Strategic Partnership Programme is to enable the rural poor—with due attention to gender—to have better access to and capacity to take advantage of new market opportunities, especially markets for high-value agricultural products and markets for climate change mitigation and other environmental services. This will be achieved through applied policy research and knowledge management and sharing between IFAD, IFPRI, and selected countries, combined with investment, impact evaluation, and scaling-up based on the results of the program. The specific objectives are (1) to strengthen the capacity of country program partners to analyse and address policy issues, in particular those related to improving access by small farmers to new market opportunities in agriculture, including for high value products, and for climate change mitigation and other environmental services; (2) to identify, test, and evaluate innovative policy, institutional, and program options for improved access to such market opportunities; and (3) to disseminate and mainstream the identified options so that they become solutions in national policies and investment programs.

These objectives are being pursued in a single program to develop positive synergies in efforts to promote pro-poor access to high-value commodity markets and markets for climate change mitigation and other environmental services, as well as to facilitate interorganizational cooperation and lower transaction costs and ensure a rigorous approach to innovation and its mainstreaming in IFAD-funded operations.

Knowledge-sharing partners are those who help to store and transmit knowledge. They may be key in disseminating information to their own constituency (as when a donor agency shares findings from research in one site to its offices in other countries) or to a broader public. Knowledge-sharing partners also play a critical role in capacity strengthening; this is the case when universities use research findings in courses or graduate research or when other organizations run training courses using the research outcomes.

In some cases, the same organization may have all three types of partnerships with CRP2, such as when an agricultural research institute or NGO participates in the research, helps to implement policy innovations, and takes part in dissemination of research findings.

Partnerships for Impact

Because partnerships play a crucial role in achieving impact, there is broad correspondence between the types of partners and the three impact pathways of CRP2 (see Section 3 and especially Figure 3.1).

- In general, research partners play the greatest role in impact pathway 1, by helping to influence and strengthen other research. For example, NARSs that work with the foresight or science policy subthemes will be better able to target their technical research to meet the needs of poor people.

- Practitioner partners play a key role in impact pathway 2, influencing the policy development and implementation arena. By participating in the research in some way, these agencies are more likely to be aware of the findings and to apply them in practice. Similarly, policy partners are key in impact pathway 3. Researchers may work directly with such "boundary partners" for the direct purpose of

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influencing their behavior or positions. For example, in Indonesia, ICRAF researchers worked directly with a range of stakeholders (including farmers, foresters, local officials, and policymakers) to reconcile differences in their expectations and aspirations on watershed functions for the purpose of achieving more sustainable management of the resource (see Box 7.5).

- Knowledge-sharing partners play a role in all three pathways, by ensuring that the findings are communicated effectively not only to the research, policy, and practitioner communities, but also to a broader public, and by helping with capacity strengthening.

Box 7.5—Collective action partnerships for change

In West Sumatra, Indonesia, in the early 1990s, the government believed that uncontrolled deforestation and conversion to coffee on sloping lands had led to significant increases in erosion, which was threatening the operation of a newly constructed hydropower dam and reducing water availability for irrigated paddy rice downstream. As a consequence, between 1991 and 1996 thousands of farmers from Sumberjaya Forest were evicted. However, studies by ICRAF in the area showed that multi-strata coffee farms not only provided livelihoods to people, but also acted similarly to the natural forest in controlling erosion. ICRAF scientists focused on clarifying the knowledge differences between and among local people, foresters, local officials, and policymakers on forest hydrological functions. The basis for collective action was rooted in the benefit of reconciling the expectations and aspirations of these multiple stakeholders on watershed functions. Local communities joined together to gain access to the Indonesian government's Community Forestry Program, which provides farmers with conditional land tenure to cultivate protected forest. In exchange, farmers adopted environmentally friendly farming practices and protect the remaining natural forest, thus ensuring that the land will continue to protect the watershed. In the context of payments for ecosystem services, this "conditional tenure" is a reward, incentive, or payment that modifies farmer behavior. A recent impact study of land tenure in Sumberjaya found that community forestry permitted increased land tenure security, doubled local land values, reduced corruption, increased income (mostly through a reduction in bribes), increased equity, promoted tree planting and agroforestry, promoted soil and water conservation, and motivated farmers to protect remaining natural forest.

CRP2 brings the particular added value of international research to bear in working in close partnership with national and regional actors to help achieve desired national and local development outcomes. Engaging with partners as part of a shared learning process helps generate clear impact pathways between research activities and development impacts. Partnerships can lead to greater impact by, for example

- allowing researchers to collaborate with community groups to implement action research programs or link producers more effectively with markets;

- facilitating dissemination, as NGOs and NARSs bridge the space between research projects and farmers' fields, leading to increased adoption of innovations; and

- enabling results to be disseminated more widely through media organizations and professional associations.

Developing Partnerships

CRP2 seeks to ensure that the partnerships forged are mutually beneficial and adhere to the need to build on complementary expertise. Consistent rules are needed for the selection of partners, as well as clarity regarding the roles each partner will play. While working closely together, partners should remain focused on their areas of expertise. Thus, partnerships in CRP2 will not involve researchers undertaking development projects or development agencies managing research initiatives. Rather, partnerships will establish clear, mutually beneficial complementarities.

In some cases, research organizations can work directly to channel research results and identify recommendations to policymakers, strengthening their role in the policy process. Some universities, NARSs, and CGIAR centers, for example, have partnered for many years, each contributing funds, personnel, infrastructure, and materials to ongoing research activities; other partnerships may be of shorter duration, or even for a single event only.

In situations where funds are available for enabling direct participation of a certain organization in delivering the program's outputs, the partnership will be formalized under a contractual agreement. In other cases, and provided that the research meets their own objectives, partners will contribute their own or complementary resources from other funding sources and synergistically align their work with CRP2 to deliver enhanced outcomes through collaborative actions.

A critical step in developing effective and impact-enhancing partnerships is the selection of additional relevant partners from civil society, the public sector, and the private sector. The selected partners should have similar interests in contributing to reaching the MDGs through targeting the rural poor; significant leverage or reach in their spheres of influence; and a clear capacity to develop and test prototypes, evaluate lessons learned, and upscale effective results. While specific partner agencies are best defined at the regional level, candidates might include national and international NGOs capable of reaching hundreds of thousands or millions of farmers;[22] multilateral, bilateral, or philanthropic funding agencies with significant investments in projects supporting relevant market-related initiatives[23]; national and subnational government agencies; and key private companies involved in crops and geographies important to the rural poor.[24] The process of partner selection will occur at the regional level, but will be linked to the overall CRP2 learning agenda at the global scale.

The identification of relevant partners of the three types defined above cannot be a one-shot exercise, but will rather be a continuous and open process. Additional regional or national institutions or initiatives may emerge as stronger partners after a while as a result of capacity-building activities spearheaded by the CRPs and other international programs. Given the fundamental role that partnerships play in CRP2 to catalyze collaborative actions and sharing of knowledge, we propose that **development of partnerships will become an integral part of the program**. This will be achieved by closely involving existing partnership mobilization structures, such as GFAR and the wide range of stakeholders it brings together through regional forums and sectoral networks. A CRP2 partnership status report will be prepared on a semi-annual basis.

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[22] Possible examples include international NGOs such as CRS, Oxfam, and CARE, as well as national NGOs, such as BRAC International or PRADAM.

[23] The most obvious candidates here are the World Bank, USAID, and the Bill and Melinda Gates Foundation, but the regional development banks are additional candidates, as well as UN agencies, such as IFAD, UNCTAD, and others.

[24] At the international level, candidate companies include those already participating in sustainable agricultural platforms, such as the Sustainable Food Lab and the Sustainable Agriculture Initiative Platform; similar partnership spaces may also be identified at the regional or national level.

Boundaries between CRP2 and other CRPs

In some area of research—such as investment strategies, futures scenarios, and macroeconomic and international trade policy—CRP2, with the well-recognized expertise of IFPRI and other CGIAR centers in scientific analysis of key agricultural issues at a global scale, has a clear comparative advantage compared to other CRPs. This advantage has its greatest value when brought together with other global, regional, and national foresight initiatives as they develop in the context of the implementation of the GCARD Road Map. In other areas, strong research cooperation is also needed across CRPs and partnering institutions.

In the area of value chains, for example (see Annex 3), CRP2 will engage in cutting-edge methodology development and lead cross-commodity synthesis, the main focus being linking smallholders to (local, regional, and international) markets. CRP2 will also support CRP3's commodity-specific capacities by providing specialized expertise in developing, validating, and refining economic models and policy questions. In undertaking collaborative work on cross-commodity synthesis, CRP3's input will focus on commodity- and production system-specific research, which requires close linkages between social scientists and biophysical scientists in developing appropriate, demand-driven innovations. Many commodities have differentiated value chains that may also vary across farming systems and policy environments. As a result, in cooperation with CRP2, CRP3's work on value chains will focus on their commodity-specific value chains. For example, CRP3 will focus on the maize- and wheat-specific elements of technology targeting, adoption, and impact assessments; analysis of seed systems, input delivery systems, and associated value chains; differentiated markets and value chains; the maize/wheat systems-specific elements of poverty; gender studies, system dynamics, and social and environmental footprints of maize/wheat interventions.

In the area of natural resource management policies, the focus of CRP2 is production and technology policies that enable pro-poor and gender-equitable growth and strengthen capacity related to food, agriculture, and rural development. CRP2 will perform this work across locations, agricultural commodities, and farming systems, including those studied by CRP1 and CRP3. Moreover, CRP2 will look at market-agent interactions, biophysical-environment linkages, and institutional and policy constraints to assess sustainable agricultural production policies across scales. CRP2 will also work with CRP7 on policies, institutions, and investments for natural resource management (NRM) related to climate change, and with CRP5 on policies, institutions, and investments for NRM related to water.

The issues of governance, collective action, and property rights also cut across CRPs. CRP2 will provide intellectual leadership in the broad areas of governance, collective action, and property rights research, leading the development of high-level hypotheses, and support for methods. CRP2 will also engage in broader partnerships for research and to enhance impacts. CRP2 should be the nexus for research on land tenure; cross-cutting gender, agriculture, and NRM issues; and implementation of collective action for marketing and agricultural production. Other CRPs will collaborate with CRP2 in these areas where appropriate and lead research in governance, collective action, and property rights issues of particular relevance to their topic of focus. In addition to the broad principles described in the preceding paragraphs, additional detail on the intersection of CRP2 research themes with other CRPs is presented in Table 7.1 and in Annex 2.

As shown in Table 7.1 and Annex 2, the linkages across CRPs in the policy area are quite complex. During the period of CRP development, it has not been possible to fully delineate the boundaries across CRPs and the detailed responsibility of all policy, institutions, and markets research. Therefore, we propose to call a planning meeting involving the leaders of the policy components in each CRP upon acceptance of the various CRPs, in order to fully develop the delineation of boundaries and integration of policy and social science research across the CRPs. This meeting could evolve into an annual scientific meeting on policy and social science research in the different CRPs.

Box 7.6 gives an example of partnerships between centers under CRP2. See also Box 8.2 on the Central American Learning Alliance for Rural Enterprise Development. Annex 4 shows some ways in which work by the different centers can contribute to the different subthemes of CRP2. However, this is

based on current work and does not reflect the whole dimension of IFPRI's partnerships with centers, which will from now on be implemented through CRP2 and other CRPs.

Box 7.6—Example of partnerships between centers under CRP2: ReSAKSS and AGRODEP

The current strategy for a policy renewal process in Africa, together with related development efforts such as the Comprehensive Africa Agriculture Development Program (CAADP), provide a significant scope to expand current partnership and capacity-building activities under CRP2. The most important among these to be integrated with CRP2 are (1) the Regional Strategy Analysis and Knowledge Support Systems (ReSAKSS), a collaborative effort by IFPRI, IITA, ILRI, IWMI, and ICRISAT in partnership with the African Union Commission and the Planning and Coordination Agency of the New Partnership for Africa's Development (NEPAD) at the continental level; (2) the Economic Community of West African States (ECOWAS) and the Common Market of Eastern and Southern Africa (COMESA) at the regional level; and (3) nearly two dozen countries across Africa. Under ReSAKSS, the CG centers and their partners are supporting a transition toward evidence-based policy planning and implementation, which is one of the key objectives of CAADP. This is being done through targeted collaborative research and the development of IT-based data and knowledge platforms at the regional and country levels to facilitate benchmarking, dissemination of best practices, and mutual learning.

In order to expand and sustain the analytical work feeding into the ReSAKSS, a complementary policy research capacity building has been launched: the African Growth and Development Policy Modeling Consortium (AGRODEP). The latter is a partnership between IFPRI and the two leading subregional research organizations (SROs) in Africa—the West and Central Africa Council on Agricultural Research and Development (WECARD/CORAF) and the Association for the Advancement of Agricultural Research in East and Central Africa (ASARECA)—as well as the Food, Agriculture, and Natural Resources Policy Network (FANRPAN). The ultimate goal of AGRODEP is to facilitate the emergence of a critical mass of world-class modelers in Africa, thereby creating local capacities to address issues of strategic importance to Africa and to partner with outside modelers dealing with issues of global concern. Under the Consortium, (1) a shared, IT-based modeling infrastructure will be established to allow Consortium members across Africa access to a family of cutting edge modeling tools; (2) a distributed database linking major data sources on Africa will be created to facilitate access to high quality data by members; and (3) a community of practitioners will be constituted to pursue a limited set a key strategic policy research agenda items in Africa.

Table 7.1—The intersection of CRP2 research programs with other CRPs

CRP1 Integrated Systems	CRP3 Sustainable Production	CRP4 Nutrition and Health	CRP5 Water, Land, and Ecosystems	CRP6 Forests and Trees	CRP7 Climate Change
CRP2's research will target specific agricultural systems and help to shape development paradigms, policies, and investments for a pro-poor focus to identify and support innovative institutional arrangements that can provide rural services to the poor and enhance equitable market development, as well as reflect the economic potential of drylands, wetlands, and other production systems.	CRP2 and CRP3 will work together to improve the policies, institutions, and market relationships that integrate producers of key commodities into value chains targeted by CRP3 (for example, rice, wheat, livestock, fish, roots and tubers, dryland cereals, and legumes). CRP3 will establish and maintain regular interaction with CRP2's Strategic Foresight function to enhance priority-setting at the CGIAR system-level.	Strong links will be developed between CRP2 and CRP4 to coordinate food-safety research and delivery of biofortified products to poor populations through value-chain research that can deliver food-based nutrition solutions. CRP4 will use CRP2 policy and future Foresight research to help shape agrifood systems for sustainability and better nutrition and health outcomes.	CRP2 will contribute to the analysis and development of options for governance mechanisms, policies, and institutions that provide guidance on equitable and efficient allocation of water and land resources. This will influence how investments in sustainable land, water, and ecosystems are managed. CRP2 will also support institutional innovations, strategies, and options for benefit sharing, and tools for negotiating competing claims on resources.	CRP2 will be a research and knowledge-sharing partner with CRP6 in the formulation of policies, institutions, and market-based strategies to reduce poverty, mitigate climate change, and reduce the degradation of environmental services, including loss of biodiversity. CRP2 will contribute to the design and evaluation of collective action approaches to sustainable forestry management.	CRP7 and CRP2 will collaborate in the areas of information delivery; risk management through off-farm livelihood diversification, insurance, and collective action; and managing risk through the food delivery system. CRP7 and CRP2 will share ex ante assessment of policies and programs. CRP2 research on the development of synergistic policies to increase farmers' adoption of carbon sequestration practices will support CRP7 efforts to improve adaptive techniques to climate variability.

8. CAPACITY STRENGTHENING

Strengthening the capacity of the collaborators and of those who will translate research results into on-the-ground impacts is a key element of CRP2, as described above. The capacity-strengthening mechanisms that will be used as part of CRP2 range from links with formal academic programs, to working with developing-country policy analysts to ensure they have the tools they need to answer policy questions in their countries, to the creation of development-oriented learning networks at the regional scale. Meeting the demand for capacity strengthening creates international public goods that help to amplify the impact of CPR2 over time and beyond the immediate areas where research is done.

The mechanisms for capacity strengthening in CRP2 can be divided into two broad sets of activities, which will be combined to achieve the desired development impacts:

- Capacity strengthening through collaborative research partnerships
- Production of global public goods for long-term capacity development

Capacity Strengthening through Collaborative Research Partnerships

This first type of capacity-strengthening work focuses on sharing research methods and results developed from the research components with key partners (the private sector, development NGOs, public-sector agencies, Southern and Northern research centers, other CRPs, and donors). This sharing is based on the premise of collaboration and mutual accountability with a shared goal of contributing to improved pro-poor policies, institutions, and markets. (See Section 7 for a detailed description of partnerships and Section 4 for additional information within the various research themes and subthemes.)

Production of Global Public Goods for Long-term Capacity Strengthening

The long-term sustainability of the capacity-strengthening efforts will be ensured by the production of a set of global public goods that partner institutions can effectively use to build local capacity and enhance the use of research methods, tools, and results generated from CRP2. This approach will have a multiplier effect, going beyond the aforementioned collaborative partnerships to reach a new generation of policy researchers and analysts—even beyond the time period and locations covered by CRP2. Strategic linkages with educational, research, and professional networks will promote the replication of the research methods developed by CRP2. Box 8.1 and Box 8.2 illustrate examples of how the production of global public goods effectively contributes to capacity development.

Box 8.1—CAPRi capacity building for institutional analysis

The CGIAR Systemwide Program on Collective Action and Property Rights (CAPRi) has supported extensive research on the critical role of institutions in managing natural resources and reducing rural poverty. Many NARES, NGO, and government agency partners, however, do not have strong capacity for institutional analysis. To help build this capacity, CAPRi runs a number of workshops for CGIAR researchers and other collaborators, as well as several training workshops, but the demand for capacity building is greater than what CAPRi can meet through this "retail" training approach.

To extend its reach, CAPRi has developed materials for use by NARES and NGO training programs. CAPRi collaborated on production of the textbook *Institutional Economics Perspectives on African Agricultural Development*, currently used by the Collaborative Masters Program in Agricultural and Applied Economics (CMAEE) in Eastern, Central, and Southern Africa. To reach NGOs and other practitioners, CAPRi invited NARES and NGO training specialists to a "writeshop" to develop a sourcebook adapting key CAPRi publications and case studies for nonspecialists. These materials were used by an NGO to train Ministry of Environment staff in El Salvador even before the sourcebook's release. Other universities are considering using the sourcebook in introductory courses, with links to the original source materials for more depth. The sourcebook was released in January 2011 at the International Association for the Study of the Commons conference, where it reached a network of more than 1,000 researchers and practitioners working at the interface of collective action and property rights for sustainable resource management. The Foundation for Ecological Security, an Indian NGO, is using these materials in its Commons Initiative to strengthen property rights and management of common property in India.

Capacity Strengthening for Achieving Impact: Examples from CRP2 Research Themes

Achieving the appropriate balance between academic and applied capacity strengthening is critical for achieving immediate impact and ensuring the next generation of researchers, policymakers, and practitioners who understand the policy research results. In line with this goal, each research subtheme will identify a range of capacity-strengthening activities as an integral part of its work (see Section 4 for some initial description of these activities). As an entry point to this capacity-strengthening action plan, each subtheme needs to define the key capacities to be strengthened, the target audiences, and the level of capacity to be achieved at the end of the project period. For Theme 1, for example, key capacities to be strengthened would include policy research; target audiences would include researchers in government ministries, academic institutions, and think tanks; and the ultimate goal would be increased national capacity for policy analysis and research that leads to investments for pro-poor growth.

Box 8.2—Central American Learning Alliance for Rural Enterprise Development

Despite the investments made in initiatives to improve rural livelihoods in the global South, rural poverty persists. The ability of useful research to benefit the poor is limited by the small amount of collective learning that occurs among researchers, development workers, donors, policymakers, and private enterprises.

In 2003, the International Center for Tropical Agriculture (CIAT), with the support of International Development Research Centre (IDRC), convened a group of actors from Central America, including major international NGOs, local NGOs, and the Honduran National University, with the aim of improving this situation through increased collaborative learning on rural enterprise development in four countries: El Salvador, Guatemala, Honduras, and Nicaragua. The Central American Learning Alliance works with 25 direct partner agencies and through their networks supports 116 additional organizations.

By the end of the first phase in 2008, the Learning Alliance had contributed to change in organizations working with 33,000 rural families (approximately 175,000 people) in the four countries. Seven years after the start of the project, significant changes have taken place in partners' knowledge, attitude, and practices. Evidence shows improved connections between organizations working on similar topics, better access to information and knowledge on rural enterprise development, and use of improved methods and tools. As partners realize that working together enhances their capacity to serve rural communities needs, attitudes have shifted from competition to collaboration. Moreover, the Learning Alliance approach to agroenterprise development has spread far beyond Central America. It has been used by Catholic Relief Services to increase staff capacity in rural enterprise development in more than 45 countries. Rural enterprise development practices and knowledge management have improved as a result of increased effectiveness in existing projects and a higher number of strategic new projects. These shifts, in turn, contribute to a more efficient innovation system in favor of rural enterprise development, as evidenced by the shared use and generation of information, joint capacity-building programs, and large-scale collaborative projects.

Themes 1 and 2 will emphasize strengthening the capacity of NARSs and public-sector actors to conduct economic research and analysis, make sense of the findings, and then apply them to real-world policies in diverse national and subnational contexts (see Box 8.1). To achieve this goal, CRP2 will link with formal academic programs in the North and South to sponsor and incorporate M.Sc. and Ph.D. candidates in proposed research activities and develop curriculum materials based on research outputs. For government policymakers (both public-sector employees and parliamentarians), CRP2 will organize targeted training courses on how to commission, analyze, and use research findings in public policy formulation. Finally, CRP2 will link emerging research and public policy capacities to specific regional learning platforms, including NGOs and producer organizations that will function as "communities of practice" for horizontal learning and coaching.

Theme 3 will construct a set of interlinked learning cycles at the regional scale involving researchers and practitioners. CRP2 researchers will draw on existing theoretical and case study literature to develop a prototype practitioners' toolkit that will be tested in pilot sites, and evaluated in diverse conditions to document outcomes in terms of pro-poor benefits, leading to a refined and improved toolkit. The use of learning cycles will allow us to generate a range of knowledge products and increased capacities in collaboration with implementing agencies as direct clients capable of taking these market innovations to scale in favor of the poor (see Box 8.2).

The methods and tools resulting from the learning cycles can be further used to support applied capacity strengthening programs targeted specifically at key extension or impact partners, such as international NGOs. An example of specific capacity development programs is the Post-Graduate Diploma in Rural Enterprise Development offered jointly by CIAT and Centro Agronómico Tropical de

Investigación y Enseñanza (CATIE) in Latin America since 2001.[25] This set of interlinked courses has successfully trained several hundred NGO staff throughout the region with limited donor support. Another example is the CGIAR's work with the Collaborative Masters Program in Agricultural and Applied Economics (CMAEE) in Eastern, Central, and Southern Africa (CMAAE), in which IFPRI and CAPRi have provided course materials and curriculum input for courses that reach students in more than a dozen countries.

Output indicators of capacity strengthening include the number of men and women trained as students collaborating with CRP2 projects and trainees at short courses, as well as the number of training modules and curriculum materials developed. Outcome indicators of the first capacity-strengthening strategy—capacity strengthening through collaborative research partnerships—requires assessing how much participants in training have strengthened their skills and increased their confidence and ability to incorporate research findings into their policy work. Outcome indicators of the global public goods work on capacity strengthening would include the number of universities using the curriculum materials (texts, articles, DVDs, and audiovisual materials).

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[25] See http://www.catie.ac.cr/diplomado.

9. COMMUNICATIONS STRATEGY

CRP2's overall objectives—to increase income, reduce poverty, and improve food security for male and female farmers across the world—will be achieved by focusing on three mutually supporting themes: policies and investments that accelerate pro-poor growth; enabling institutions and governance for the poor; and value chains linking smallholder farmers to markets.

The innovative research produced under this program will rely on a state-of-the-art communications strategy based on successful CGIAR outreach strategies carried out in the past. The overall purpose of such a comprehensive external and internal strategy is to forge close ties with local collaborators and key policymakers; increase opportunities for hands-on research in the field; and promote seamless collaboration among CGIAR centers, all of which leads to enhanced dissemination and impact of research results.

Internal and External Communications Strategy

The internal and external communications strategy of CRP2 will determine in detail

- important messages that should be communicated to its audience;

- Key internal stakeholders, as well as global and regional stakeholders in developing and developed countries, to whom messages and results should be communicated;

- a portfolio of media and channels (print, web, audio, and visual) through which these communications will take place;

- optimal timing of communications activities to achieve maximum mileage;

- resources available to achieve the strategic communications goals;

- information policymakers need in order to make evidence-based, informed decisions on agricultural and rural policies;

- collaboration efforts to strengthen the communications capacity of local institutions;

- the creation and management of information systems to compile and organize knowledge for maximum access and impact on policy; and

- use of policy dialogues and close interaction with policymakers and other key stakeholders on a local, national, and global level.

What to Communicate

CRP2 will produce a wide range of outputs to be communicated to various audiences:

- research results disseminated in scholarly and policy-oriented publications;

- the effective use of research-based knowledge in policy processes, indicated by the use of research-based studies in different stages of policymaking;

- research-based information to all relevant stakeholders in the public and private sectors;

- policy reforms that lead to more pro-poor national and international agricultural policies;

- analytical and capacity-strengthening mechanisms and learning networks;

- relevant, timely, and accessible datasets;

- qualitative and quantitative knowledge products

- policy and investment analyses that facilitate and support evidence-based decisionmaking; and

- methodologies and tools for monitoring and evaluation.

Program's Audience/Target Groups

The program's target groups include global and local stakeholders, such as donors, development banks, international and local research and academic institutions, CGIAR centers, NGOs, country-level policymakers, policy analysts and advisers in government ministries, and country-level academics. Partners will also be targeted.

Communication Vehicles

Each group of stakeholders has different needs, so the use of CRP2's outputs might differ widely from one stakeholder group to the next. Because of this diversity of stakeholder groups, we will define a concise and structured approach to reaching each group. For certain stakeholders, CRP2's more traditional outputs, which include country briefs/fact sheets, regional reports, presentations, and other publications, will suffice. Other stakeholders, however, might require custom-made publications and presentations. Theme leaders will work with the communications team to indentify stakeholders and design relevant vehicles for these stakeholders.

CRP2 Website

A well-designed website plays a key role in fostering cooperation and information sharing with stakeholders, especially in terms of increased functionality, improved access to information, presentation features, and enhanced visibility. A preliminary meeting among the CGIAR's web experts will establish the website design and content. A system will also be established to regularly update and improve the site.

Publications and Reports

Publications will play a key role in increasing CRP2's visibility among its national and international audiences. A strategy will be devised to ensure that research results are successfully reaching the desired outlets; submissions to journals and donor newsletters are frequent and successful; and the review, update, and distribution of brochures and other printed materials are systematic and effective.

Clearinghouse

The CRP2 will also establish a web-based information and knowledge clearinghouse that will serve as a repository for all existing and future products developed through the CRP2's three themes. This repository will be designed for use by other CGIAR researchers working on these issues, as well as the broader development research audience. The clearinghouse will include a common toolbox of methods for use by the CGIAR and R&D partners built around CRP2 prototypes and best practices from CRP2 and components of other CRPs.

A focus on datasets is essential to the overall communications strategy, because these outputs will help improve the quality, timeliness, transparency, and objectivity of evaluations of high-impact policy investments and promote the development of effective and efficient investment portfolios.

Events and Capacity-Strengthening Activities

The CRP2 will offer a repertoire of strategically advertised seminars, outreach, and capacity-strengthening activities, the capstone of which will be a biennial CGIAR Strategic Foresight Conference. Designed to showcase the CRP's newest projections, evaluation tools, and datasets, it will be framed as the premiere CRP2 event to all stakeholders.

Media

Media talent culled from the associated CGIAR centers will work with the extensive network of journalists already familiar with the CGIAR to promote the launching of tools, reports, and other products produced by the CRP2 of interest to the media. The media team will build a fine-tuned media list organized by component, region, stakeholder, and specialized topic (such as climate change or gender). It will also devise a system of recording media mentions of CRP2 work.

Communications Team

A communications team will be built from the associated CGIAR centers' staff. The team will work closely with CRP2's central communications office, as well as the CRP2's leaders, to carry out the tasks laid out in this strategy. If necessary, additional staff will be hired to ensure that communications goals are effectively carried out.

CRP2 Internal Communications Strategy

Because CRP2 operates across CGIAR centers, effective internal communication is as essential as strategic external communications. Because the communications team will often work virtually, the web will play a central role in internal communications. To this end, the team will establish a web-based (Google group, open atrium) collaboration page for sharing documents and create a central repository of communication materials for the program. This virtual internal communications system should revolve around the following elements:

- To improve the creation and dissemination of publications, the communications team will create an interactive, web-based organization chart for CRP2 to identify relationships and potential collaborations. It will also create a web-based system for distributing relevant CRP2 publications throughout CGIAR centers and send out a monthly communications email to the communications team and research leaders with updates, developments, and calls for collaboration.

- To bolster capacity strengthening through events, the communications team will increase the number of internal "virtual brown bags" reporting on program developments, findings, and best practices. The team will create a system of web-based meetings that would allow CRP2 staff to discuss an issue across time zones.

10. MANAGEMENT ARRANGEMENTS FOR CRP2 IMPLEMENTATION

The management structure of CRP2 is shown in Figure 10.1. This structure is designed to encourage decentralized, innovative research while maintaining effective oversight and minimizing bureaucracy and transaction costs. The design of this oversight, planning, management, and implementation structure was based on the following criteria: **high involvement of stakeholders, high-quality scientific oversight, transparency, low transaction costs, and minimal bureaucracy**.

Figure 10.1—CRP2 management structure
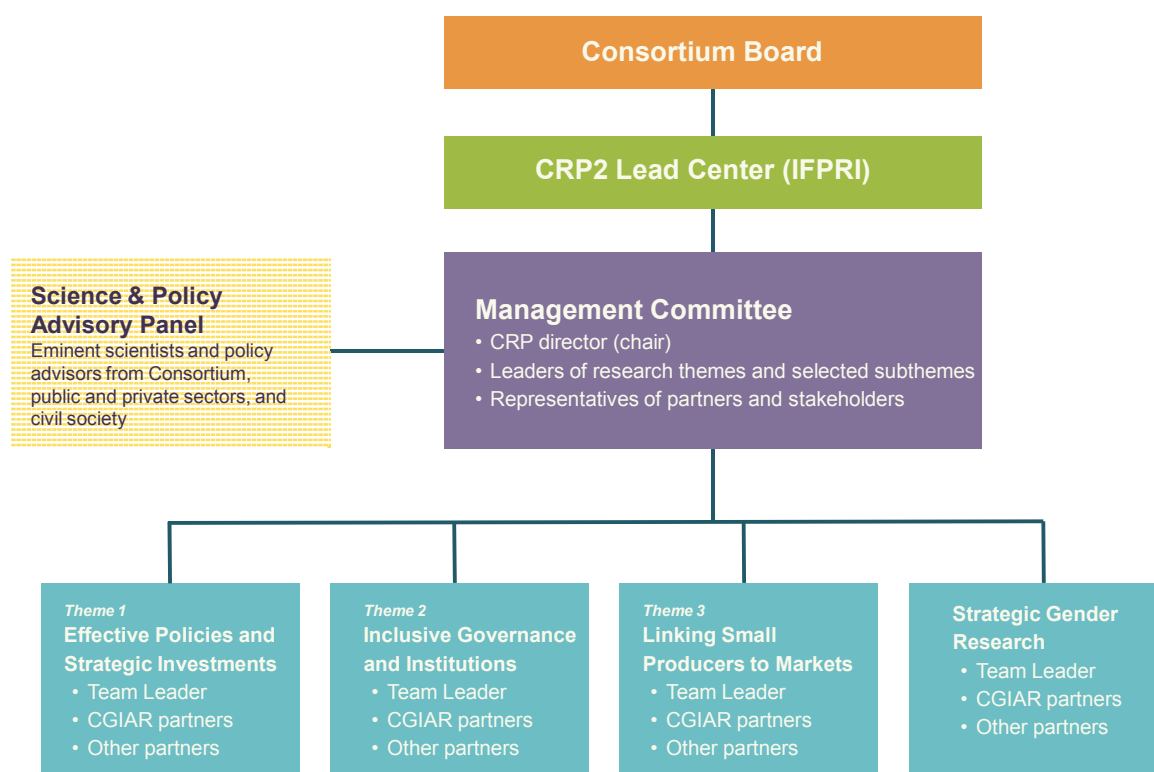
Governance

CRP2 will have one Lead Center—IFPRI—accountable to the Consortium Board under the terms of the performance contract with the CRP. The Lead Center will have responsibility for governance, intellectual, and fiduciary oversight and financial management of the main performance contract for the CRP. The Science and Policy Advisory Panel will provide independent oversight of the content and quality of the scientific research and will interact regularly with the Management Committee and Lead Center.

Science and Policy Advisory Panel

The Science and Policy Advisory Panel (SPAP) will provide its independent advice to the Management Committee and the IFPRI director general on strategic directions, research program, research priorities and focus, and relevant management and partnership issues, including incentives. Members will be appointed for an initial three-year term. Panel members will come from outside CGIAR centers and core

partner organizations of CRP2. Nominations for the 10-person panel (including the chair) will be actively canvassed from participating centers and partners by the Management Committee to ensure broad acceptance and representation. The nominees will include eminent scientists and policy advisers from the Consortium, the public and private sectors, and civil society. The slate of candidates will be proposed to the IFPRI director general for confirmation by the IFPRI Board. The SPAP will provide advice and a formal annual report to the Lead Center Board. It is expected that the chair of the SPAP will communicate regularly with the chair of the Lead Center. The CRP director and Management Committee will prepare an annual report for the SPAP. The Science and Policy Advisory Panel will have delegated authority from the IFPRI Board to undertake their mandate as an independent expert body.

Management

The Lead Center will be the primary contracting unit for CRP2 and will sign performance contracts with the Consortium Board and subcontracts with participating centers and partners. The Lead Center will report to the Consortium Board on CRP2 performance from research and financial perspectives.

The Lead Center will develop and authorize management policies. CRP2 activities will be reported by the respective centers in their audited financial statements. The Lead Center will prepare financial statements for the overall CRP2 showing fund receipts and payments to participating centers and partners and other details as agreed by the Consortium/Lead Center in due course.

Conflict resolution mechanisms will be implemented as follows. Conflicts among centers/partners will in the first instance be referred to the Management Committee. When conflicts cannot be resolved at that level, the issue will be referred to the chair of the SPAP if they concern programmatic issues and to the Lead Center director general if they concern fiduciary, legal, or reputational issues. If necessary, the Lead Center Board will be consulted, and, where appropriate, the issue maybe referred to them for a decision. If the conflict cannot be resolved at these levels it will be referred to the Consortium Board.

Management Committee

The CRP2 director will be appointed by the Lead Center and will report directly to the IFPRI director general. The CRP2 director, assisted by the Management Committee, will be responsible for overall management of CRP2. The CRP2 director and Management Committee will act on behalf of all participating institutions and will make key decisions in a consultative manner. The Management Committee will consist of the following:

- The CRP2 director (who will serve as chair of the Management Committee)
- The leader of Theme 1 and another representative of Theme 1 chosen among the Subtheme leaders
- The leader of Theme 2 and another representative of Theme 2 chosen among the Subtheme leaders
- The leader of Theme 3
- The leader of the Strategic Research on Gender.

Theme 3 has a higher level of homogeneity than Theme 1 and Theme 2, which is why it will be represented by only one member. The relatively small size of the Management Committee will keep meeting costs as modest as possible while enhancing management efficiency. To reflect the importance of the participation of other centers and partners in the management processes, a minimum of three members will be drawn from centers or other partners than IFPRI.

The Management Committee will be responsible for the following activities:

- coordinating strategic foresight, planning, and reporting of the full research portfolio;

- preparing the five-year and annual work plans with the Management Committee and the theme leaders;

- prioritizing research activities using the priority-setting processes detailed in Section 3 of this proposal;

- determining the allocation of resources coming from the CGIAR Fund to the research themes and their activities, based on the priority-setting process, evidence collected from regular assessments, and monitoring of agreed-on work plans submitted by the participating centers and their strategic partners;

- interfacing between CRP2 and the Consortium Board and Fund (budgets, contracts, and financial reporting);

- representing CRP2 at major events of the global and regional R&D communities;

- fundraising (together with the centers and other partners);

- managing the monitoring and evaluation program described in detail in Section 3, including establishing reporting regimes and developing mechanisms for tracking progress against agreed milestones and budget use;

- organizing periodic research reviews; and

- preparing and conducting annual meetings of the SPAP, the Management Committee, the research leaders of CRP2 subthemes, and other small workshops with the research and development community worldwide.

To carry out these tasks, the CRP2 director and Management Committee will be assisted by a small **Program Management Unit (PMU)**, including a program manager and a research coordinator. Funds for CRP2 management will consist of (1) a fund to help catalyze teamwork, new research, and delivery activities with partners; (2) funds to implement cross-cutting activities related to gender, science capacity strengthening, and Strategic Foresight functions; (3) and general program management funds, including communications, workshops and travel, and CGIAR integration.

The overall mode of operation will provide for considerable **decentralized decisionmaking (see Box 10.1)**. Each theme and subtheme will operate on an appropriately designed partnership model. The research activities of the portfolio will be developed and implemented under performance contracts between the Lead Center and a center or other institution that has leadership of the theme. The theme leaders and their teams will have considerable flexibility in developing, managing, and implementing research activities. Each organization leading a subtheme will be responsible and accountable for managing its activities together with team partners, ensuring that work is consistent with the CRP business plan, and delivering results. This approach will ensure that wherever possible, funds, responsibilities, and accountabilities are devolved to the center, unit, or partner undertaking specific tasks.

Box 10.1— Involvement of the other centers in CRP2 management

- Among the Theme Leaders and Subtheme Leaders, some will be from other centers than IFPRI.

- These Theme/Subtheme Leaders will participate in the Management Committee and thus take an active part in all strategic decisions relative to CRP2 research and management (research orientations, allocation of resources, research prioritization, etc.)

- Theme leaders will have considerable flexibility in developing, managing, and implementing research activities, as long as these activities fall under the scope of the Program Participant Agreements that will be signed with each center.

- Other centers will be consulted for the nomination of the SPAP members.

- Conflict resolution mechanisms will be designed to solve potential conflicts between the Lead Center and other CG centers.

11. POTENTIAL RISKS AND WAYS TO MITIGATE THEM

There are risks ahead in managing these complex, multidisciplinary research activities and integrating them into the work of other CRPs and other CGIAR centers. We see three categories of risk:

- **Administrative risks.** With CRP2 spanning many CGIAR centers and partners, the management structure within the CRP itself and across other CRPs could be complex. Rather than trying to build another bureaucracy, we will address this risk through efficient M&E systems, mediation processes, and decentralization to existing centers. A clear outline of the role of various institutions (along with timelines for deliverables) and the interaction of different segments will be prepared at the inception of the CRP.

- **Financial risks.** The current funding base could be too small and fragmented to successfully achieve the goals of this CRP. To mitigate this risk, the CRP needs to concentrate funding on a set of priorities and to actively and collectively seek additional funding for activities.

- **Political risks.** Political changes may lead policymakers or other stakeholders to view research ideas and outputs unfavorably. This risk should be mitigated by taking a long-term perspective and building long-term partnerships.

12. BUDGET

The indicative scale of CRP2 is reflected in the following budget, which projects **US$82 million in activity for 2011, rising to $95M in 2013**. This captures costs associated with the collaboration among 11 CG centers, including IFPRI, as well as a host of global partners. Personnel and partnership costs represent 36 and 23 percent, respectively, of the total 2011 budget. As can be expected, Theme 1 comprises the majority of the budget, at $40 million or 49 percent. These ratios are fairly consistent over the three year period.

As was described earlier in this proposal (see especially Section 4, Section 7 and Section 8), CRP2 will engage many partners both within and outside the CGIAR. The Lead Center, IFPRI, has historically had a higher portion of its budget devoted to partners than other centers, and has the management capacity and corporate structure to manage such relationships. As is reflected in Table 12.1, IFPRI's partnership costs as a percentage of total operating costs average 30 percent, compared with 16 percent for the CGIAR as a whole. IFPRI's research agenda is traditionally highly participatory, engaging over 200 partners annually, harnessing the expertise of CG centers, universities, local and international NGOs, and private companies. IFPRI's culture of extensive collaboration is woven into CRP2's research activities, as is evident from the budget for partnerships. Collectively, personnel and partnership resources projected for CRP2 represent 59 percent of the budget, which is consistent with the historical ratio for the CGIAR. However, partnership costs for CRP2 are proportionately higher than personnel costs when compared with the CGIAR historical trend. This is indicative of the commitment to an integrated, inclusive solution that is aligned with the Strategy and Results Framework of the CGIAR objective of strategic partnerships.

Other than office space to accommodate research staff, policy research requires a relatively modest level of investment in property and equipment. Research outputs are facilitated by information and knowledge management system; thus computers and information technology and services are the primary components of capital investments supporting policy research. Table 12.1 illustrates the low capital investments for IFPRI and CRP2 compared with the CGIAR, which includes centers that conduct research requiring significant investment in infrastructure, laboratories, and vehicles.

Table 12.1—Cost trends

Description	CRP2	Historical	
		CGIAR	IFPRI
Personnel costs	36%	42%	45%
Partnership/collaborators	23%	16%	30%
Operating expenses (including training, workshops and institutional overhead)	34%	31%	17%
Travel	6%	7%	7%
Capital and other equipment for project	1%	4%	1%
Total	100%	100%	100%

One of the pillars of the CGIAR reform process is to provide greater assurance of longer term and sustainable funding. Donors contributing to the new Trust Fund are encouraged to contribute to Window 1 (unrestricted funding) to maximize coordination and harmonization. While donors are strongly encouraged to channel their resources through the fund, bilateral funding continues. In cases where such funding is provided, it should be consistent with the agreed Strategy and Results Framework. The

accompanying financial projections assume that current bilateral funding will gradually be replaced by grants through the Fund. Thus, in 2011, US$30M, or 37 percent of total funding, is assumed to be from the Fund, and broadly in line with the current systemwide ratio of unrestricted to restricted (bilateral projects). In 2013, the ratio of CGIAR Fund income is projected to be $63M, or 66 percent of total funding.

The "rate of shift" is not possible to predict with any degree of accuracy. IFPRI, as designated Lead Center for the CRP, has assembled the costs necessary to do the work, but cannot be expected to predict with great accuracy the delineation of funding sources between Consortium Windows and bilateral funding sources.

Table 12.2 shows the total costs by theme for the period 2011 to 2013.

Table 12.2—Theme Budget (2011-2013)

	$M	%
1 Effective Policies and Strategic Investments	126	47
2 Inclusive Governance and Institutions	59	22
3 Linking Small Producers to Markets	58	22
Strategic Gender Research	12	5
Total Direct Research	255	96
CRP Management	10	4
	265	**100**

Once the overall CRP has been approved, the Budget proposals for 2012 have to be further refined to ensure the full cost recovery principles embodied in CGIAR Financial Guideline Number 5 are effectively made operational. As Lead Center, IFPRI has operated project based full costing principles for many years. The partner centers are committed to following these principles and identifying the appropriate cost drivers.

Detailed Budgets for 2012 are in the process of being developed and will be evaluated by the Planning and Management Committee in October 2011 to ensure that the CRP and the individual participating centers achieve budget harmony for 2012.

Budget figures are stated at conservative levels and do not include upside or overly optimistic estimates. First year budgets are based largely on financial data from each center's medium-term plan (MTP) on a full cost- recovery basis. Years following the base year show a modest cost increase of 7 percent in 2012 and 8 percent in 2013. Given the demand from stakeholders and donors, the budget illustrates a clear and achievable transition to a CGIAR Research Program financing structure that supports a rapid deployment of CRP2 in 2011.

The accompanying tables provide a breakdown of costs on an overall program basis and also by the three main research themes: (1) Effective Policies and Strategic Investments, (2) Inclusive Governance and Institutions, and (3) Linking Small Producers to Markets. As described in Section 4, these main themes are further broken down by subtheme; however, for ease of presentation, Table 12.3 is limited to the theme level.

Table 12.3—Budget, 2011–13

Project Cost	000's		2011 Amount (US$)	2012 Amount (US$)	2013 Amount (US$)	Project Cost Amount (US$)
Cost group	Description					
1	Personnel Cost		29,783	31,928	34,550	**96,261**
2	Travel		4,710	5,021	5,385	**15,116**
3	Operating expenses		13,587	14,393	15,435	**43,416**
4	Training / Workshop		2,331	2,566	2,759	**7,656**
5	Partners / Collaborator / Consultancy Contracts		18,453	19,932	21,622	**60,007**
6	Capital and other equipment for project		727	821	903	**2,451**
7	Contingency		476	545	599	**1,620**
	Total		**70,068**	**75,206**	**81,255**	**226,528**
8	**Institutional Overhead (as a % of Direct project cost)**		11,876	12,821	14,007	**38,704**
	Total Project Cost		**81,943**	**88,028**	**95,262**	**265,233**

Project Funding		2011 Amount (US$)	2012 Amount (US$)	2013 Amount (US$)	Project Cost Funding (US$)
	Description				
Funding					
	CGIAR Fund	30,310	47,797	62,723	**140,830**
	Current Restricted Donor Projects	50,664	39,277	31,467	**121,408**
	Other Income	969	954	1,072	**2,995**
Total Funding		**81,943**	**88,028**	**95,262**	**265,233**

Tables 12.4 through 12.6 provide a breakdown of costs by theme for 2011, 2012, and 2013, respectively.

Table 12.4—Breakdown of costs by the three main themes, 2011

Project Cost	000's		2011					
Cost group	Description		Theme 1 Effective Policies and Strategic Investments	Theme 2 Inclusive Governance and Institutions	Theme 3 Linking Small Producers to Markets	Strategic Gender Research Theme	CRP Management	Total
1	Personnel Cost		14,580	6,548	5,757	1,415	1,484	**29,783**
2	Travel		2,273	1,021	1,057	215	144	**4,710**
3	Operating expenses		6,579	3,112	2,985	624	287	**13,587**
4	Training / Workshop		1,176	511	370	122	153	**2,331**
5	Partners / Collaborator / Consultancy Contracts		8,792	4,054	4,408	951	248	**18,453**
6	Capital and other equipment for project		277	160	243	-	47	**727**
7	Contingency		214	111	128	-	24	**476**
	Total		**33,891**	**15,516**	**14,947**	**3,326**	**2,387**	**70,068**
8	**Institutional Overhead (as a % of Direct project cost)**		5,770	2,625	2,502	535	443	**11,876**
	Total Project Cost		**39,661**	**18,141**	**17,449**	**3,862**	**2,830**	**81,943**

Project Funding							
Funding							
	CGIAR Fund	11,761	6,423	8,496	800	2,830	**30,310**
	Current Restricted Donor Projects	27,488	11,492	8,622	3,062	-	**50,664**
	Other Income	412	226	331	-	-	**969**
Total Funding		**39,661**	**18,141**	**17,449**	**3,862**	**2,830**	**81,943**

Table 12.5—Breakdown of costs by the three main themes, 2012

Project Cost	000's	2012					
Cost group	Description	Theme 1 Effective Policies and Strategic Investments	Theme 2 Inclusive Governance and Institutions	Theme 3 Linking Small Producers to Markets	Strategic Gender Research Theme	CRP Management	Total
1	Personnel Cost	15,267	7,003	6,415	1,487	1,756	31,928
2	Travel	2,355	1,105	1,185	226	151	5,021
3	Operating expenses	6,894	3,299	3,265	656	279	14,393
4	Training / Workshop	1,270	585	423	128	160	2,566
5	Partners / Collaborator / Consultancy Contracts	9,287	4,394	4,851	999	402	19,932
6	Capital and other equipment for project	295	186	287	-	53	821
7	Contingency	223	132	164	-	26	545
	Total	35,592	16,704	16,589	3,495	2,827	75,206
8	Institutional Overhead (as a % of Direct project cost)	6,065	2,837	2,822	563	535	12,821
	Total Project Cost	41,656	19,541	19,411	4,058	3,362	88,028
Project Funding							
Funding							
	CGIAR Fund	19,989	10,095	12,672	1,680	3,362	47,798
	Current Restricted Donor Projects	21,285	9,229	6,384	2,378	-	39,276
	Other Income	382	217	355	-	-	954
Total Funding		41,656	19,541	19,411	4,058	3,362	88,028

Table 12.6—Breakdown of costs by the three main themes, 2013

Project Cost	000's	2013					
Cost group	Description	Theme 1 Effective Policies and Strategic Investments	Theme 2 Inclusive Governance and Institutions	Theme 3 Linking Small Producers to Markets	Strategic Gender Research Theme	CRP Management	Total
1	Personnel Cost	16,428	7,680	7,019	1,562	1,860	34,550
2	Travel	2,518	1,191	1,284	237	156	5,385
3	Operating expenses	7,354	3,577	3,575	687	242	15,435
4	Training / Workshop	1,363	639	457	135	165	2,759
5	Partners / Collaborator / Consultancy Contracts	9,975	4,833	5,262	1,049	503	21,622
6	Capital and other equipment for project	326	203	316	-	58	903
7	Contingency	246	142	182	-	29	599
	Total	38,210	18,266	18,096	3,671	3,013	81,255
8	Institutional Overhead (as a % of Direct project cost)	6,545	3,128	3,108	591	635	14,007
	Total Project Cost	44,755	21,393	21,204	4,261	3,648	95,262
Project Funding							
Funding							
	CGIAR Fund	27,384	13,418	15,847	2,426	3,648	62,723
	Current Restricted Donor Projects	16,944	7,723	4,963	1,836	-	31,467
	Other Income	426	254	392	-	-	1,072
Total Funding		44,755	21,393	21,204	4,261	3,648	95,262

Table 12.7. indicates the anticipated breakdown of funding for 2011 between the Fund and bilateral sources.

Table 12.7—Allocation of budget among participating centers and funding sources, 2011 (000s)

	Effective Policies and Strategic Investments	Inclusive Governance and Institutions	Linking Small Producers to Markets	Strategic Gender Research Theme	CRP Management	Total 2011 Budget	CGIAR Fund	Restricted and Other Funding	CGIAR Fund %
BIOVERSITY	823	228	1,456			2,507	1,115	1,392	44%
CIAT	357	1,189	4,399			5,944	3,745	2,199	63%
CIMMYT	581	443	443			1,466	1,225	241	84%
CIP	627	579	1,514			2,721	2,305	415	85%
ICARDA		256				256	64	192	25%
ICRAF	1,160	435	1,305			2,900	1,199	1,701	41%
ICRISAT	4,779	1,692	2,773			9,245	4,196	5,048	45%
IFPRI	28,846	10,822	4,082	3,862	2,830	50,442	12,694	37,748	25%
IITA	818	403	278			1,500	1,099	400	73%
ILRI	1,091	1,031	910			3,031	2,120	912	70%
WORLDFISH	579	1,062	290			1,931	547	1,384	28%
Total	39,661	18,141	17,449	3,862	2,830	81,943	30,310	51,632	37%

Funding									
CGIAR Fund	11761	6423	8496	800	2830	30310			
Current Restricted Donor Projects	27488	11492	8622	3062	0	50664			
Other Income	412	226	331	0	0	969			
Total Funding	39,661	18,141	17,449	3,862	2,830	81943			
Ratio by Components	48%	22%	21%	5%	3%	100%			

Table 12.8. indicates the anticipated breakdown of funding by theme and subtheme.

Table 12.8—Allocation of budget by theme and subtheme, 2011–13 (000s)

		2011	2012	2013	Total
Theme 1. Effective Policies and Strategic Investments					
Subtheme 1.1	Foresight and Strategic Scenarios	8,689	9,058	9,966	27,713
Subtheme 1.2	Macroeconomic, Trade, and Investment Policies	13,476	14,160	14,960	42,596
Subtheme 1.3	Production and Technology Policies	12,967	13,659	14,776	41,402
Subtheme 1.4	Social Protection Policies	4,530	4,779	5,053	14,361
Theme 1 Total		*39,661*	*41,656*	*44,755*	**126,072**
Theme 2. Inclusive Governance and Institutions					
Subtheme 2.1	Policy Processes	6,504	6,840	7,264	20,608
Subtheme 2.2	Governance of Rural Services	1,626	1,803	2,120	5,548
Subtheme 2.3	Collective Action and Property Rights	3,495	3,897	4,366	11,758
Subtheme 2.4	Institutions to Strengthen the Assets of the Poor	6,516	7,000	7,643	21,160
Theme 2 Total		*18,141*	*19,541*	*21,393*	**59,075**
Theme 3. Linking Small Producers to Markets					
Subtheme 3.1	Innovations Across the Value Chain	13,087	14,558	15,902	43,548
Subtheme 3.2	Impact of Upgrading Value Chains	4,362	4,853	5,301	14,517
Theme 3 Total		*17,449*	*19,411*	*21,204*	**58,064**
Strategic Cross-Cutting Research on Gender		*3,862*	*4,058*	*4,261*	**12,181**
CRP Management		*2,830*	*3,362*	*3,648*	**9,841**
Total Cost		**81,943**	**88,028**	**95,262**	**265,233**

ANNEXES

Annex 1—CRP2 performance indicator matrix

1. RESEARCH OUTPUTS	INDICATORS AND METRICS
Theme 1: Effective Policies and Strategic Investments	
Subtheme 1.1: Foresight and Strategic Scenarios	
• Decision-support analyses targeted to key CGIAR, partner, and external policy investment researchers and practitioners • Web portal providing data, tools, models, reports, findings, policy and investment briefs, media, and capacity- building materials • Web portal materials posted on social network avenues (blogs, Facebook, Twitter, etc.) for nonscience/general audience and media • User-friendly modeling program and manual for non-modelers • Foresight conferences and flagship reports • Coordination of foresight work among CGIAR centers, international and regional organizations, public and private agencies, and other partners	• Number of publications on foresight and strategic scenarios • Number of decision-support analysis documents produced • Number of datasets, tools, models, reports, etc. made available on the web portal • Attendance and coverage of foresight conference
Subtheme 1.2: Macroeconomic, Trade, and Investment Policies	
• Growth scenarios • Global databases on domestic trade margins and transportation costs, migration and remittances, foreign direct investment • Identification of country-level optimal trade policies • Support analysis for trade negotiations (regional, global) and trade reform in terms of economic (macro and micro) effects • Presentations to official trade negotiation bodies • Methods and tools for monitoring and evaluating public investment • Web-accessible databases on public expenditures and investment in agriculture and nonagriculture (for example, education, health, transportation, defense, social security) • Country case studies about sectoral policies • South-South learning workshops, field study tours	• Number and scope of scenarios, scenario results • Number of databases released on the web • Number of countries for which optimal trade policies are identified • Number of presentations to official trade negotiation bodies • Number of South-South learning workshops and field study tours, and number of participants • Number of country case studies • Number of tools to evaluate public investment developed

1. RESEARCH OUTPUTS (cont'd)	INDICATORS AND METRICS
Subtheme 1.3: Production and Technology Policies	
• Synthesis of evidence on effective germplasm management systems for food and nutrition security • Scenario analyses and interactive tools on food, land, water, and energy use • Design of policies, strategies, and capacity-building materials for resource-efficient technologies • In-depth analyses of biotechnology and nanotechnology impacts, policy challenges, and knowledge gaps • Platforms and other collaborative mechanisms for promoting neglected and underutilized species • Assessments of key technology opportunities and extension modalities and their gender implications • Decision-support tools for policymakers on strategies for sustainable intensification of agriculture • Design of technology policies and capacity building for rural diversification, including nonfarm activities • Innovative certification schemes for enhanced productivity, biodiversity, and rural incomes	• Number of publications on tradeoffs among energy, water, and food • Number and scope of policy support and capacity-building materials on promising technologies, including biotechnology and nanotechnology, and on complementarities and tradeoffs between increased productivity and environmental outcomes • Number and scope of policy support and capacity-building initiatives on rural diversification • Activity of platforms and other collaborative mechanisms promoting neglected and underutilized species • Number of publications on innovative environmental standards and certification schemes
Subtheme 1.4: Social Protection Policies	
• Design of social protection interventions that cost-effectively protect and increase asset bases of poor households • Design of social protection interventions that reach neglected and vulnerable groups • Improved understanding of the gender-differentiated impacts of social protection interventions • Improved understanding of linkages between social protection and agriculture	• Number of social protection policy research outputs, by category of outputs (reports, presentations, etc.) • Quantification of interactions with governments, donors, and other development community stakeholders about social protection policies

1. RESEARCH OUTPUTS (cont'd)	INDICATORS AND METRICS
Theme 2: Inclusive Governance and Institutions	
Subtheme 2.1: Policy Processes	
• Case studies documenting how public policies and investments are made, and what drives the choice among alternative policies • Improved understanding of political feasibility of different agricultural policies and food policy reforms • Identification of factors that promote effective implementation of pro-poor policy decisions • Synthesis of evidence on causes for the limited political voice of the poor to shape agricultural policies in their favor, and recommendations on how their voice can be enhanced	• Number of published case studies on policy processes • Number of research reports on the features affecting formulation and implementation of pro-poor policies and investments
Subtheme 2.2: Governance of Rural Services	
• Evaluations of the determinants of effective and efficient delivery of public services to smallholder farmers and the rural poor, and of the determinants of access to these services • Innovative methods to design rural services that improve the productivity and welfare of the poor • In-depth analyses and insights on how public services can be more gender-equitable, using innovative gender-disaggregated data collection methods • Practical tools and materials for assessing the suitability of different governance arrangements for providing agricultural services and infrastructure • Development of typologies of land governance, and development of a framework to assess the quality of land-related services • Virtual platforms and in-person workshops to increase adoption of evidence-based good practice guidelines on the governance of rural services	• Number of gender-disaggregated databases on rural service delivery • Number of country reports providing land governance assessment frameworks • Number of workshops on the governance of rural services • Number of typologies and tools on land and other governance • Number and use of virtual platforms for sharing information on improved governance of rural services

1. RESEARCH OUTPUTS (cont'd)	INDICATORS AND METRICS
Subtheme 2.3: Collective Action and Property Rights	
• Case studies and experimental games identifying factors leading to effective collective action groups • Identification of effective ways of strengthening inclusive collective action and coordination for managing natural resources • Studies of large-scale land-based investments to identify ways such investments can be made without loss of property rights for women and poor local populations • Identification of effective ways of strengthening property rights to commons and customary rights • Capacity-building materials for producer organizations and NGOs	• Number of case studies • Number and scope of synthesis studies • Number and scope of capacity building materials • Number of forums dealing with property rights where CAPRi materials are discussed
Subtheme 2.4: Institutions to Strengthen the Assets of the Poor	
• Country case studies documenting how men and women accumulate assets and use them to move out of poverty • Evaluations of the impact of a range of policies and interventions on assets held by the poor • Better understanding of the role of risk management and insurance in protecting assets • Gender-disaggregated methods for measuring assets • Gender-disaggregated datasets and recommendations for gender-disaggregated data collection	• Number of case studies • Number of impact evaluations • Number and scope of synthesis studies identifying ways to strengthen assets of the poor and reduce gender gap in assets • Number of documents with recommendations of good practice for gender-disaggregated data collection • Number of gender-disaggregated datasets
Theme 3: Linking Small Producers to Markets	
Subtheme 3.1: Innovations across the Value Chain	
• Tools to optimize and prioritize investment in institutional arrangements and value chain infrastructure • New practices to upgrade value chains across CRPs and through institutional innovations on CRP2 • Models to evaluate the impact of interventions on production, consumption, prices, and trade in agricultural markets • Series of documents on optimal strategies for contract farming arrangements, horizontal coordination, and business-capacity development • Suggested innovative mechanisms to improve smallholders' access to credit and insurance • Recommendations regarding quality assurance systems	• Number of value chain research outputs, by category of outputs (tools, reports, presentations, etc.) • Number of best practices identified to upgrade value chains (by commodity and across commodities) • Number of papers on optimal strategies for contract farming and horizontal coordination • Number of countries covered in terms of identification of optimal strategies for contract farming and horizontal coordination • Number of pilot interventions designed to improve smallholders' access to credit and insurance • Number of briefs providing recommendations on quality assurance systems

1. RESEARCH OUTPUTS (cont'd)	INDICATORS AND METRICS
Subtheme 3.2: Impact of Upgrading Value Chains	
• Strategy for evaluating and assessing the impact of different interventions in upgrading value chains across different CRPs • Web-based information and knowledge clearinghouse • Database on value-chains management information systems	• Number and scope of indicators to monitor and evaluate the impact of interventions on value chains across CRPs • Number of impact evaluations implemented • Number of databases of value-chain management information systems

2. RESEARCH OUTCOMES	INDICATORS AND METRICS
Theme 1: Effective Policies and Strategic Investments	
Subtheme 1.1: Foresight and Strategic Scenarios	
• Greater capacity of targeted decisionmakers and policy and investment practitioners to access, interpret, and use strategic foresight knowledge products and findings • Growing influence of strategy foresight products and findings on policy and investment decisions • Increasing interest and understanding of general audience and media • Cohesive relationships and understanding of technical expertise among CGIAR centers and other partners • Enhanced relationships and increased cooperation with the private sector and public donors	• Number of citations of strategy foresight reports and findings • Number of hits on web portal links, and number of downloads of data, models, and publications on web portal • Number of blog posts on web portal, number of hits on social network web links • Number of users of modeling program • Evidence of utilization of results in strategic assessments and foresight studies
Subtheme 1.2: Macroeconomic, Trade, and Investment Policies	
• Pro-poor components included in trade-related reforms • Systems to monitor the spending performance across sectors	• Number of downloads from databases • Number of citations of work under Subtheme 1.2 in reports used in trade negotiations or trade forums (split by developed and developing countries) • Number of hearings by government bodies and national or international agencies in which reports under Subtheme 1.2 were cited or utilized • Number of trade agreements involving least-developed countries (LDCs) and small and vulnerable economies (SVEs) for which advice or analysis was provided

2. RESEARCH OUTCOMES (cont'd)	INDICATORS AND METRICS
Subtheme 1.3: Production and Technology Policies	
• Improved smallholder access to better quality seeds • Increased investment and improved regulatory systems to support biotechnology and nanotechnology • Increased food security and income opportunities arising from local species • Increased investment in public and private research and extension systems • Improved access of rural poor to promising high-benefit/low-risk technologies • Enhanced diversification of rural activities • Increased adoption of policies that sustainably increase agricultural productivity • Adoption of resource-efficient policies • More effective policies in support of value chain integration for local agrobiodiversity	• Number/proportion of smallholders using quality seeds • Number of laws and regulatory instruments set up to support biotechnology and nanotechnology (at country level and regional level) • Panel data on use of NUS • Measure of revenue from use of local species (gender differentiated) • Investment levels in research and extension (ASTI), time series data • Household data evidence on changes in productivity, income, diversification, and role of extension • Adoption rate of new technologies among rural poor households (by technology) • Number of diversified rural households • Changes in levels of energy- and water-use efficiency of agricultural production
Subtheme 1.4: Social Protection Policies	
• Provision of new insurance products and services • Social protection policies that benefit women and men equally • Social protection policies that effectively protect the poor's assets • Better integration of social protection and agricultural growth policies	• Number of new insurance products/services created, number of beneficiaries • Proportion of women in beneficiaries of social protection policies • Changes in assets hold before and after the implementation of social protection policies
Theme 2: Inclusive Governance and Institutions	
Subtheme 2.1: Policy Processes	
• Improved capacity of CRP2 researchers to undertake research outreach, by better understanding the pathways from research to policy • CRP2 research more effectively and constructively integrated in policymaking processes • Processes leading to policies and investments improved by reflecting insights from research under this subtheme • Greater role and voice for women, smallholders, and the poor in formulation, design, and implementation of policies affecting them	• Number of citations of reports on the political economy of policy decisionmaking that affects the rural poor • Number of policy documents that make use of tools and recommendations developed by CGIAR research • Number of policy and investment strategy documents reflecting explicit attention to improving the policymaking process • Number of Country and Regional Strategy Support Programs • Number of cases where the role of marginal groups and the poor in decisively shaping investments and other policies in their favor is documented

2. RESEARCH OUTCOMES (cont'd)	INDICATORS AND METRICS
Subtheme 2.2: Governance of Rural Services	
- Improved quality, quantity, and effectiveness of rural services and infrastructure - More equitable access to rural public services between men and women - Stronger targeting of rural services to the poorest households and to vulnerable groups (including lower social strata) - More allocatively and technically efficient use of resources in the delivery of agricultural and rural services - Stronger public sector capacity to appropriately adapt governance systems to country conditions for better results for the agricultural and rural poor	- Number of programs that refer to CGIAR research results in the design of service/infrastructure delivery programs - Number of written documentation by policymakers and decisionmakers pointing to the way that this research on the governance of rural services has helped shape policy and investments - Number of web hits on the virtual platform for land governance and land-related services - Number of beneficiaries of services and infrastructures per unit of investment - Proportion of the poor who benefit from key rural services in and for agricultural development - Ratio of women to men who have access to a public service, by service type - Level of increase in welfare measures (e.g., income, consumption) attributable to a unit of investment allocated for delivery of rural services - Number of documented cases of a change in governance arrangements explicitly for the purpose of improving how services and infrastructure are provided in rural areas
Subtheme 2.3: Collective Action and Property Rights	
- Creation or strengthening of intermediary institutions advocating for access rights - Programs to improve tenure security that pay particular attention to the needs of the poor, women, and marginalized groups - Strengthening of associations of women and smallholders for improved voice in decisionmaking and market access - Enhanced capacity of government and NGOs to work with collective action institutions (and vice versa)	- Number of institutions advocating for access rights that are linked to CAPRi work - Number of property rights reforms designed to secure tenure for the poor, marginalized groups, and women - Proportion of land where tenure is considered secure - Proportion of women and other marginalized groups in collective action groups in programs associated with CRP2 partners - Use of CAPRi materials in training programs for government, NGOs, producer organizations

2. RESEARCH OUTCOMES (cont'd)	INDICATORS AND METRICS
Subtheme 2.4: Institutions to Strengthen the Assets of the Poor	
• Use of asset-based indicators to evaluate project and program impacts on the poor • Use by project implementers of promising approaches and best practices to reduce gender-based constraints affecting the control and ownership of key productive assets in agricultural development programs • Recognition by research managers, donors, and NGOs of the importance of reducing asset disparities and explicitly targeting them in their programming	• Number of evaluations using asset-based indicators • Number of agricultural development projects using recommended practices to strengthen assets of the poor, especially of women • Knowledge, attitudes, and practice (KAP) studies of research managers, donors, NGOs, and evidence of targeting women in asset-building strategies
Theme 3: Linking Small Producers to Markets	
Subtheme 3.1: Innovations across the Value Chain	
• Adoption of value chain best practices • Improved access to markets for smallholders at better prices and lower transaction costs • Innovative horizontal and vertical coordination contracts in place • Reduced marketing margins, increased farmgate prices • New modalities on microfinance (risk scoring) and on insurance	• Number of citations of work under Subtheme 3.1 on value chains, contract farming and farmer associations • Number of new value chains measures/practices adopted • Number of contract farming arrangements influenced and number of farmer associations influenced • Rate of decrease in marketing margins, rate of increase in farmgate prices in areas of study • Number of financial institutions/nonfinancial institutions adopting innovations on risk scoring • Number of insurance pilots implemented, number of farmers impacted
Subtheme 3.2: Impact of Upgrading Value Chains	
• Impact evaluations of value-chain-related interventions in different CRPs • Documentation of best practices	• Number of impact evaluations conducted, number of CRPs impacted, and number of farmers impacted • Number of hits and downloads on web clearinghouse

3. CONTRIBUTION TO SLOs	GLOBAL INDICATORS, CHANGE BY 2025
Theme 1: Effective Policies and Strategic Investments	SLO 1: Reduced rural poverty
SLO 1: Reduced rural poverty	• Reduction of 7–10% in poverty due to improvements on market access, thereby reducing marketing margins, increasing farm-gate prices, and boosting the production incomes of rural households
• More effective prioritization of fiscal and public investment policies meet the needs of the rural poor	• More secure environment for uptake of new technologies increases efficiency of production by 1–3%
• Macro, trade, key sectoral, and rural labor policies optimize agricultural growth and competitiveness are identified	• Diversification of nonfarm income and reduced risks
• Policies supporting rural income diversification increase resilience to climatic, price, and other income shocks	SLO 2: Increased food security
• Key sectoral policies crafted for broad-based rural growth to increase job creation and optimize rural-urban linkages, creating new income opportunities	• Global crop, livestock, and fish production increased by 10–15%
• Effective safety nets prevent income loss	• 4–6% increase in calorie consumption by the poor due to lower prices and higher farm incomes
• Strategy foresight products and findings have growing influence on policy and investment decisions	SLO 3: Increased nutrition and health
SLO 2: Increased food security	• Reduced child malnutrition by 3–5%
• Enhanced development, management, and use of germplasm of major agricultural commodities improves food security	SLO 4: Sustainability of natural resources
• Sustainable intensification through development and adoption of agricultural technology policies increases food security at national and global levels	• Reduction in crop area by 3–4%, thereby freeing land for conservation
• Appropriate policies help cope with risk and volatility in international markets	
• Enabling environments increase productivity and sustainable agricultural growth	
• Policies improve participation of smallholders in global market in light of country trade specialization, trade costs, and farm heterogeneity	
SLO 3: Increased nutrition and health	
• Enhanced development, management, and use of germplasm of neglected and underutilized species improves nutrition security	

3. CONTRIBUTION TO SLOs (cont'd)	GLOBAL INDICATORS, CHANGE BY 2025
SLO 4: Sustainability of natural resources • Strategic foresight identifies environmental threats and appropriate responses to reduce impact of climate change • Identification of appropriate policies and regulations allows for sustainable agricultural growth • Increased efficiency of agricultural technologies allows sustainable intensification of agricultural production, reducing pressure on other areas **Theme 2: Inclusive Governance and Institutions** SLO 1: Reduced rural poverty • Research findings are more likely to result in policy reforms that reduce social exclusion • Better agricultural research, extension, and infrastructure services increase incomes • Stronger collective action enables smallholders and women to engage in markets • Gender-differentiated strategies of asset accumulation overcome poverty traps SLO 2: Increased food security • Collective action for pooling resources, safety nets, and access to credit provides buffer against shocks • Women's productive assets increase food production SLO 3: Increased nutrition and health • More responsive agricultural research and extension systems provide women and men farmers with information on production of nutrient-rich foods • Stronger women's assets increase women's bargaining power, which leads to better child nutrition	

3. CONTRIBUTION TO SLOs (cont'd)	GLOBAL INDICATORS, CHANGE BY 2025
SLO 4: Sustainability of natural resources • Secure property rights give incentives for investment in resource base, especially common property • Collective action enables management of resources across scales to ensure equitable access and reduce resource degradation • Improved extension services provide information on managing resources under climate change **Theme 3: Linking Small Producers to Markets** SLO 1: Reduced rural poverty • Transaction costs and market failures are reduced • There are greater opportunities for smallholders and women to benefit from growth in demand for high-value commodities and access to retail structures • Institutional and infrastructure innovations generate equitable and sustainable benefits to value-chain actors SLO 2: Increased food security • Best practices are identified to increase yields and market access and reduce transaction costs for smallholders SLO 3: Increased nutrition and health • Improving standards and certification across the value chain ensures food safety and quality and rewards farmers for good production practices • Nutrition content of value chains is improved (linking with CRP4) SLO 4: Sustainability of natural resources • Partnerships among more effective public agricultural research and extension organizations, private firms, NGOs, and producer associations ensure sustainable use of natural resources in the production practices at different points in the value chain	

Annex 2—Linkages between CRP2 and other CRPs, by subtheme

Subtheme 1.1—Strategic Foresight and Future Scenarios

CRP1 Integrated Systems	CRP3 Sustainable Production	CRP4 Nutrition and Health	CRP5 Water, Land, and Ecosystems	CRP6 Forests and Trees	CRP7 Climate Change
• CRP2 offers trends and scenarios for poverty, markets, environmental conditions, and risks for particular environments, (regions, countries, or agroecological zones or systems, depending on the purpose of the analysis) • Assess productivity responses to scenario dynamics (other CRPs give input to models, get aggregate projections) periodic strategic analyses from a more focused regional, thematic, commodity or system perspective	• CRP2 offers trends and scenarios for poverty, markets, environmental conditions, and risks for particular commodities • CRPs will provide input to models to assess productivity responses to scenario dynamics and benefit from aggregate projections • Conduct periodic strategic analyses from a more focused regional, thematic, commodity or system perspective • Apply IMPACT and other models to improve CRP3 ex ante priority setting and impact assessment • Analyze and predict market demands for specific crops and products, including cereal-fed livestock and poultry, in specific areas • CRP2 will provide market predictions for specific new products for dryland cereals, for example, pre-processed traditional foods (with thrust on nutrition) • Provide market predictions for specific varietal qualities in dryland cereals, to guide breeders and seed producers	• CRP2 offers forecasting trends and developing scenarios for poverty, health, food consumption and demand, malnutrition and deficiencies, environmental conditions for selected ecosystems/locations • Conducting periodic strategic analyses from a more focused regional, thematic, commodity, micronutrient, or system perspective • Map the agriculture, food consumption, and nutrition transition pathways using longitudinal panel data • Identify hot-spots that agricultural R&D could effectively target to address hunger, poverty, health and nutrition • Estimate the number of poor and vulnerable people that the CGIAR system will help lift out of poverty, improving their livelihoods, diet, and nutritional health.	• CRP2 to lead capacity building for forecasting and scenario analysis on supply and demand of water and land resources • Identify potential for interregional technology transfer	• CRP2 offers trends and scenarios for poverty, markets, environmental conditions, risks for trees, forest areas • Periodic strategic analyses from a more focused regional, thematic, commodity, or system perspective	• CRP2 offers trends and scenarios for poverty, markets, environmental conditions, and risks under climate change • Demand and supply scenarios and identify potential regions or sources of growth • Conduct periodic strategic analyses from a more focused regional, thematic, commodity, or system perspective • Jointly develop integrated modeling systems framework tools for ex ante impact assessment, at multiple levels, of climate change adaptation and mitigation options having dynamic orientation

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Annex 2—Linkages between CRP2 and Other CRPs, by subtheme (cont'd)

Subtheme 1.2— Macroeconomic, Trade, and Investment Policies

CRP1 Integrated Systems	CRP3 Sustainable Production	CRP4 Nutrition and Health	CRP5 Water, Land, and Ecosystems	CRP6 Forests and Trees	CRP7 Climate Change
• Identify key macro-economic factors affecting particular environments • Analyze agricultural productivity–employment links • For example, CRP2 will contribute global, regional, and national analyses of macroeconomic factors, poverty scenarios, and other factors of importance for aquatic agricultural systems (CRP 1.3) • CRP 1.3 will contribute hub-level and larger scale data to CRP2 to test analyses and recommendations • Optimizing public investments in particular environments, ex ante evaluation of agriculture production system research	• Identify key macro-economic factors affecting particular commodities • Analyze agricultural productivity–employment links • For example, determine economic costs and benefits of coordinating and harmonizing regional rice (or other commodity-specific) policies • Identify prospects for enhanced trade in pulses (or other commodities) between Asia and Africa • Investigate polices to encourage breeding for drought-tolerance and its effects on social welfare in terms of enhanced income, income stability, reduction in price uncertainty, and improvement in nutrition security	• Provide analytical base and support country-level capacities of the adoption of macroeconomic, international trade, and nonagricultural policies for more efficient functioning of food, nutrition, and agricultural systems at country, regional, and global levels • Identify the optimal models of public investment to achieve or maximize food and nutritional security of poor people	• CRP5 leads or jointly conducts with CRP2 research on the pathways through which trans-boundary water policies affect agricultural growth, poverty, and income inequality • Examine the effects of legislation and policies on exploitation of surface and underground water, and pricing and subsidies on farmers access to water • Analyze the effect of input subsidies, such as fertilizer and rural infrastructure on agricultural production, employment, income, poverty, and competitiveness of smallholder farmers	• Identify pathways through which domestic biofuel policies affect agricultural growth	• Identify pathways through which domestic biofuel policies at both global and domestic levels affect agricultural growth and welfare • Evaluate subnational climate change and market policy options for agricultural and environmental management to address adaptation in food systems • Conduct life cycle analysis of food supply-chain analysis of low carbon agricultural development options • Improvement and evaluation of climate information services and delivery mechanisms • Test the economic and technical feasibility of mitigation options on farms

Annex 2—Linkages between CRP2 and Other CRPs, by subtheme (cont'd)

Subtheme 1.3—Production and Technology Policies

CRP1 Integrated Systems	CRP3 Sustainable Production	CRP4 Nutrition and Health	CRP5 Water, Land, and Ecosystems	CRP6 Forests and Trees	CRP7 Climate Change
• Conduct cross-country comparisons of production and technology policy across ecosystems • Identify policies that facilitate conservation, development, dissemination, exchange, and effective use of germplasm • Develop innovative extension programs • Conduct location-specific analyses of policies to encourage dissemination, uptake, and refinement of production technologies	• Jointly develop innovative extension programs • Identify and test policies for sustainable land management across countries and management of transboundary resources • CRP3 builds on CRP2 approaches to advocacy and impact assessments of policy-related work • Jointly conduct cross-country analyses of production and technology policy across various commodity systems • Jointly develop and test policies that facilitate conservation, development, dissemination, exchange, and effective use of germplasm • Identify policies to support biotech and nanotech development for key crops (including biofuels) • Identify women's need and priorities through PVS trials	• Assess policies on biotechnology, nanotechnology for vaccines and health • Assess policies on neglected and underutilized species • Assess policies on postharvest processing • Assess policies on household energy use and health • Conduct cost–benefit analysis of standardizing and/or harmonizing regulatory systems and labeling for GM and biofortified crops • Conducting cost–benefit analysis of biofortification with mandatory fortification of food staples	• CRP2 and CRP5 jointly study national and international policy frameworks supporting sustainable land, water, ecosystem technology policies and sustainable agricultural practices for long-term investments in sustainable land and water management • Conduct cross country analysis of agrarian policies for sustainable land management • Develop policy framework for supporting resource-saving technologies in dryland agriculture	• Cross-country comparisons of production and technology policy across ecosystems • Identify policies on biofuels, household energy use	• Develop national and international policy frameworks supporting climate change adaptation, and mitigation policies • Identify policies and strategies that increase agricultural productivity and farmers' adoption of carbon sequestering practices, as well as availability of breeding materials that address abiotic and biotic stresses • Evaluate new crop, livestock, and fisheries breeding and production technologies (including water management) for likely impact under future condition • Evaluate policy needs for genetic resource access and benefit sharing under changed climate • Design welfare-enhancing policies and technological interventions to address climate change challenges

Annex 2—Linkages between CRP2 and Other CRPs, by subtheme (cont'd)

Subtheme 1.4—Social Protection Policies

CRP1 Integrated Systems	CRP3 Sustainable Production	CRP4 Nutrition and Health	CRP5 Water, Land, and Ecosystems	CRP6 Forests and Trees	CRP7 Climate Change
• Identify safety net, insurance, and health programs to promote producers' incomes in fluctuating environments • Identify best practices on social protection mechanisms in farming systems • Conduct gender analysis with sex-disaggregated data to help identify vulnerable populations in the drylands	• Identify and experiment with safety net and insurance programs to promote producers' investments and incomes • Conduct economic analysis of effects specific emergency food and seed interventions on short-term and longer term food security and dryland cereals markets	• Identify safety net, insurance programs to protect health and nutrition • Examine impact of different social protection modalities or options and determine how best to reach the neglected groups			• Identify safety net, insurance programs to promote producers' incomes in fluctuating environments • Work with humanitarian community on improving and evaluating climate-related crisis response and post-crisis recovery • Generate science-based evidence to advise policy formulation for social safety nets in drylands areas for men and women

Annex 2—Linkages between CRP2 and Other CRPs, by subtheme (cont'd)

Subtheme 2.1—Policy Processes

CRP1 Integrated Systems	CRP3 Sustainable Production	CRP4 Nutrition and Health	CRP5 Water, Land, and Ecosystems	CRP6 Forests and Trees	CRP7 Climate Change
• CRP2 research on policy processes will provide information on stakeholders and policymakers who are envisaged as partners in focus hubs and focus countries of CRP1 • CRP2 action research on political participation and research–policy linkages (organization of platforms where researchers and stakeholders meet over time) will include policy processes in which CRP1 research is engaged in.	• CRP2 research on political economy of institutional and agricultural policy reforms will be carried out in close collaboration with all components of CRP3 to address commodity-specific policy challenges • In selecting cases for the CRP2 action research on political participation and research-policy linkages (organization of platforms), emphasis will be placed on including cases of commodity-specific policy processes (for example, policy processes related to livestock policies), which are covered in the different components of CRP3	• CRP2 research on policy processes will be carried out in close collaboration with Component 5 of CRP4, which deals with "Policy Processes in Agriculture, Health, and Nutrition"; collaboration will involve joint action research to strengthen research–policy linkages as well as joint development of tools and approaches; • CRP2 and CRP4 will also collaborate in conducting research on political obstacles to cross-sectional policy coordination, which is a specific focus of CRP4.	• CRP2 research on political participation and research-policy linkages will be carried out in collaboration with CRP5 strategies to promote "Best Bets" • CRP2 research on political economy of institutional reforms will support devolution of management for irrigation systems, pastoral systems and other natural resource systems covered in CRP5 • CRP2 research on political process at the local level will contribute to the analysis of the political dimension of community-based natural resource management	• CRP2 research on policy processes will involve collaboration with CRP6 research on improved gender-sensitive policies to secure rights to forests, agroforestry and trees of forest- and tree-dependent communities • CRP2 research on national agricultural policy reform will use synergies with CRP6 on the impact of macro-policies on forest management • CRP2 research on local political processes will contribute to CRP5 research (Theme 3) on community-based forest management	• CRP2 research on political economy of policy reform processes will provide important insights for all four themes of CRP7 by addressing the political obstacles to adoption of climate change policies • CRP2 action research on participation and evidence-based policymaking will include policy processes related to climate change policies, in particular using opportunities for collaboration with CRP7 Theme 4 (Integrated decisionmaking: mainstreaming adaptation and mitigation in national policies)

Annex 2—Linkages between CRP2 and Other CRPs, by subtheme (cont'd)

Subtheme 2.2— Governance of Rural Services

CRP1 Integrated Systems	CRP3 Sustainable Production	CRP4 Nutrition and Health	CRP5 Water, Land, and Ecosystems	CRP6 Forests and Trees	CRP7 Climate Change
• CRP2 will provide data on global best practice for CRP1.3 (for example) to identify institutional arrangements for agricultural research and extension services, finance, and insurance • Regulate quality of inputs and agribusiness models to disseminate technologies • CRP1.3 will conduct cross-hub and country analyses to identify best practices and innovative arrangements on the topics listed above	• Identify and test institutional and governance arrangements for agricultural research and extension services, finance and insurance, and regulate quality of inputs • Conduct research on partnerships	• Identify and test institutional arrangements for extension service, and to ensure food safety, food quality, and water infrastructure	• Identify institutional arrangements for provision of research and extension services, finance, land and water administration, irrigation and governance of common properties, and enhancing domestic and international market access	• Identify institutional arrangements for provision research and extension services, finance, and insurance	• Identify institutional arrangements for research and extension services, insurance, water infrastructure, and the role of formal public and private agencies

Annex 2—Linkages between CRP2 and Other CRPs, by subtheme (cont'd)

Subtheme 2.3—Collective Action and Property Rights

CRP1 Integrated Systems	CRP3 Sustainable Production	CRP4 Nutrition and Health	CRP5 Water, Land, and Ecosystems	CRP6 Forests and Trees	CRP7 Climate Change
• CRP2 will provide data on securing tenure and collective action for agricultural production and value chains, management of common property fisheries, rangelands, watershed and genetic resource management and pro-poor Payment for Environmental Services, provide methods, and facilitate learning across different types of groups • CRP1.3 will conduct cross-hub and country analyses to identify best practices and innovative arrangements on the topics listed above	• Investigate collective action option for agricultural production, insurance and value chains, fisheries, rangelands, and genetic resource management • Provide methods and study the facilitation of learning across different types of groups • Build social networks and social capital for men and women to empower communities	• Investigate collective action opportunities for agricultural production and postharvest management and marketing, credit, and input delivery • Provide research methods and facilitate learning across different groups	• Jointly study the securing of land and water rights for investment by small producers • Research collective action opportunities for water and watershed management to empower communities • Identify collective action and property rights aspects of Payment for Environmental Services • Providing methods and facilitating learning across different types of groups, including formal and informal institutions and for men's and women's livelihoods	• Explore how to secure tenure and collective action for trees and forest management, provide methods/facilitate learning across different types of resources • Collect and use gendered data to explore the use of common property resources in drylands, identify gaps, and suggest strategies for enhancing women's property rights	• Role of tenure and collective action for climate change mitigation (for example, REDD) and adaptation • Identify institutions and incentives that enable smallholders to benefit from carbon markets • Examine impacts of mitigation policies on livelihoods • Explore the role of collective action in aggregating smallholders into carbon markets • Identify institutional arrangements that enhance poor smallholders' and women's benefits from carbon payments and access to climate and agriculture-related services that help adaption to climate change • Study the adaptive capacity of men and women in drylands systems • Explore use of formal and informal social networks for their ability to enhance coping mechanisms during climatic shocks

Annex 2—Linkages between CRP2 and Other CRPs, by subtheme (cont'd)

Subtheme 2.4—Institutions to Strengthen the Assets of the Poor

CRP1 Integrated Systems	CRP3 Sustainable Production	CRP4 Nutrition and Health	CRP5 Water, Land, and Ecosystems	CRP6 Forests and Trees	CRP7 Climate Change
• CRP2 will provide data on identifying key assets of the poor, including land, livestock, fisheries, and agrobiodiversity, and natural resources • Investigate how producers increase and protect these assets • Develop methods to assess changes in assets by gender • CRP1.3 will conduct cross-hub and country analyses to identify best practices and innovative arrangements on the topics listed above	• Identify key assets of the poor, including land, livestock, fisheries, agro-biodiversity, natural resources, how to increase and protect them • Provide methods to assess changes in assets by gender category	• Identify key assets of the poor, including role of education, health, and nutritional status, and how to increase and protect them • Provide methods to assess changes in assets by gender • Identify the institutional arrangements that transfer assets that contribute to empowerment of women and the education and health of children • Analyze gendered consumption patterns of households, food intake and nutrient levels of men and women, and the roles and responsibilities of women in crop value chains to address inequities in nutritional status among vulnerable groups • Research access to various resources, inputs, knowledge on agriculture-health-nutrition linkages with a gender perspective • Explore livelihood diversification and improvement of health and nutrition	• CRP2 and CRP5 to work collaboratively to identify role of land and water as assets of the poor • Explore how to increase and protect land and water assets • Provide methods to assess changes in assets by gender • Identify role of land and water as assets of the poor, how to increase and protect them • Identify mechanisms for promoting access of the landless, marginalized and other vulnerable groups to new productive assets (especially equipment)	• Identify role of trees, forest lands as assets of the poor, how to increase and protect them • Provide methods to assess changes in assets by gender	• Assess role and impact of climate shocks on assets like land, livestock, fisheries, agro-biodiversity, and natural resources by gender • Investigate mechanisms to protect assets in the face of climate variability

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Subtheme 3.1— Innovations across the Value Chain

CRP1 Integrated Systems	CRP3 Sustainable Production	CRP4 Nutrition and Health	CRP5 Water, Land, and Ecosystems	CRP6 Forests and Trees	CRP7 Climate Change
• Input and technology • Improve regulatory and marketing tools and business competencies to link smallholder producers to value chains • CRP2 will contribute to the identification of best practices of value-chain approaches • CRP1.3 (for example) will conduct cross-hub and country analyses to identify best practices and innovative arrangements on the topics listed above	• Improve postharvest activities • Provide information to farmers using ICTs and agricultural extension and advisory services • Study incentives for vertical and horizontal coordination • Provide technical assistance and value addition • Identify consumer preferences for rice traits • Testing new methods of value chain analysis on maize and wheat value chains • Conduct value chain analysis for selected legumes and dryland cereals to identify ways of ensuring that commercialization does not transfer control from women to men • Examine roles and responsibilities of women in seed production and delivery • Explore and develop innovative contract farming options to link roots, tubers, and banana farmers to markets • Compile a taxonomy of institutional arrangements for uptake of technology in fish and livestock production, processing, and marketing	• Input and technology • Improve efficient value chains (including Public Distribution System) to enhance food and nutritional security of poor and the neglected.	• Output market linkages • Input and technology: Identify the factors conditioning adoption and adaptation of land and water management innovations by smallholder farmers • Output market linkages (such as contract farming, cooperative marketing) for better marketing opportunities in domestic and international market	• Output market linkages	• Output market linkages • Adaptation of farming systems to changing climate conditions through the integration of tested technologies, practices, and policies (contract farming arrangements through value chain) • Evaluate and develop innovations in weather-index insurance mechanisms by smallholder farmers under the value chain theme (this could also include a combination of insurance and access to credit to reduce the risks faced by farmers)

Note: Under CRP3, many activities will be relevant to most commodities; the examples above are illustrative.

Annex 2—Linkages between CRP2 and Other CRPs, by subtheme (cont'd)

Subtheme 3.2— Impact of Upgrading Value Chains

CRP1 Integrated Systems	CRP3 Sustainable Production	CRP4 Nutrition and Health	CRP5 Water, Land, and Ecosystems	CRP6 Forests and Trees	CRP7 Climate Change
	• Evaluation of the economic cost, benefit, and viability of regional rice reserve • Analysis of adoption and impacts at the system or regional level • Evaluate institutional innovations for delivery of market information and services to small producers of maize and wheat • Draw out lessons on value chain approaches to technology uptake and innovation • Jointly identify best practices in engaging the private sector and research partners on the ground • Co-development and engage partners in evaluation of results of policy communication • Facilitate cross-commodity learning platforms among CRPs working on value chain development and operations				

Annex 3—Examples of collaboration between the CRP2 Value-chain Theme (Theme 3) and CRP3 Commodities

	CRP3.3 - GRiSP	CRP2 collaboration CRP3.3	CRP3.4 - roots, tubers and bananas	CRP2 collaboration with CRP3.4	CRP3.7 - livestock and fish	CRP2 collaboration with CRP3.7
Theme	Theme 4: Extracting more value from rice harvest through improved processing	Theme: Value chain	Theme 6. Adding value in markets and enhancing postharvest technologies	Theme: Value Chain	Theme 1. Targeting Identifying beneficiaries and their needs/vulnerabilities	Theme: Value chain
Product line or subtheme	▪ Business model to improve rice postharvest practices, processing and marketing		▪ Promoting innovation for increased value added in markets		▪ A value chain-based R4D approach to enhancing food and nutrition security and livelihood	▪ Standardized measurement of value addition and value chain performance ▪ Cross-commodity and cross-context models of R4D ▪ Methods and key indicators of "livelihoods" and "food security"
Products	▪ Improved technologies and management options to increase post harvest yield ▪ Business models for postharvest technologies and tools for improved rice market information systems ▪ Institutional and organizational innovations enabling greater access to markets for smallholders	▪ Postharvest activities ▪ Information to farmers using ICTs and agricultural extension and other advisory services ▪ Incentives for vertical and horizontal coordination and technical assistance and value addition	▪ Strategies for linking farmers to markets and stimulating demand for RTBs in urban markets validated	▪ Enhanced methodology to validate strategies to link farmers to markets through innovative contract farming with at least 5 commodities	▪ Improved technologies and uptake/use	▪ Compiled experience on institutional arrangements for technology uptake ▪ Experience of application of whole-chain approaches to technology uptake and innovation ▪ Taxonomy of institutional arrangements with associated standardized performance measures
Outcomes	▪ Research outcome: innovations to increase post harvest yield ▪ Development outcome: farmers with higher yields and income	▪ Research outcome: CRP1 using improved methodologies ▪ Development outcome: farmers with higher yields and income	▪ Research outcome: ▪ Innovation platforms of CRP3.4 linked stakeholders ▪ Development outcome: Farmers with expanded markets and higher prices for RTBs	▪ Research outcome: CRP3.4 using improved methodology ▪ Development outcome: Farmers with expanded markets and higher prices	▪ Research outcome: ▪ Innovation on improved technologies and uptake use ▪ Development outcome: Farmers with expanded markets	▪ Research outcome: CRP3.7 using improved methodology ▪ Development outcome: Farmers with expanded markets/
Linkage mechanisms	▪ Jointly funded activity between CRP 3.3 and CRP2 leading to a shared output.	▪ Report/article with comparative perspective across staple commodities on business models	▪ Jointly funded activity between CRP3.4 and CRP2 leading to a shared output	▪ Report/article with comparative perspective across commodities and lessons learned based on a solid impact evaluation	▪ Jointly funded activity to identify best practices in engagement of private sector and research partners on the ground	▪ Strategy of co-development and engagement of partners can utilize CRP3.7 partners in project design and elevation of results through to policy communication. ▪ CRP2's institutional analysis base would offer a taxonomy of options for change mechanisms, along with analytical methods for their examination, design and analysis. This is turn would be strengthened by experience generated by CRP3.7.

Annex 4—Involvement of CGIAR centers in CRP2

(Theme 1)

CGIAR Center	Theme 1. Effective Policies and Strategic Investments			
	Subtheme 1.1 Foresight and Strategic Scenarios	Subtheme 1.2 Macroeconomic, Trade, and Investment Policies	Subtheme 1.3 Production and Technology Policies	Subtheme 1.4 Social Protection Policies
Africa Rice Center			Work on rice will contribute to cross-cutting (including cross-commodities) research themes in Africa	
Bioversity International			Impact assessment of agrobiodiversity conservation on peoples' livelihood Role of agritourism in conserving agrobiodiversity and associated culture Policies to support the role of women in developing and marketing local agrobiodiversity Mainstreaming of local agrobiodiversity/ NUS species conservation and use into academic curricula and research institution agenda Information systems & platforms for enhancing sustainable conservation & use of local agrobiodiversity/NUS	
CIAT	Poverty mapping to target CGIAR crops for biofortification and estimate ex ante impact Climate change impacts on crop suitability and ex ante assessment of livelihood impacts	Evaluate distributional effects of economic benefits among household producers depending on private–public partnerships	Ex ante and ex post assessment of agricultural technologies' impact on the livelihoods of the rural poor Assess impact of improved strategies for technology dissemination to achieve greater influence Defining impact of improved bean varieties in Sub-Saharan Africa Assess economic impact for introducing GMO varieties for small producers in Latin America	Evaluate the effectiveness of existing social protection policies and participating in proposed adjustments
CIP	Targeting agricultural research based on overlay of crop importance and MDG indicators Targeting agricultural research at subnational level using dynamic models Assessing commodity situations and outlooks based on trend analysis Priority-setting based on rates of return of investments and impacts using economic surplus analysis, at the global and regional levels	Analysis of macroeconomic and trade policies affecting potato and sweet potato production and commercialization chains with specific focus on impacts on the inclusion of poor farmers	Analysis of policies that favor use of IPM and sustained cropping in the face of climate change Identify the social, economic, institutional, infrastructural, and policy factors promoting or hindering the uptake of agricultural innovations Assess technology uptake, diffusion, and spillover pathways across development domains and production systems	
ICARDA	The impact of climate change on natural resources, farm income, and food security in CA & China Targeting agricultural research and development to areas of high potential for poverty reduction	The impact of recent droughts on food security in Morocco and Syria (The most drought-affected countries)	Study on the diffusion of barley and food legumes in Ethiopia Adoption and impacts of improved lentil varieties on poverty reduction in Ethiopia and Bangladesh	

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CGIAR Center	Theme 1. Effective Policies and Strategic Investments			
	Subtheme 1.1 **Foresight and Strategic Scenarios**	Subtheme 1.2 **Macroeconomic, Trade, and Investment Policies**	Subtheme 1.3 **Production and Technology Policies**	Subtheme 1.4 **Social Protection Policies**
ICRISAT	Support pro-poor evidence-based decisionmaking processes in favor of dryland agriculture through SAT Futures Studies and situation and outlook analyses of ICRISAT mandate crops Identifying locations and agricultural systems vulnerable to changes in global environment Plausible future scenarios in dryland agriculture for relevant research and policy directions	Regional/global economic outlook (supply, demand, trade, prices) of ICRISAT mandate dryland cereals and grain legumes Sources of growth and instability in dryland agriculture	ICRISAT Village Level Studies (longitudinal household panel data that commenced in 1975) that tracks critical changes and responses in the SAT rural household and village economies in Sub-Saharan Africa and Asia Baseline studies for monitoring technology uptake and impact for dryland cereals and legumes in Sub-Saharan Africa and South Asia Farmer's/farm household's response to, adaptation strategies for, and coping mechanisms for changes in new technologies, institutional and market innovations, policy interventions, and natural resource base and related shocks Assessments for ex ante research evaluation of promising technologies Adoption studies and impact assessments of dryland technologies	Social assessments and institutional analysis to empower smallholders, especially women, and hasten technology uptake Analysis of institutional innovations (credit, information, technology, market, insurance, and other social safety nets, extension, etc.) for reducing transaction costs along the value chain for dryland commodities in domestic and international markets Farmers' response and adaptation strategies to change in policies

CGIAR Center	Theme 1. Effective Policies and Strategic Investments			
	Subtheme 1.1 Foresight and Strategic Scenarios	Subtheme 1.2 Macroeconomic, Trade, and Investment Policies	Subtheme 1.3 Production and Technology Policies	Subtheme 1.4 Social Protection Policies
IFPRI	Use of Foresight Analysis and the Foresight Platform to develop critical and quantitative evaluation of the key drivers of change and uncertainty in global food systems, and development of plausible future scenarios that encompass the evolution of various driving forces and their impact on food and nutrition (Global Futures Project) The Harvest Choice program develops an enhanced and interlinked set of data and quantitative tools, which include spatial databases, detailed mapping of food-system characteristics and human welfare, and a detailed characterization of the impacts of changes and uncertainty in the state of natural resources on global food systems The Harvest Choice program develops a wide range of policy options and possible technological and institutional interventions that can be tailored to fit the specific regional, national, or subnational problems, issues, or opportunities that are identified Updated and expanded quantitative information on capacity and investment trends in national, regional, and global agricultural R&D that is widely accessible for improved decisionmaking and further analysis (ASTI Initiative) Establish and operate the African Growth and Development Policy Modeling consortium (AGRODEP) with the objective of creating a world-class modeling community in Africa	Assessment of the contributions of multilateral trade agreements and rules to efficient global food and agricultural markets and benefits for the world's poor Priorities of public investment for promoting rural growth and reducing poverty are assessed, and the role of governance in public investment is better understood Assessment and documentation of the regional effects of multilateral trade policies and rules, and of the contributions of regional trade agreements to efficient food and agricultural markets and benefits for the poor Greater understanding of the heterogeneous demands of smallholders for infrastructure and institutions, and the importance of their complementarities in the development of rural markets Analysis of country development strategies including general equilibrium analyses of trade and exchange-rate policies (Country Strategy Support Programs) Analysis of implications of alternative rural and urban focused development strategies	Develop enhanced rural water quality management options Develop policy options for reform of investments in irrigation water systems Development of enhanced tools for the valuation of ecosystem services related to water Impacts of land management practices on poverty and sustainability of the resource base assessed, and synergies or tradeoffs evaluated The role, implementation, and impact of different approaches to promoting SLM and the potential for synergies among different approaches evaluated Assess the role of crop genetic resource management as a tool to increase the resilience of producers to biotic and abiotic constraints Analyze the constraints to the access and delivery of improved seeds to small farmers: from intellectual property rights to seed systems Adoption and socioeconomic impacts of transgenic crops: guiding methods and policies to maximize the potential of biotechnologies for the poor Research, new knowledge, and information for biosafety policy development and regulatory decisionmaking in the Program for Biosafety Systems (PBS) Regional and subregional models and initiatives for biosafety policies and procedures in Africa and Asia developed under the PBS program	Innovations developed in research designs and analytical methods for evaluations of policies and programs to provide social protection, reduce poverty, and improve human capital of the poor Increased understanding of the impacts and impact pathways—in the short, medium, and long term—of alternative social protection interventions to increase human capital and promote sustainable poverty reduction, food security, and nutrition improvement Increased understanding of the impacts of shocks on poverty, food security, and human capital, and innovations in social protection interventions that can best respond to new conditions, for different regions and demographic groups in the short and long term. Shocks emphasized in this research include HIV and AIDS, rising food prices, and climate Improved understanding of how social protection policy processes, institutions, and program operations affect intervention outcomes, and development of methods for studying these factors
IITA	Targeting agricultural research and development based on potential impacts on poverty reduction Strategic analysis of research and investment options for guiding public investments in African agriculture for economic growth and poverty reduction (ReSAKSS-WA) Assessing the efficiency and equity tradeoffs and the scope for resource reallocation in agricultural research and development Assessing national, regional, and global commodity situation and outlook for Africa's staple crops Geospatial analysis for biophysical and socioeconomic characterization of development domains and production systems		Identify the social, economic, institutional, infrastructural, and policy factors promoting or hindering the uptake of agricultural innovations among the poor and the marginalized Assess technology uptake, diffusion, and spillover pathways across development domains and production systems	
ILRI	Spatial analysis and development of data and spatial products on land-use change, crop–livestock interaction, livestock systems, livestock–resource issues, environmental	Assessing animal disease and mitigation impacts on trade access and performance Examination of the potential for commodity-based trade in livestock products on a regional and international	Inclusion and assessment of livestock-based livelihoods in planning for sustainable resource management Linkages to private-sector providers of technology	

CGIAR Center	Theme 1. Effective Policies and Strategic Investments			
	Subtheme 1.1 **Foresight and Strategic Scenarios**	Subtheme 1.2 **Macroeconomic, Trade, and Investment Policies**	Subtheme 1.3 **Production and Technology Policies**	Subtheme 1.4 **Social Protection Policies**
	indicators, food security, and poverty Monitoring of economic, social, and environmental trends related to livestock and livestock systems Modeling of scenarios of change in resource productivity, food security, environment, climate, and demography Enhancing data quantity and quality for use by policymakers in Africa	basis Multimarket modeling of Ethiopian agriculture Multimarket modeling of selected livestock–crop systems in targeted countries	for livestock product preservation or other value addition Extension of existing policy advocacy and examples to additional agro-environments and countries Monitoring and evaluation of technologies, formulation of associated policy advocacy messages	
IRRI	Assessment of future scenarios for rice production, consumption, and trade		Identify consumer preferences for rice traits	
World Agroforestry Center			Determining best practices for facilitating enterprise development for ensuring improved livelihoods, particularly for the poor and women Assessing how innovative extension approaches, such as volunteer farmer trainers and rural resource centers, can foster entrepreneurship and improve farmers' capacity to innovate	
WorldFish Center	Work on the impacts of climate change on small-scale fisheries and aquaculture WorldFish cross-cutting work on impact assessment as well as specific multi-stakeholder projects (e.g., work with IFAD)	Work on the poverty and food security impacts of globalization and regional trade in fish products in Africa (Fish to 2030) Ex ante impact assessment of fisheries and aquaculture investment programs combining quantitative methods with strong participatory and consultation components	Identifying appropriate strategies to enable expansion of aquaculture SMEs, including public–private partnerships in R&D, while managing environmental risks Developing opportunities for livelihood diversification	Understanding and enhancing social welfare functions of fisheries and aquaculture Role of aquaculture in household livelihood strategies for families affected by HIV-AIDS

Annex 4—Involvement of CGIAR centers in CRP2 (cont'd)

(Theme 2)

CGIAR Center	Theme 2. Inclusive Governance and Institutions			
	Subtheme 2.1 Policy Processes	Subtheme 2.2 Governance of Rural Services	Subtheme 2.3 Collective Action and Property Rights	Subtheme 2.4 Institutions to Strengthen the Assets of the Poor
Africa Rice Center				
Bioversity International			Impact of external reward mechanisms for agrobiodiversity conservation on local practices, rules, and institutions of collective action and property rights Current status and trends regarding the conservation of local agrobiodiversity in situ/on farm	
CIAT	Case studies showing the impact of participatory methods on livelihoods in the Andes and the development of evidence-based processes of policy incidence Regional platform to promote discussion and debate regarding the inclusion of the poor in processes of agricultural innovation in the Andes	Consolidation and diffusion of participatory methods that favor the poor in the Andean Region through development of national agricultural innovation systems in Bolivia, Colombia, Ecuador, Peru		
CIP			Role of collective action in value chains, seed systems, and response to climate change	Research on multistakeholder platforms to strengthen assets of poor in value-chain context in LAC Assess the determinants, pathways, and impacts of agricultural technologies on livelihoods, capital assets, and sustainable livelihoods among rural poor and marginalized
ICARDA	Review of water and land management policies in Egypt, Morocco, and Jordan	The impact of agricultural policies on the sustainability, equity, and efficiency of natural resource use in CWANA countries		
ICRISAT	Strategic Analysis and Knowledge Support System in Southern and Eastern Africa (ReSAKSS) to improve policy and strategic planning and implementation in the agricultural sector Dynamics of poverty and policy processes in Sahelian drylands		Coping mechanisms and collective action among farm households—social and institutional innovations	Network architecture and institutions for introducing pro-poor interventions and strengthening assets of the rural poor

CGIAR Center	Theme 2. Inclusive Governance and Institutions			
	Subtheme 2.1 Policy Processes	Subtheme 2.2 Governance of Rural Services	Subtheme 2.3 Collective Action and Property Rights	Subtheme 2.4 Institutions to Strengthen the Assets of the Poor
IFPRI	Develop typologies capturing key country characteristics and stages of development to (a) identify preconditions for successful pro-poor and gender-sensitive growth and food security, (b) guide selection of appropriate development strategies, (c) provide a basis for developing-country performance indicators, and (d) guide selection of countries for more in-depth research to contribute to effective Country Strategy Support Programs Approaches for bringing knowledge into agriculturally relevant country strategies and implementation of processes developed and tested to contribute to effective Country Strategy Support Programs (CSSPs)	Identify governance reforms that strengthen agricultural and rural service provision and improve the business climate for smallholder farmers, including public-sector and regulatory reforms, decentralization, strengthening of local governance, anticorruption measures, and promotion of farmers' organizations and rural women's groups Identification of best practices in the provision of rural infrastructure and institutions to better link smallholders to markets Increased effectiveness of ministries and departments of agriculture in fulfilling their governance functions Increased effectiveness of international organizations in charge of food and agriculture to deliver global public goods	Strengthened knowledge of collective action and property rights institutions and their role in poverty reduction and natural resource management (CAPRi) Policy instruments and options identified that facilitate the formation, improved functioning, resilience, and spontaneous evolution of organizations of users and property institutions that provide equitable access to resources (CAPRi) Enhanced capacities of researchers, policymakers, and technical staff to deal with property rights and collective-action institutions (CAPRi)	Improved measures of women's effective control of assets Better understanding of the factors that influence the gender gap in assets in a range of study countries Identification of the impacts—and impact pathways—of gender gaps in assets on poverty and other development-policy outcomes toward the creation of a policy narrative on the role of women's assets in development policy Advice to practitioners and policymakers on how to effectively increase women's control of assets in projects and policy
IITA	Assessing the influence and impacts of IITA investments in cassava research and commercialization through the presidential initiatives on cassava in Africa (Nigeria and Ghana) Assessing the role of key stakeholders in influencing policy processes in agriculture—the case of presidential initiative on cassava in Nigeria			Identify the social, economic, institutional, and infrastructural factors conditioning the creation and maintenance of assets for the rural poor through new agricultural technologies
ILRI	Various stages of work on facilitating policy change that ensures domestic and international market access for smallholder livestock producers and informal market participants	Focus on hubs or clusters of service provision Examination of alternative Business Development Services provision models	Examination of roles of collective action in provision of food safety in developing country urban areas, with a focus on the roles and potential benefits available to women	Development of methods for measurement of performance of livestock as assets, generators of farm and nonfarm benefits, and mitigators of vulnerability to sensitive populations Examination of intrahousehold asset ownership and control, and associated income flows Development of insurance products for livestock keepers
IRRI				
World Agroforestry Center			Collective action, property rights, and market access	

CGIAR Center	Theme 2. Inclusive Governance and Institutions			
	Subtheme 2.1 Policy Processes	Subtheme 2.2 Governance of Rural Services	Subtheme 2.3 Collective Action and Property Rights	Subtheme 2.4 Institutions to Strengthen the Assets of the Poor
WorldFish Center	Grounded analyses of policy reforms in fisheries and aquaculture and broader river basin/coastal zone management—what approaches work to enhance the value of research in policy decisions?	Alternative institutional arrangements for delivery of feed, seed, and technical advice for aquaculture development, including innovation in public- and private-sector roles Decentralization Farmers' empowerment: institutional innovations that improve the voice of small-scale fishers and aquaculture producers in policy decisions that affect them, including landless poor, women, and other frequently marginalized groups	Role of collective action in enabling community-based resource management, as well as cross-scale and intersectoral management of resource competition; comparative analysis of alternative tenure regimes in fisheries and aquaculture to increase livelihood outcomes and social–ecological resilience	Strategies to strengthen women's income, with associated reinvestment in children's education, nutrition, and health Links between resource tenure security and related asset building Gendered organization of labor in fisheries and aquaculture, including opportunities to enhance women's assets through on-farm aquaculture production and post-harvest processing and marketing

Annex 4—Involvement of CGIAR centers in CRP2 (cont'd)

(Theme 3)

CGIAR Center	Theme 3. Linking Small Producers to Markets
	Subtheme 3.1 Innovations Across the Value Chain, and Subtheme 3.2 Impact of Upgrading Value Chains
Africa Rice Center	Conduct value chain analyses on rice in Africa
Bioversity International	Enhancing the use of local agrobiodiversity/ NUS through simple production and technological solutions to overcome cultivation/postharvest bottlenecks Promoting the use of local agrobiodiversity/ NUS through GI systems Role of certification schemes in promoting the use of local agrobiodiversity Explore alternative market and nonmarket incentive mechanisms for promoting the conservation and sustainable use of currently threatened agrobiodiversity
CIAT	Business case for why buyers should work with small producers and how that might be achieved in Guatemala, Colombia, and the Dominican Republic Assess donor/public policies that support market linkages for their effects on competitiveness and poverty reduction in Colombia, Guatemala, and Dominican Republic Through case studies, identify underlying principles for sustained trading relationships between poor smallholders and large buyers and test them in Kenya, Ethiopia, and Ghana Pilot studies on Sub-Saharan market scenarios
CIP	Value-chain analysis of the organization and performance of output and input markets, and identification of institutional options, public investments, and enabling factors for enhancing market efficiency and pro-poor value Develop and promote tools and methodologies that enhance smallholder farmers' and traders' entrepreneurial, business, and market skills Validation of Participatory Market Chain Approach (PMCA)
ICARDA	
ICRISAT	Market baseline studies and value-chain analysis for dryland cereals and legumes in the semi-arid tropics Input and output market linkages for reducing transactions costs along the value chain for dryland commodities Protocols and platforms for innovations for sorghum, millet, groundnut, chickpea, and pigeonpea that reach the poor in a timely and relevant manner with important technical innovations and market information Analysis of institutional innovations (credit, information, technology, market, insurance, and other social safety nets, extensions, etc.) for reducing transaction costs along the value chain for dryland commodities in domestic and international markets
IFPRI	Improved understanding of long-term patterns, trends, and emerging issues in high-value agriculture, focusing either on one sector globally or all sectors in one country Improved understanding of the competitiveness of small farmers in high-value agriculture, including the degree of participation of small farmers, its contribution to income and employment, and the constraints to participation Implications of agribusiness development and retail transformation on smallholders and other poor households, and identification of best practices to maximize the pro-poor impact of these changes
IITA	Undertake value-chain analysis of the organization and performance of output and input markets, and identify institutional options, public investments, and enabling factors for enhancing market efficiency Develop and promote tools and methodologies that enhance smallholder farmers' and traders' entrepreneurial and business skills (participatory market research, business planning, etc.) Analyze the impact of processing activities along the value chain of commodities
ILRI	Design and establishment of innovation platforms linking smallholder producers with informal and formal market participants to facilitate innovation by way of vertical coordination Examination of alternative organizational models that provide product and input marketing service to smallholders and to informal sector actors Identification and trialing of interventions to enhance performance of value chains for remote, low value livestock products from remote/ poor areas
IRRI	
World Agroforestry Center	Developing and testing appraisal tools for value chain analysis, particularly for the benefit of poor and women farmers Determining key constraints and opportunities in selected product value chains and how stakeholders can address them Reviewing guidelines and manuals for value chain analysis to assist development practitioners to choose which are most appropriate for their needs and to assess gaps and limitations and how methodologies

CGIAR Center	Theme 3. Linking Small Producers to Markets
	Subtheme 3.1 Innovations Across the Value Chain, and Subtheme 3.2 Impact of Upgrading Value Chains
	can be improved to better address stakeholder needs. Designing and validating a methodology and related tools for a) assessing the poverty impacts of value chain development, focusing on the effects on household and enterprise assets, and b) understanding the conditions under which value chain development can most effectively contribute to poverty reduction Assessing how and under what circumstances standards and certification systems for production and marketing of agroforestry products help the poor and contribute to environmental services Assessing producers perceptions of and motivation for joining collective action initiatives in marketing and strategies to enhance their adoption Developing improved market information systems for neglected/and underutilized species Assessing alternative strategies for promoting private enterprises to profitably produce and market tree seed and seedlings. Assessing key marketing interventions and how should they be sequenced for helping farmers improve returns from agroforestry enterprises and improve smallholder competitiveness Assessing what improved methods and rapid appraisal tools can be used for analyzing subsector and value chains, particularly for the benefit of poor and women farmers Determining key constraints and opportunities in selected product value chains and how stakeholders can address them Improved market information systems for neglected/underused species
WorldFish Center	Value-chain analysis for fish products (output and input market components)—both domestic market systems (Africa, Asia), intraregional and high value products Analysis of changes in demand, market structure, and market access; analysis of collective action and institutional arrangements that improve pro-poor market access Analysis of economic multipliers in fish value chains

Annex 5— Alternative suppliers and comparative advantages of CRP2, by subtheme (in alphabetical order)

Subtheme #	Subtheme title	Alternative suppliers	CRP2 comparative advantage
1.1	Foresight and Strategic Scenarios	- Agricultural Model Intercomparison and Improvement Project (AgMIP) - Agropolis – Agrimonde - Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) - Center for Global Trade Analysis (GTAP) - Food and Agriculture Organization of the United Nations (FAO) - Food and Agricultural Policy Research Institute (FAPRI) - Global Conference on Agricultural Research for Development (GCARD) - International Institute for Applied Systems Analysis (IIASA) - Intergovernmental Group on Earth Observations (GEO) - GEO-V Joint Global Change Research Institute - Massachusetts Institute of Technology (MIT) - Netherlands Environmental Assessment Agency (PBL) - Potsdam Institute for Climate Change Research (PIK) - Organisation for Economic Co-operation and Development (OECD) - Wageningen University and Research Centre, LEI-WUR	- CRP2 provides an ongoing platform for foresight and scenarios research to frame and analyze foresight and allocation questions for the Consortium - The cross-CRP evaluation platform provided by CRP2 will serve as an "accounting framework" and reality check across the expectations of impact from individual CRPs - CRP2 institutions have collaborated for a long time directly as partners with most of the leading alternative suppliers shown here - CRP2 undertakes strategic planning and develops strategic directions that are understood and "owned" by the Consortium and its staff - CRP2 modeling tools are being regularly expanded and updated, have been used for many years by CG centers, and are contributing to other past and future global foresight exercises, including the Millennium Ecosystem Assessment, GEO-IV and GEO-V, the IAASTD, AGMIP, and others

Subtheme #	Subtheme title	Alternative suppliers	CRP2 comparative advantage
1.2	Macro-economic, Trade, and Investment Policies	- Alliance for a Green Revolution in Africa (AGRA) - Center of Social Research of National Academy of Sciences, Kyrgyzstan - Centre d'Études Prospectives et d'Information Internationales (CEPII), France - Centre for Advanced Training in Rural Development (SLE), Germany - Cornell University - Food and Agriculture Organization of the United Nations (FAO) - Institute of Development Studies (IDS), Sussex - International Institute for Applied Systems Analysis (IIASA) - Global Forum for Agricultural Research (GFAR) - Harvard University, John F. Kennedy School of Government - Heifer International - Humboldt University, Dept. of Agricultural Economics and Social Sciences, Germany - Institute for International Trade Negotiations (ICONE), Brazil - Iowa State University - LESESALQ/University of Sao Paolo - Makerere University - National Center for Agricultural Economics and Policy Research (NCAP), India - Norwegian Institute of International Affairs (NUPI) - Pakistan Agricultural Research Council (PARC) - Poverty and Economic Policy (PEP) - Purdue University - Thailand Development Research Institute (TDRI) - Universite Bordeaux Montesquieu, France - University of Adelaide - University of Benin - University of Ghana - University of Ibadan, Nigeria - World Bank	- Specific focus on how macroeconomic, trade, and investment policy interacts with food security, poverty reduction, and agricultural and rural development - Large datasets in global trade, economywide modeling, and public investment related to agriculture, rural development, and food security - Building of national capacity facilitated by large presence in and strong collaboration with national institutes in developing countries - Ongoing direct research input and policy advice provided to G20 and WTO platforms and negotiations - Existing collaboration with many of the alternative suppliers shown here

Subtheme #	Subtheme title	Alternative suppliers	CRP2 comparative advantage
1.3	Production and Technology Policies	- Universities in both developed and developing countries (US land grant universities, European agriculture universities, one to two universities in most of our partner countries in the developing world) - Agricultural economics research organizations in many developing countries (for example, CCAP in China, ICAR in India, ICASEPS in Indonesia,) - Private companies (seed technology, crop/livestock breeding companies, irrigation suppliers, etc.) - Specialized, technology-focused extension and environmental organizations (examples: AGRA, William Jefferson Clinton Foundation, Forest Trends, the Katoomba Group, M.S. Swaminathan Research Foundation, the National Research Conservation Center (NCRC-Ghana), Professional Assistance for Development Action (PRADAN, India), PROINPA, the World Land Trust, the World Wildlife Fund)	- Comprehensive and comparative assessment of policies across the globe (not restricted to a specific policy or geographic region) - Work in close partnership with national governments and national agricultural research organizations - Direct integration of CRP2 policy research with science research in the other CRPs and CGIAR institutes - Impartiality/neutrality of an international organization, compared to universities based in a specific country and/or the private sector - Multidisciplinary teams of economists, sociologists, crop scientists, and water resource engineers - Development of and access to household and village panel datasets in many countries

Subtheme #	Subtheme title	Alternative suppliers	CRP2 comparative advantage
1.4	Social Protection Policies	- Addis Ababa University - Bangladesh Institute of Development Studies (BIDS) - Bangladesh Rural Advancement Committee (BRAC) - Beijing Normal University - Catholic Overseas Development Agency (CAFOD) - CARE - Cambridge University - Centre for Development Research (ZEF), Bonn University - Centre for Policy Dialogue (Bangladesh) - Centre for the Study of African Economies(CSAE), University of Oxford - Christian Aid - Concern International - Cornell University - CRS - Dadimos - Economic and Policy Research Institute (EPRI), South Africa - Ethiopian Development Research Institute (EDRI) - Indian Institute of Technology (IIT), Mumbai - Institute of Development Studies (IDS), University of Sussex - Mercy Corps - M.S. Swaminathan Research Foundation (MSSRF) - Overseas Development Institute (ODI) - Oxfam - Oxford Policy Management (OPM) - Save the Children - Technoserve - University of California, Berkeley - World Vision	- Leveraging international experience to promote knowledge sharing across a wide variety of country contexts - Designing and implementing interventions using randomized or nonrandomized designs - Impact evaluation - Quantitative/statistical analysis - Policy dialogue and engagement - Long-term engagement with alternative suppliers

Subtheme #	Subtheme title	Alternative suppliers	CRP2 comparative advantage
2.1	Policy Processes	- Center for Development Research (ZEF), Bonn - Center for the Study of Law and Governance (CSLG), Jawaharlal Nehru University, India - Department of Political and Administrative Studies, University of Malawi - Harvard University, John F. Kennedy School of Government - Humboldt University, Berlin - Institute of Development Studies (IDS) - Institute of Environment and Economic Development (IEED) - Institute of Policy and Strategy for Agricultural and Rural Development (IPSARD), Vietnam - London School of Economics and Political Sciences - Overseas Development Institute (ODI) - Political Science Departments of Cornell and Texas A & M Universities - School of African and Oriental Studies (SOAS) - University of Hohenheim - University of Kiel - University of London	- Presence of research teams in partner countries, well-established close links to the policymaking process at the country level - Specific expertise and focus on policy processes related to agriculture, food security and rural development

Subtheme #	Subtheme title	Alternative suppliers	CRP2 comparative advantage
2.2	Governance of Rural Services	- Agricultural economics departments of US land grant universities - Center for Development Research (ZEF), Bonn - Center for the Study of Law and Governance (CSLG), Jawaharlal Nehru University, India - Centre for Study of Social Exclusion and Inclusive Policy (CSSEIP), India - Department of Political and Administrative Studies, University of Malawi - Humboldt University, Berlin - Institute for Social and Economic Change (ISEC), Bangalore - Institute of Development Studies (IDS) - Institute of Environment and Economic Development (IEED) - Institute of Local Government Studies (ILGS), Ghana - Institute of Policy and Strategy for Agricultural and Rural Development (IPSARD), Vietnam - Institute of Statistical, Social and Economic Research (ISSER), Ghana - National Center for Agricultural Economics and Policy Research (NCAP), India - Overseas Development Institute (ODI) - Pakistan Agricultural Research Council (PARC) - School of African and Oriental Studies (SOAS) - Tata Institute of Social Sciences (TISS), Mumbai, India - University of Hohenheim - University of Kiel - University of London	- Research closely links to the policymaking at the country level in rural service provisions - Specific focus on the governance of rural services - Presence of research teams in partner countries - Well-established links to public sector and civil society organizations that provide respective services at the country level - Close links to agencies funding rural services - Close collaborations with both alternative supplies of such research and demand for it

Subtheme #	Subtheme title	Alternative suppliers	CRP2 comparative advantage
2.3	Collective Action and Property Rights	- Arizona State University - Associates for Rural Development - Centre de coopération internationale en recherche agronomique pour le développement (CIRAD) - Property Rights Group at Norwegian University of Life Sciences, Institute for Poverty, Land and Agrarian Studies - University of Western Cape - Workshop on Political Theory and Policy Analysis, Indiana University	- CAPRi program has built strong reputation for bringing together collective action and property rights research of high caliber - Conceptual frameworks and application of best practice methods - Close collaboration with alternative suppliers - Ability to link theory and research to practical applications - Strong networks with NGOs and policy agencies (governmental and international) to ensure application of research findings
2.4	Institutions to Strengthen the Assets of the Poor	- Assets and Market Access CRSP - BRAC Research and Evaluation Department - Center for Development Research (ZEF) - Centre for the Study of African Economies (CSAE), Oxford University - Duke University - Innovations for Poverty Action (IPA) - International Center for Research on Women (ICRW) - Landesa - Abdul Latif Jameel Poverty Action Lab (J-PAL) - University of California, Berkeley - University of California, Davis - Yale University	- Ability to work in a number of countries and regions on common themes to arrive at cross-regional/cultural perspective - Ability to consider a wide range of assets - Use of mixed qualitative and quantitative methods (including experimental and quasi-experimental methods) - Strong emphasis on gender and poverty reduction across all studies

Subtheme #	Subtheme title	Alternative suppliers	CRP2 comparative advantage
3.1	Innovations across the Value Chain	- ARD, World Bank - Brazilian Agricultural Research Corporation (Embrapa) - Economic Commission for Latin America and the Caribbean (CEPAL) - Centre for the Study of African Economies (CSAE) - Cornell University - Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH - Inter-American Institute for Cooperation on Agriculture (IICA) - Indonesian Center for Agriculture and Socioeconomic Policy Studies (ICASEPS) - Indonesian Center for Agricultural Policy and Agribusiness Studies (CAPAS) - Institute of Development Studies (IDS) - Katholieke Universiteit, Belgium - Michigan State University - Monash University's Centre for Retail Studies - Overseas Development Institute (ODI) - Oxford Policy Management (ODP) - Radboud University Nijmegen - United Nations Development Programme (UNDP) - University College London - University of Adelaide - University of Bonn's Foodnet - University of New South Wales - University of Oxford - University of Sussex - Wageningen University - World Food Program (WFP) Purchase for Progress	- CRP2 combines knowledge of technology and policy, and Theme 3 maximizes complementarity with Themes 1 and 2 - CRP2 plays the role of a platform to bring the technology improvements from other commodities by creating an overarching theoretical framework

Subtheme #	Subtheme title	Alternative suppliers	CRP2 comparative advantage
3.2	Impact of Upgrading Value Chains	- Abdul Latif Jameel Poverty Action Lab (J-Pal), Massachusetts Institute of Technology - Cambridge University - Centre for the Study of African Economies (CSAE) - Cornell University - Michigan State University - Institute of Development Studies (IDS) - International Growth Center (IGC) with Oxford University and the London School of Economics - Katholieke Universiteit, Belgium - Overseas Development Institute (ODI) - Oxford Policy Management (OPM) - Radboud University Nijmegen - University College London - University of California, Berkeley - University of New South Wales - University of Oxford - University of Sussex - Wageningen University - World Bank	- CRP2 brings together a unifying theory and performance metrics that enable consistent data collection and analysis - It brings together state-of-the-art tools on impact evaluation to identify best practices in upgrading value chains across different commodities - It offers a unique platform for research activities and communication of results

Annex 6—Partners of CGIAR centers participating in CRP2

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
3.2	A2N: Africa 2000 Network						X							X	Uganda			X	
1.3	Abeokuta University of Agriculture		X											X	Nigeria	X			
3.1	Access for Development						X							X	India		X	X	
1.1, 3.1	Acharya N.G. Ranga Agricultural University (ANGRAU)		X											X	India	X		X	
1.4	Action Contre la Faim (ACF)						X					X			Zimbabwe			X	
1.4, 2.4	Addis Ababa University		X											X	Ethiopia	X			
3.2	Africa College of University of Leeds, UK		X									X			East and West Africa	X			
1.3	African Forum for Agricultural Advisory					X							X		Africa	X	X	X	

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Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Services																		
1.3	African Biotechnology Stakeholders Forum						X							X	Kenya		X	X	
ALL	African Development Bank							X					X	X			X		
1.3	African Network for Agriculture, Agroforestry and Natural Resource Management Education (ANAFE)					X							X		Africa			X	
2.3	African Union					X							X		Africa		X	X	
1.2	African Union (AU)				X								X		Ethiopia	X	X	X	
1.1, 1.2, 3.1	African Union Inter-African Bureau for Animal Resources (AU-				X							X			Pan-African	X	X	X	

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	IBAR)																		
1.3	Agency for Trade Research and Development (TREDA)				X									X	Indonesia	X	X		
3.1	AGEXPORT										X		X		Central America			X	
1.3	Agricultural Research and Development Institute (ARDI)	X												X	Tanzania		X		
2.4	Agricultural Research Center			X										X	Egypt				
1.3	Agricultural Research Corporation (ARC)	X		X										X	Sudan	X			
1.3	Agricultural Research Council of Nigeria (ARCN)	X		X										X	Nigeria	X			
2.3,	Agricultural	X												X	Mozambi	X		X	

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
3.1	Research Institute of Mozambique (IIAM)														que				
1.3	Agro-biodiversity Conservation Project			X											X	Nepal		X	X	
3.2	Alianza de Aprendizaje	X												X	Peru	X	X		
2.4	ALINe (based at IDS)										X	X		X			X	X	
1.1, 3.1	All India Coordinated Pearl Millet Improvement Project (AICMIP)	X												X	India	X		X	
1.2, 1.3, 2.2, 3.1	Alliance for a Green Revolution in Africa (AGRA)					X						X	X		Pan-African		X	X	
1.1, 3.1	Amhara Regional Agricultural Research			X										X	Ethiopia	X	X	X	

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Institute (ARARI)																		
3.1	Andhra Pradesh Federation of Farmers Association (APFFA)					X									India	X		X	
2.1, 3.2	ASARECA: Association for Strengthening Agricultural Research in Eastern and Central Africa					X							X		East Africa	X	X	X	
3.1	Ashoka Trust for Research in Ecology and the Environment (ATREE)						X						X	X	India	X	X	X	
2.1	Asociación de Investigación y Estudios Sociales (ASIES)													X	Guatemala	X			
1.3	Asociación de Productores de Oleaginosas y								X					X	Bolivia		X	X	

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Trigo (ANAPO)																		
3.1	Assessment Institute for Agricultural Technology, East Java	X		X	X									X	Indonesia	X	X	X	
3.1	Assessment Institute for Agricultural Technology, Nakhonsithammarat	X	X	X	X									X	Thailand	X			
3.1	Assessment Institute for Agricultural Technology, South Kalimantan	X		X	X									X	Indonesia	X	X	X	
2.4	Assets and Market Access (CRSP)		X									X	X			X			
1.2, 1.3, 2.2, 3.1	Association for Strengthening Agricultural Research in E. and C. Africa					X							X	X		X	X	X	

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	(ASARECA)																		
1.1, 3.2	Association pour le Développement des Activités de Production et de Formation (ADAF/Galle)						X					X			Burkina Faso			X	
3.2	AT- Uganda						X							X	Uganda			X	
1.2	Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO)			X	X								X	X		X		X	
2.2, 3.1	Australian Council for International Agricultural Research (ACIAR)				X								X	X		X		X	
2.3, 2.4, 3.1	Austrian University of Natural		X											X		X		X	

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Resources and Life Science (BOKU)																		
3.1	BAIF Development Research Foundation						X						X	X	India		X		
1.4	Bangladesh Institute of Development Studies			X										X	Bangladesh	X			
2.2	Bangladesh Rural Advancement Committee						X							X	Bangladesh	X	X	X	
1.3	Beijing Normal University		X											X	China	X			
3.2	Belgian Technical Cooperation							X					X		Peru		X		
2.3, 2.4, 3.1	Bharatiya Agro Industries Foundation (BAIF)						X							X	India		X		

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.2, 1.3, 2.4, 3.1	Bill & Melinda Gates Foundation (BMGF)										X	X	X	X			X	X	
1.3	Biodiversity Conservation Agency-National Environment Agency				X									X	Vietnam	X			
1.3	Biotech Consortium India Limited (BCIL)						X							X	India				
1.3	Biotechnology Coalition of the Philippines										X			X	Philippines		X	X	
1.3	Biotechnology-Ecology Research and Outreach Consortium (BioEROC)										X			X	Malawi		X	X	
1.3	Bogor Agricultural University (IPB)		X											X	Indonesia	X			

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.1, 1.3	Botswana Institute for Development Policy Analysis (BIDPA)			X										X	Botswana				
3.1	Botswana Meat Corporation (BMC)										X			X	Botswana				
1.4, 2.4	BRAC						X							X	Bangladesh		X	X	
1.1, 1.3, 3.1, 3.2	Bunda College of Agriculture		X											X	Malawi	X		X	
1.3	Bureau of Plant Industry, Department of Agriculture										X			X	Philippines		X		
2.4	Cairo University		X											X	Egypt	X			
1.4, 2.3	Cambridge University		X									X			UK	X		X	
ALL	Canadian International Development							X					X	X			X		

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Agency (CIDA)																		
ALL	Canadian International Development Research Centre (IDRC)							X						X		X		X	
2.2, 2.4, 3.1	CARE USA						X					X	X	X			X	X	
1.4	Catholic Agency For Overseas Development (CAFOD)							X							UK			X	
1.4, 3.1, 3.2	Catholic Relief Services (CRS)						X					X			USA		X	X	
2.3	Catholic University of Louvain		X									X			Belgium	X	X	X	
3.1, 3.2	CATIE			X											Latin America	X		X	
1.3	Center for Chinese Agricultural	X	X										X			X	X		

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Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Policy (CAAP)																		
2.4, 3.1	Center for Development Research (ZEF) Bonn University		X	X								X			Germany	X			
1.3	Center for Information on Low External Input and Sustainable Agriculture (ILEIA)						X					X						X	
1.2	Center for Policy Dialogue						X							X	Banglades h	X		X	
2.1	Center for the Study of Law and Governance, Jawaharlal Nehru University and Indian Institute of Dalit Studies		X											X	India	X			
2.1	Center of Social Research of National Academy of			X										X	Kyrgyzsta n	X			

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Sciences																		
3.1	Central Institute for Subtropical Horticulture (CISH)			X	X									X	India	X		X	
2.3	Central Potato Research Institute			X											India	X			
1.4, 3.1	Central Research Institute for Dryland Agriculture (CRIDA)			X										X	India	X	X	X	
2.3	Central Tuber Crops Research Institute			X										X	India	X			
1.2	Centre d'Études Prospectives et d'Information Internationales (CEPII)				X									X	France	X			
1.2	Centre for Advanced Training in							X							East and Southern			X	

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Rural Development, SLE, Germany														Africa				
1.3	Centre for Agrarian Systems Research and Development (CASRAD)				X									X	Vietnam	X	X		
3.1	Centre for Agricultural Policy Consulting (CAP)										X			X	Vietnam	X	X	X	
2.3	Centre for Pacific Crops and Trees, Secretariat of the Pacific Community (SPC)			X									X		Fiji	X	X	X	
1.1, 1.4	Centre for Policy Dialogue (CPD)						X							X	Bangladesh	X			
2.4	Centre for the Study of African Economies,		X											X	Africa	X			

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Oxford University																		
1.3	Centre National de la Recherche Appliquée du Développement Rural (FOFIFA)	X		X										X	Madagascar	X			
1.3	Centre National de l'Élevage et de Recherches Vétérinaires (CNERV)	X		X										X	Mauritania	X			
1.3	Centre National de Recherche Agronomique (CNRA)	X		X										X	Côte d'Ivoire	X			
1.3	Centro de Investigación de Recursos Naturales y de Medio Ambiente (CIRNMA)						X						X		Americas			X	
2.3	Centro de Investigación de Recursos Naturales y	X		X										X	Peru	X			

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Medio Ambiente																		
3.1	Centro de Investigaciones Fitogenéticas de Pairumani			X										X	Bolivia	X	X		
1.3	Centro Regional de Investigación en Biodiversidad Andina-CRIBA		X											X	Peru		X		
3.1	Chanthaburi Horticultural Research Center Khlung District	X		X	X									X	Thailand	X			
1.4	Chiang Mai Field Crops Research Station, Department of Agriculture		X											X	Thailand	X		X	
3.1	Chiang Mai Royal Agricultural Research	X		X	X									X	Thailand	X			

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Centre																		
1.3, 3.2	Chinese Academy of Agricultural Sciences		X	X										X	China	X	X	X	
1.4	Christian AID							X				X			Zimbabwe			X	
1.3, 2.3	CIRAD			X								X			Sub-Saharan Africa; Americas	X	X	X	
3.1	College of Forestry, Sirsi		X											X	India	X		X	
1.3, 1.4, 3.1	Comités de Investigación Agrícola Local (Committees for Local Agricultural Investigation)							X						X	Bolivia		X	X	
1.3	Committee on Sustainability Assessment										X	X				X		X	
1.2,	Common Market of					X							X			X	X	X	

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.3	Eastern and Southern Africa (COMESA)																		
1.3	CONALGODON (National Federation of Cotton Producers)								X					X	Colombia		X		
1.4	Concern Worldwide							X				X			Zimbabwe				X
2.3	Congressional Hunger Center						X							X					
1.2	Conseil Général du Développement Agricole				X									X	Morocco		X		
1.3	Consortium pour la Recherche Economique et Sociale (CRES)			X										X	Senegal	X			
3.1	Consumer Association Penang	X			X		X				X			X	Malaysia	X	X	X	

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
2.4	Cooperative for American Relief Everywhere (CARE)						X					X		X	Bangladesh		X	X	
1.4	Cooperative for American Relief Everywhere (CARE)							X							Zimbabwe			X	
3.2	Cooperative for American Relief Everywhere (CARE)						X						X		Peru		X		
1.2	CORAF					X							X		Senegal	X		X	
ALL	Cornell University		X									X	X	X		X		X	
1.3	Corporación del Instituto Nacional de Investigación Agropecuaria - CORPOINIAP	X		X										X	Ecuador	X	X		
3.1	Costco									X		X			Africa / LAC			X	
1.4	Council for						X							X	Sri Lanka	X	X	X	

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Agricultural Research and Policy (CARP)																		
1.3, 1.4, 3.1	Crops for the Future (CFF)										X	X			Global			X	
3.2	CRS						X						X		Peru		X		
1.3	CSRI, Soil Research Institute	X												X	Ghana	X			
2.2	Daarut Tauhid Eco Pesantren						X							X	Indonesia			X	
1.4	Dadimos									X				X	Ethiopia	X			
2.4	Data Analysis and Technical Assistance Ltd.									X				X	Bangladesh	X			
1.3	Dean Faculty of Agriculture, National University of Rwanda		X											X	Rwanda	X			
2.4	Department for International							X									X		

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Development																		
1.3, 2.1, 2.2, 2.4, 3.1, 3.2	Department for International Development (DFID)							X				X	X	X			X	X	
1.4	Department for Social Protection				X									X	South Africa		X		
1.3	Department of Agricultural Economics, University of Ibadan		X											X	Nigeria	X			
1.3	Department of Agricultural Research (DAR)	X		X										X	Botswana	X			
3.1	Department of Agricultural Research for Development (DAR4D)	X												X	Zimbabwe		X	X	
1.3, 3.1	Department of Agricultural Research				X									X	Malawi	X			

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Services																		
3.1	Department of Agriculture	X			X									X	Thailand	X			
3.1	Department of Agriculture - Central Luzon							X							Philippines		X	X	
3.1	Department of Agriculture Sarawak	X			X									X	Malaysia	X	X		
2.3	Department of Agronomy and Plant Genetics, Hassan II Institute of Agronomy and Veterinary Medicine		X									X			Morocco	X	X	X	
3.1	Department of Forestry Sabah	X			X									X	Malaysia	X	X		
3.1	Department of Livestock Production and Development (DLPD)	X												X	Zimbabwe		X	X	

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.3	Department of Public Health				X									X	Kenya	X			
1.1, 3.1	Department of Research & Development (DRD)			X										X	Tanzania	X			
1.3	Department of Veterinary Services				X									X	Kenya	X			
2.3	Department of Land Economy, University of Cambridge		X											X	UK	X		X	
1.4	DFID							X				X			UK		X	X	
1.1, 3.2	Direction Départementale de l'Agriculture (DDA)				X									X	Niger	X		X	
1.3	Directorat General des Recherches Scientifiques et Techniques (DGRST)	X		X										X	Republic of Congo	X			

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.3	Directorate of Research and Development (DRD)	X		X										X	Tanzania	X			
1.3	Donald Danforth Plant Science Center (DDPSC)										X			X	USA	X	X	X	
2.4	Duke University		X									X				X			
2.1	East African Community (EAC)					X								X	East Africa		X		
1.1, 3.1	East African Grain Council (EAGC)						X							X		X		X	
1.3	Ecole Nationale de l'Agriculture		X											X	Morocco	X			
1.4	Economic and Policy Research Institute			X										X	South Africa	X		X	
1.3	Economic and Social Research Foundation (ESRF)						X							X	Tanzania	X	X		

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.2	Economic Community of West African States (ECOWAS): Agricultural Policy of the Economic Community of West African States (ECOWAP)					X							X		Nigeria	X	X	X	
1.3	Ecosystems Research and Development Bureau, Department of Environment and Natural Resources				X									X	Philippines	X	X		
3.1	Eco-Watch						X							X	India		X		
2.1	Egerton University		X											X	Kenya	X			
1.1	Enquête Nationale sur le Budget et la Consommation des Ménages				X									X	Niger	X	X		

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	(ENBC-INS)																		
1.3	Environmental Affairs Department										X			X	Malawi		X		
1.3	Environmental Economics Policy Forum in Ethiopia (EEPFE)		X											X	Ethiopia	X	X		
2.3	Environmental Law Institute										X	X							
1.3	Escuela Agrícola Panamericana, Zamorano University (EAP)		X											X	Honduras	X	X		
1.3	Ethiopian Agricultural Research and Extension Organization			X										X	Ethiopia	X			
1.4	Ethiopian Development Research			X										X	Ethiopia		X	X	

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Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Institute																		
1.1, 3.1, ALL	Ethiopian Institute of Agricultural Research (EIAR)	X		X										X	Ethiopia	X			
ALL	European Commission				X							X	X	X			X	X	
1.3	Farm and Infrastructure Foundation	X		X										X	Nigeria	X			
3.2	FAUEX: Federation of Associations of Ugandan Exporters									X				X	Uganda				
1.3	Federal University of Santa Catarina		X											X	Brazil			X	
1.1, 3.2	Federation Nationale des Groupements Naam (FNGN)						X							X	Burkina Faso			X	
2.2	Field Alliance Indonesia						X		X					X	Indonesia		X	X	

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
3.1	Field Crops Research Institute (FCRI)			X											Thailand	X	X		
3.1	Field Indonesia						X							X	Indonesia		X		
3.2	Flona Commodities Ltd.									X				X	Uganda				Private company
1.3	Food and Agricultural Research Council (FARC)	X		X										X	Mauritius	X			
1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2	Food and Agriculture Organisation of the UN (FAO)							X				X	X	X			X	X	
1.4	Food Security and Coordination Directorate				X					X				X	Ethiopia		X		
1.3, ALL	Food, Agriculture and Natural					X								X	Southern and Eastern	X	X	X	

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Resources Policy Analysis Network (FANRPAN)														Africa				
2.4	Ford Foundation						X						X		Africa		X		
3.1, 3.2	Ford Foundation						X						X		Andean Region			X	
ALL	Forum for Agricultural Research in Africa, (FARA)					X							X	X	Pan-African	X		X	
2.3	Foundation for Ecological Security						X							X	India	X	X	X	
2.1	Fundación Centroamericana de Desarrollo (FUNCEDE)						X							X	Guatemala	X			
3.2	Fundación Marco						X							X	Ecuador		X		
1.3, 1.4, 2.3,	Fundación Promoción e Investigación						X							X	Bolivia	X	X	X	

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
2.4, 3.1	de Productos Andinos (PROINPA)																		
3.2	Fundación Valle										X			X	Bolivia		X	X	
1.3, 1.4, 3.1	G.B. Pant University of Agriculture and Technology		X											X	India	X		X	
ALL	German Academic Exchange Service (DAAD)										X		X			X		X	
3.2	GIZ							X					X		Peru			X	
ALL	Global Forum for Agricultural Research (GFAR)										X	X					X	X	Convening
3.1	Green Mountain Coffee Roasters									X				X	Central America		X	X	
1.3	Grupo de Análisis para el Desarrollo (GRADE)			X											Peru	X	X		

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		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.4	Guizhou Academy of Agricultural Sciences (GAAS)		X											X	People's Republic of China	X		X	
1.1, 3.1	Gujarat Agricultural University (GAU)		X											X	India	X		X	
1.2, 2.1, 2.2, 3.1	Guwahati Milk Vendors' Association										X			X	Assam, India		X		
3.1	Hannover University, Institute for Environmental Economics and World Trade		X									X			Germany	X			
1.1, 3.1	Haramava University		X										X		Ethiopia				
2.1	Harvard University, John F. Kennedy School of Government		X									X				X			

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.1, 3.1	Haryana Agricultural University		X											X	India	X		X	
1.1, 3.1	Hawassa University		X											X		Ethiopia				
1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2	Heifer International						X							X				X	
2.4	Helen Keller International						X					X		X	Burkina Faso		X	X	
3.1	Hershey's									X			X		Africa			X	
3.1	Hohenheim University, Department of Agricultural Engineering in the Tropics and Subtropics		X									X				X			
2.1	Hohenheim University,		X									X				X			

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Division of Social and Institutional Change in Agricultural Development																		
3.1	HortiChain Indonesia						X	X			X			X	Indonesia		X		
2.1, 2.3	Humboldt University Berlin (Germany), Dept. of Agricultural Economics and Social Sciences		X									X				X		X	
3.2	IICA					X							X		Latin America & Caribbean		X		
3.1, 3.2	IIED			X									X		Africa	X	X	X	
3.2	INALPROCES									X				X	Ecuador				
1.3	Indian Agricultural Research	X												X	India	X	X		

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Institute																		
ALL	Indian Council of Agricultural Research (ICAR)	X												X	India	X		X	
3.1	Indian Institute of Chemical Technology (IICT)			X										X	India	X			
2.1	Indian Institute of Dalit Studies, New Delhi (IIDS)		X											X	India	X			
1.4, 2.3	Indian Institute of Technology, Mumbai			X										X	India	X		X	
1.3	Indian Statistical Institute				X									X	India			X	
2.3	Indiana University		X									X				X			
1.3	Indonesian Center for Agricultural Biotechnology and Genetic										X			X	Indonesia	X	X	X	

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Resources Research and Development (ICABIOGRAD)																		
1.3	Indonesian Center for Agriculture Socio Economic and Policy Studies (ICASEPS)		X											X	Indonesia	X	X		
3.1	Indonesian Centre for Horticulture Research and Development (ICHORD)	X		X	X									X	Indonesia	X	X	X	
3.1	Indonesian Citrus and Subtropic Horticulture Research Institute	X		X	X									X	Indonesia	X		X	
2.3	Indonesian Vegetable Research Institute			X										X	Indonesia	X			

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
3.2	INIAP			X										X	Ecuador	X		X	
1.1, 1.2, 1.3	Institut de Recherche Agricole pour le Développement (IRAD)	X												X	Cameroon	X			
1.3	Institut de Recherche Agronomique de Guinée (IRAG)	X		X										X	Guinea	X			
1.3	Institut de Recherches Agronomiques et Forestières (IRAF)	X		X										X	Gabon	X			
1.1, 1.3, 2.4, 3.1, 3.2	Institut d'Economie Rurale (IER)	X		X										X	Mali	X		X	
1.3	Institut des Sciences Agronomiques du Burundi (ISABU)	X		X										X	Burundi	X			

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.3	Institut des Sciences Agronomiques du Rwanda (ISAR)	X												X	Rwanda	X	X		
1.3	Institut National de la Recherche Agronomique	X												X	Morocco	X	X		
1.3	Institut National de l'Énvironnement et des Recherches Agricoles	X		X										X	Burkina Faso			X	
1.2	Institut National de Recherche Agronomique (INRA)			X										X	France	X			
1.3	Institut National de Recherches Agricoles	X		X										X	Benin	X		X	
1.1, 1.3,	Institut National de			X										X	Niger	X		X	

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
3.1, 3.2	Recherches Agronomiques du Niger (INRAN)																		
1.1, 3.1	Institut National de Statistique (INSTAT)				X									X	Mali	X	X	X	
1.3	Institut National des Recherches Agricoles du Bénin (INRAB)	X		X										X	Benin	X			
1.3	Institut National pour l'Etude et la Recherche Agronomique (INERA)	X		X										X	Democratic Republic of Congo				
1.1, 1.3, 3.2	Institut National pour l'Etude et la Recherche Agronomiques (INERA)	X		X										X	Burkina Faso	X			
1.3	Institut Sénégalais de			X										X	Senegal	X			

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Recherche Agricole (ISRA)																		
1.3	Institut Togolais de Recherche Agronomique (ITRA)	X		X										X	Togo	X			
2.3	Institute for Environmental Security										X	X			Netherlands				
3.1	Institute for Horticultural Research (IIHR)			X	X									X	India	X		X	
1.2	Institute for International Trade Negotiations (ICONE)						X							X	Brazil	X		X	
2.3	Institute for Poverty, Land and Agrarian Studies		X										X		Africa			X	
2.1	Institute for Social and Economic Change,			X										X	India	X			

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		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Bangalore																		
1.1, 3.1, 3.2	Institute of Agricultural Research (IAR)			X										X	Nigeria	X			
1.3, 1.4	Institute of Development Studies, University of Sussex		X	X								X				X	X	X	
2.1	Institute of Local Government Studies (ILGS), Ghana				X									X	Ghana		X		
1.3, 2.1, 2.2, 2.4, 3.1, 3.2	Institute of Policy and Strategy for Agricultural and Rural Development (IPSARD)	X												X	Vietnam	X		X	
1.3	Institute of Rural Economy (IER)	X		X										X	Mali	X			
1.3,	Institute of Statistical,	X		X											Ghana	X	X		

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
2.1	Social and Economic Research (ISSER)																		
1.3	Institute of Water Resources Planning (IWRP)	X		X										X	Vietnam	X			
1.3	Instituto de Investigação Agrária de Moçambique (IIAM)	X		X										X	Mozambique	X			
3.1	Instituto de Tecnología de Alimentos (ITA)			X										X	Bolivia		X	X	
1.3	Instituto Nacional Autónomo de Investigaciones Agropecuarias del Ecuador (INIAP)	X												X	Ecuador		X		
2.3, 3.1	Instituto Nacional de Innovacioin	X			X									X	Peru	X	X	X	

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Agraria (INIA)																		
1.4	Inter-American Development Bank							X				X					X	X	
3.2	Intercooperation							X						X	Peru		X	X	
2.3	International Association for Study of the Commons										X	X					X	X	
1.4	International Centre for Integrated Mountain Development (ICIMOD)						X							X	Nepal	X	X	X	
1.2	International Centre for Trade and Sustainable Development (ICTSD)						X					X						X	
1.4	International Cooperation Group Planning and Technical				X									X	Thailand		X	X	

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Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	division (ICGPTD)																		
1.3	International Development Enterprises (IDE)			X								X			USA	X	X		
1.1, 3.2	International Fertilizer Development Centre (IFDC)						X					X			Niger, Nigeria, Mali			X	
ALL	International Fund For Agricultural Development (IFAD)							X				X	X	X			X	X	
1.2	International Institute for Applied Systems Analysis (IIASA)			X								X				X			
2.3, 2.4	International Institute for Rural Reconstruction						X					X						X	
2.3	International						X					X		X	Rwanda,	X	X	X	

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Land Coalition														global				
1.3	International Life Science Institute Research Foundation-Center for Environmental and Risk Assessment (ILSI - CERA)										X	X			USA				
1.3	International Service for the Acquisition of Agri-biotech Applications (ISAAA)										X			X	Kenya		X	X	
1.3, 1.4, 3.1	International Treaty for PGRFA										X	X			Global		X		
1.2	Iowa State University		X											X	USA	X			
1.3	Iowa State University – Biosafety Institute for Genetically		X								X			X	USA	X	X	X	

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Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Modified Agricultural Products																		
1.3	IRD			X								X			France				
1.3, 3.1	Ireland AID							X						X			X		
1.3	ISAAA AfriCenter										X		X		Kenya		X	X	
3.1	Janaki Feeds									X					India			X	
ALL	Japan International Research Centre for Agricultural Sciences (JIRCAS)							X						X		X			
1.3	Jawaharlal Nehru University		X											X	India	X			
1.1	JIGAWA Agricultural and Rural Development Authority					X									Nigeria		X	X	

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	(KTARDA)																		
3.1	JK Agri-Genetics									X					India			X	
1.3	Kangwon National University		X											X	Korea			X	
1.1	KANO Agricultural and Rural Development Authority (KNARDA)					X									Nigeria		X	X	
1.3	Kasetsart University		X											X	Thailand			X	
1.1	KATSINA Agricultural and Rural Development Authority (KTARDA)					X									Nigeria		X	X	
1.3	Kenya Bureau of Standards										X			X	Kenya		X		
1.3	Kenya Plant Health										X			X	Kenya		X		

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Inspectorate Service																		
1.3	Kenya Tree Seed and Nursery Operators Association								X					X	Kenya		X		
ALL	Kenyan Agricultural Research Institute (KARI)	X												X	Kenya	X		X	
1.2, 2.1, 2.2, 3.1	Kenyan Association of Milk Traders										X			X	Kenya		X		
2.4	Kickstart International											X		X	Tanzania, Kenya		X		
3.1	Kraft									X			X		Africa			X	
3.1	Krishi Vigyan Kendra (KVK) Beed			X											India	X		X	
3.1	La Molina University		X											X	Peru				

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1.3, 1.4, 3.1	La Paz on Foot									X				X	Bolivia		X		
1.1, 3.1	Lake Chad Research Institute (LCRI)			X										X	Nigeria	X			
2.4	Landesa			X								X					X	X	
2.4	Land O'Lakes									X		X		X	Mozambique		X		
1.3	Leibniz Center for Agricultural Landscape Research (ZALF)			X								X			Germany	X			
3.1	Lembaga Pengembangan Masyarakat Pedesaan						X							X	Indonesia			X	
1.2	LES-ESALQ/University of Sao Paolo		X											X	Brazil	X			
1.3	LI-BIRD						X						X		Asia			X	
3.1	Live Trust						X							X	India		X		

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		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
2.4	Livestock CRSP		X									X	X			X			
1.3, 1.4, 2.3, 2.4, 3.1	Local Initiative for Biodiversity, Research and Development (LIBIRD)						X							X	Nepal	X	X	X	
1.1, 3.1	Mahatma Phule Krishi Vidyapeeth (MPKV)		X											X	India	X		X	
1.3, 2.1, 3.2	Makerere University		X											X	Uganda	X		X	
3.1	Malaysia Agricultural Research and Development Institute (MARDI),	X		X	X									X	Malaysia	X	X	X	
1.1, 3.1	Marathwada Agricultural University (MAU)		X											X	India	X		X	
1.1, 2.2,	McKinsey Consulting									X				X	Ethiopia	X		X	

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
3.1																			
3.1	Mercy Corps						X							X	Nepal	X		X	
1.3, 3.1	Michigan State University		X									X		X	USA	X		X	
2.4	Millennium Challenge Corporation							X									X		
1.3	Moi University		X											X	Kenya	X			
2.2	Molde University		X											X	Norway	X			
3.1	Mozambican Agricultural Research Institute (IIAM)			X										X	Mozambi que	X			
1.3, 1.4, 2.3, 2.4, 3.1	M.S. Swaminathan Research Foundation						X							X	India	X	X	X	
1.2, 2.1, 2.2,	Namibian National Farmers' Union								X					X	Namibia		X		

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
3.1																			
1.3	National Academy of Science and Technology										X			X	Philippines		X	X	
1.1, 2.1, 3.1, 3.2	National Agricultural Advisory Services (NAADS)	X											X		Uganda	X		X	
1.3	National Agricultural Research Council	X												X	Nepal	X			
3.2	National Agricultural Research Extension System (NARES)	X												X	Mali			X	
2.4	National Agricultural Research Institute	X		X										X	Morocco	X			
1.1,	National	X		X										X	Eritrea	X	X	X	

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.3, 3.1	Agricultural Research Institute (NARI)																		
1.3	National Agricultural Research Institute (NARI)	X		X										X	Gambia	X			
1.1, 1.3, 3.1	National Agricultural Research Organisation (NARO)	X		X										X	Uganda	X	X	X	
1.3	National Biosafety Committee										X			X	Nigeria		X		
1.3	National Biosafety Committee										X			X	Uganda		X		
1.3	National Biosafety Regulatory Committee										X			X	Malawi		X		
1.3	National Biotechnology Development										X			X	Nigeria		X	X	

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Agency																		
1.1, 1.2, 1.3, 3.1	National Bureau of Statistics				X									X			X		
1.1, 1.3, 2.1, 3.1	National Center for Agricultural Economics and Policy Research (NCAP)			X										X	India	X	X	X	
ALL	National Commodity Boards and Authorities										X			X			X		
1.3	National Council of Applied Economic Research (NCAER)	X		X										X	India	X	X		
1.3	National Council on Science and Technology										X			X	Kenya		X	X	
1.3	National Environment										X			X	Kenya		X		

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Management Authority																		
1.3	National Fadama Development Office (NFDO)				X										Nigeria	X	X		
2.3	National Genebank of Kenya, Kenya Agricultural Research Institute (KARI)		X											X	Kenya	X	X	X	
1.3	National Institute for Agricultural Research										X			X	Mozambique		X		
3.1	National Institute of Animal Husbandry			X												X		X	
ALL	National Ministries resp. for Agriculture and Livestock				X									X			X		
ALL	National Ministries resp.				X									X			X		

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	for Environment and Nat Resource Management																		
ALL	National Ministries resp. for Nutrition and Public Health				X									X			X		
3.1	National Research Centre for Citrus (NRCC)			X	X									X	India	X		X	
3.1	National Research Centre for Sorghum (NRCS)			X										X	India	X		X	
1.1	National Research Centre for Sorghum (NRCS), changed to Directorate of Sorghum Research (DSR)			X										X	India	X		X	

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
												Category			Geographical level			Type of partner	
3.1	National Research Centre on Litchi (NRCL)			X	X									X	India	X		X	
1.3	National Research Council										X			X	Malawi		X	X	
1.1, 3.2	National Smallholder Farmers Association of Malawi (NASFAM)								X						Malawi			X	
1.3	National University of Zambia		X											X	Zambia	X		X	
1.3	Nepal Agricultural Research Council (NARC)	X		X										X	Nepal	X			
ALL	Netherlands Development Organisation - SNV				X									X			X		
2.3	Noragric		X									X			Ghana,	X		X	

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Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
															Ethiopia				
1.1, 1.2, 1.3, 3.1	Norwegian Institute of International Affairs			X									X	X		X		X	
1.1, 1.2, 1.3, 3.1	Norwegian School of Veterinary Sciences		X											X		X		X	
1.3	Novus International									X		X			USA	X	X		
1.4	Nyala Insurance Company									X				X	Ethiopia				
1.3	Obafemi Awolowo University of Ife		X											X	Nigeria	X			
3.2	OFIAGRO										X			X	Ecuador		X		
1.2, 2.2, 2.4, 3.1, 3.2	OPEC Fund for International Development					X						X	X	X			X		

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.3, 2.4	Oxfam America						X						X		USA			X	
3.1, 3.2	Oxfam Great Britain						X					X					X	X	
1.4, 2.3	Oxford University		X									X			UK	X		X	
1.3, 1.4, 2.1	Pakistan Agricultural Research Council (PARC)	X		X										X	Pakistan	X	X	X	
1.2	Pakistan Institute for Trade and Development (PITAD)				X									X	Pakistan	X	X		
3.2	Papa Andina Initiatives									X					Peru				Corporate Social Responsibility
3.2	Pepsico Frito-Lay									X					Peru				Corporate Social Responsibility
1.3	Pest Control										X			X	Kenya		X		

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Products Board																		
1.3	Philippine Council for Agriculture, Forestry, and Natural Research (PCARRD)										X			X	Philippines		X	X	
3.1	Philippine Rootcrops Research and Training Center			X											Philippines	X		X	
1.3	Philippines Council for Advanced Science and Technology Research and Development (PCASTRD)										X			X	Philippines		X	X	
2.3	Philippines Department of Agriculture - Policy Research Service				X									X	Philippines	X	X	X	
1.2	Poverty and Economic			X								X							

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Policy (PEP)																		
1.4, 2.4, 3.1. 3.2	Practical Action						X							X			X	X	
1.4, 2.4, 3.1	PRADAN						X							X	India		X	X	
1.3	Programme d'Actions Communautaires (PAC)							X							Niger		X		
1.3, 3.2	PROINPA Foundation									X				X	Bolivia		X	X	
2.3	Promoción y Investigación de Productos Andinos	X		X									X			X			
3.1	PT Bimandiri									X					Indonesia			X	
1.1, 3.1	Punjab Rao Deshmukh Krishi Vishwavidyalaya (PDKV)		X											X	India	X		X	

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		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.3, 3.1	Purdue University		X									X		X	USA	X		X	
3.1	Pusat Pembangunan Komoditi, Kuala Kedah, Kedah	X			X									X	Malaysia	X			
3.1	Pusat Pembangunan Komoditi, Perak	X			X									X	Malaysia	X			
3.1	Rainforest Alliance						X					X			Africa / LAC		X	X	
1.1, 3.1	Rajasthan Agricultural University (RAU)		X											X	India	X		X	
2.3	Reading University		X												UK	X	X	X	
1.3	Regional Agricultural and Environment Initiatives Network-Africa (RAEIN-Africa)					X							X		South Africa	X	X	X	
1.3	Research and					X							X		India	X			

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Information System for Developing Countries																		
3.2	Research Institute of Organic Agriculture (FIBL)										X	X					X	X	
1.2	Research on Poverty Alleviation (REPOA)						X							X	Tanzania	X			
3.1, 3.2	RIMISP					X							X			X	X	X	
3.1	Rusni Distilleries									X				X	India	X			
1.1, 1.3	Rutgers University		X											X	USA			X	
1.4	SADC							X				X					X	X	
2.2	Sapang Multipurpose Cooperative								X					X	Philippines			X	

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		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.1, 3.2	Sasakawa African Association				X							X			Mali			X	
1.4	Save the Children											X			UK			X	
1.3	Science and Technology Policy Research Institute (STREPRI)	X		X										X	Ghana	X			
1.3	Science Foundation for Livelihoods and Development (Scifode)			X	X										X	Uganda			X	
1.3	Secretaria de Agricultura y Ganaderia (SAG)					X									X	Honduras				
2.3	Secretariat of the FAO CGRFA				X							X			Italy		X	X	
2.3	Secretariat of the International Treaty				X							X			Italy		X	X	

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Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.3	Secretariat of the Pacific Community					X							X		Pacific Community			X	
1.1, 3.2	Selian Agricultural Research Institute			X										X	Tanzania	X		X	
3.2	SEMWANGA CENTER									X				X	Uganda	X			
3.1	Sichuan Academy of Agricultural Sciences			X										X	China	X			
1.3	Sierra Leone Agricultural Research Institute (SLARI)	X		X										X	Sierra Leone	X			
ALL	Sir Ratan Tata Trust						X							X	India		X		
3.1	Sisaket Horticultural Research Center (SHRC)	X		X	X									X	Thailand	X			

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		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
3.2	SNV							X					X		Peru		X		
1.1	SocioConsult							X						X	Bangladesh	X			
ALL	Sokoine University Agriculture		X											X	Tanzania	X		X	
1.3	Soluciones Practicas / ITDG-Peru							X						X	Peru		X		
3.1	Sorghum Research Institute in Liaoning Academy of Agricultural Sciences, Shenyang		X												People's Republic of China	X			
1.2	Southern African Development Community (SADC): Regional Development Plan (RIDSP)				X								X		Botswana	X	X	X	

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.3	Southern Institute of Water Resources Planning (SIWRP)	X		X										X	Vietnam	X			
1.3	Sri Lanka Council for Agricultural Research Policy (SLCARP)	X		X										X	Sri Lanka	X			
3.1	Sri Venkateshwara Veterinary University (SVVU)		X											X	India	X			
1.3	Stanford University		X									X			USA	X			
3.1	Starbucks									X			X		LAC			X	
2.1	State Administrative Training Institutes and Rural Development Institutes				X									X	India		X		

Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.3	Sub-institute of Hydrometeorology of South Viet Nam (SiHymete)	X		X										X	Vietnam	X			
1.3	Sub-Saharan Africa Challenge Program												X						
3.2	Sulma Foods									X				X	Uganda				Private export company, with an outgrowers scheme
3.1, 3.2	Sustainable Food Lab										X	X			Africa / LAC		X	X	
ALL	Swedish International Development Agency (SIDA)							X					X	X	E Africa		X		
ALL	Swedish University of Agricultural Sciences (SLU)		X											X	E Africa	X			

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		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
3.2	Swiss Contact										X		X		Peru		X	X	
3.2	Swiss Contact (Foundation)										X			X	Bolivia		X	X	
3.1	Swisscontact						X							X	Central America		X	X	
1.1, 3.1	Syngenta Foundation						X					X			Switzerland	X			
3.1	Sysco Food									X				X	LAC / GT, DR		X	X	
1.1, 3.1	Tamilnadu Agricultural University (TNAU)		X											X	India	X		X	
2.3	Tarlac College of Agriculture		X												Philippines	x		X	
3.1	Tata Chemicals Limited (TCL)									X				X	India	X			
2.1	Tata Institute of Social Sciences (TISS), Mumbai		X											X	India	X			
1.4, 2.4,	Technoserve						X							X			X		

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Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
					Category								Geographical level				Type of partner		
3.1																			
ALL	Texas A & M University		X										X	X		X	X	X	
3.1	Trang Horticultural Research Centre, Trang	X		X	X									X	Thailand	X			
1.4	Transparency International						X					X			Sri Lanka	X		X	
1.3	Tribhuvan University		X											X	Nepal			X	
2.3	Tropenbos International							X				X			Netherlands	X			
1.3	Tsinghua University		X											X	China	X			
3.1	Twantoh Mixed Farming Association							X						X	Cameroon		X		
1.3	Uganda Bureau of Standards										X			X	Uganda		X		
1.3	Uganda National			X	X									X	Uganda		X		

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	Council on Science and Technology (NCST)																		
3.2	Uganda National Farmers' Federation (UNFFE)								X					X	Uganda			X	
3.2	Ugandan National Bureau of Standards (UNBS)				X									X	Uganda		X		
1.1, 3.1	Ukiriguru Research Institute (URI)			X										X	Tanzania	X			
1.3	UN University		X									X			Japan		X	X	
2.3	UNHabitat							X				X					X	X	
3.1, 3.2	Unilever									X		X					X	X	
1.3	Unión De Organizaciones Campesinas Indígenas De								X					X	Ecuador		X		

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		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Cotacachi-UNORCAC																		
ALL	United States Agency for International Development (USAID)							X					X	X			X		
1.3	Universidad de los Andes		X											X	Colombia			X	
1.3	Universidad de Talca		X											X	Chile	X			
1.3, 1.4, 3.1	Universidad Mayor de San Andres (UMSA)		X											X	Bolivia	X		X	
1.3	Universidad Nacional (Colombia)		X											X	Colombia			X	
2.3	Universidad Nacional Autónoma de México		X										X		Latin America			X	
2.3	Universitas Papua	X	X											X	Indonesia	X		X	

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Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
		Category										**Geographical level**				**Type of partner**			
1.2	Universite Bordeaux Montesquieu		X											X	France	X			
1.2, 1.1, 1.3	Université de Yaoundé I, Dep. d'Anthropologie		X											X	Cameroon	X			
1.3	Universiti Kebangsaan Malaysia		X											X	Malaysia			X	
1.3	Universiti Putra Malaysia		X											X	Malaysia			X	
3.2	University of Adelaide		X										X		Australia	X			
1.1, 3.1	University of Agricultural Science (UAS), India		X											X	India	X		X	
1.3	University of Ateneo, School of Government		X											X	Philippines			X	
1.3, 1.4, 3.1	University of Bangalore		X											X	India	X		X	

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2.1	University of Benin		X											X	Nigeria	X			
1.3	University of Calabar		X												Nigeria	X			
1.3	University of California, Berkeley		X									X			USA	X			
1.3	University of Copenhagen		X											X	Denmark			X	
1.3, 1.4	University of Dhaka		X											X	Bangladesh	X			
1.3, 1.4, 3.1	University of Dharwad		X											X	India	X		X	
ALL	University of Edinburgh		X											X		X		X	
2.3	University of Eduardo Mondlane	X	X											X	Mozambique	X			
1.3, 2.1	University of Ghana		X											X	Ghana	X			

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Subtheme	Organization name	NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
1.3, 3.1	University of Ghent		X									X			Sub-Saharan Africa; Americas	X		X	
1.1	University of Gottingen		X									X			East Africa	X			
1.3	University of Hannover		X									X			Germany	X			
ALL	University of Hohenheim		X										X	X		X		X	
1.4, 2.3	University of Hyderabad		X											X	India	X		X	
1.2	University of Ibadan		X											X	Nigeria	X			
1.3	University of Illinois (UIUC)		X									X			USA	X			
2.1	University of Kiel (Germany), Agricultural Policy Division		X									X				X			
1.3	University of Kinshasa		X											X	Democratic Republic	X		X	

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		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
															of Congo				
2.1	University of Leuven, Centre for Institutions & Economic Performance (LICOS)		X									X				X			
1.3	University of Maiduguri		X											X	Nigeria	X			
2.1, 3.1	University of Malawi		X											X	Malawi	X			
1.3, 2.3	University of Malaya		X										X		Malaysia	X	X	X	
1.3	University of Minnesota										X			X	USA		X		
1.3	University of Montpellier		X									X						X	
ALL	University of Nairobi		X										X	X	Kenya	X		X	
1.3	University of Nottingham - Crops for the Future		X										X		Asia, Pacific, Oceania			X	

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Research Center – Malaysia																		
1.3	University of Ouagadougou		X											X	Burkina Faso				
2.4	University of Pennsylvania		X									X			USA	X			
ALL	University of Pretoria		X										X		Southern Africa	X		X	
ALL	University of Queensland		X											X	Vietnam	X		X	
2.1	University of Texas at Austin		X										X		Africa	X			
ALL	University of the Free State		X										X		Southern Africa	X		X	
1.3, 2.3, 3.2	University of the Philippines at Los Baños		X										X		Philippines	X	X	X	
1.3	University of Tsukuba		X											X	Japan			X	
1.3	University of Zambia		X											X	Zambia	X			

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
2.3	Urban Landmark			X															
1.3	Value Addition through Genomics (VALGEN)			X										X	Canada	X			
1.4, 2.3	Vietnam Academy of Agricultural Sciences		X											X	Vietnam	X		X	
1.2	Virginia Tech.		X									X		X	USA	X		X	
3.2	Visayas State University		X											X	Philippines	X		X	
2.4	Wageningen International											X						X	
1.3	Wageningen UR Centre for Development Innovation		X	X								X			Netherlands			X	
1.3	Water Research Institute			X	X									X	Ghana	X			

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1.3	Water Resource Commission (WRC)				X									X	Ghana	X	X		
1.2	Watershed Organization Trust (WOTR)						X					X			India	X		X	
1.2, 2.2, 2.4, 3.1, 3.2	Wellcome Trust									X			X	X		X	X	X	
1.2	West African Council on Agricultural Research and Development (CORAF/WECARD)												X				X	X	
1.1, 3.2	Winrock International						X					X			Mali			X	
1.3, 1.4, 3.1	Women Associations (SHG)						X							X	India		X	X	

Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
3.2	Wong Supermarkets									X				X	Peru				Corporate Social Responsibility
ALL	World Bank							X				X	X	X			X		
1.1, 1.2, 1.3, 2.1, 2.4, 3.1, 3.2	World Organization for Animal Health (OIE)										X	X			Global		X		
1.4	World Vision						X							X	Zimbabwe			X	
1.3	Wuppertal Institute														Germany				
3.1	Wuppertal University, Department of Food Chemistry		X									X			Germany	X			
2.4	Yale University		X									X				X			
3.1	Zambia Agricultural Research	X												X	Zambia	X			

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Subtheme	Organization name	Category										Geographical level				Type of partner			
		NARES	University	Research institute	Government organization	Regional organization	NGO	Development agency	Farmers' organization	Private company	Other	International	Regional	National / Site	Name of region or country, if applicable	Research partners	Policy and practitioner partners	Knowledge-sharing partners	Other (Please specify)
	Institute																		
3.2	ZARDI-NARO			X										X	Uganda	X			

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