A Reflection on Impact and Influence of CGIAR Policy-Oriented Research

Standing Panel on Impact Assessment

June 2018

CGIAR Independent Science and Partnership Council

Cover image: Neil Palmer/IWMI

Renkow, M. 2018. *A Reflection on Impact and Influence of CGIAR Policy-Oriented Research*. Rome, Italy: Standing Panel on Impact Assessment (SPIA), CGIAR Independent Science and Partnership Council (ISPC). 34 pp

Table of Contents

Acronyms

ARC	AfricaRice
Bio	Bioversity International
CCAFS	Climate Change, Agriculture and Food Security (CRP)
CGE	Computable General Equilibrium
CIAT	International Center for Tropical Agriculture
CIFOR	Center for International Forestry Research
CIP	International Potato Center
CRP	CGIAR Research Program
J-PAL	Abdul Latif Jameel Poverty Action Lab
ICARDA	International Center for Agricultural Research for Dryland Areas
ICRAF	World Agroforestry Centre
ICRISAT	International Crops Research Institute for Semi-Arid Tropics
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
IPGs	International Public Goods
IRRI	International Rice Research Institute
ISPC	Independent Science and Partnership Council
IWMI	International Water Management Institute
NARS	National Agricultural Research Systems
NRM	Natural Resource Management
PIM	Policies, Markets and Institutions (CRP)
PMS	Performance Management System
POR	Policy-oriented Research
SIAC	Strengthening Impact Assessment in the CGIAR
SPIA	Standing Panel on Impact Assessment
USAID	United States Agency for International Development
WF	WorldFish

Acknowledgements and Author's Disclosure

This work has benefitted from numerous insightful discussions with Tim Kelley, Roger Slade, Derek Byerlee, Peter Hazell, and Frank Place, as well as helpful comments by Nancy Johnson on an earlier draft. These are gratefully acknowledged, as is funding from the Standing Panel on Impact Assessment (SPIA) of CGIAR's Independent Science and Partnership Council (ISPC).

Prof. Mitch Renkow
Department of Agricultural and Resource Economics
North Carolina State University
Raleigh, NC 27517 U.S.A.
renkow@ncsu.edu

Executive Summary

Policy-oriented research (POR)—defined as research aimed at identifying new or improved policies, regulations, or institutions (or their management) that enhance economic, social, and environmental welfare—is an important and growing part of CGIAR portfolio. This paper assesses progress that has been made over the past decade to evaluate the welfare impacts of POR conducted within CGIAR. The paper's first section reviews recent evaluative efforts and finds that little in the way of quantitative impact assessments has occurred since the publication of a set of quantitative ex post POR impact assessments in 2008. Rather, POR evaluations have taken a more qualitative emphasis, focusing on illuminating impact pathways and establishing the contribution of policy research toward effecting policy outcomes. This review also describes a recently-compiled database of 94 significant policy outcomes attributable to CGIAR policy research.

In the second section of the paper, a theory of change is developed to illuminate POR's role in the formulation—and ultimately, the impact—of agriculture- and food-related policies. The theory of change posits two phases to the process whereby POR might produce welfare impacts: a first phase in which research outputs combine with a set of political inputs to produce policy outcomes (new laws, regulations, institutions, etc.); and a second, post-implementation phase in which those policy outcomes produce welfare changes (impacts) on various populations. Each phase poses different evaluative challenges; these challenges are considered in light of the experience over the past decade or so. The paper concludes with a consideration of the future prospects for additional quantitative *ex post* impact assessments of POR to be conducted, as well as the degree to which carefully constructed outcome assessments and influence studies are substitutes for quantitative analyses in the eyes of different stakeholders in government, donor, research management, and academic communities.

1. Introduction

Social science research analyzing the design, conduct, and effects of agricultural and rural development policy has historically been a core strength of the CGIAR (CGIAR Science Council 2009). Policy-oriented research undertaken in CGIAR is widely acknowledged for its high quality and influence in government, donor, and academic circles. Policy analysis is the primary mandate of four Centers (IFPRI, IWMI, CIFOR, and Bioversity) and is a major focus—to varying degrees, and at differing points in time—of all of the others. CGIAR member centers can lay plausible claim to having contributed significantly to a large number of policy outcomes in a variety of geographical, legal, and topical contexts.

CGIAR invests significantly in policy-oriented research (POR).[1] Place and Hazell (2015) report that the cumulative value of those investments exceeds US$1 billion. CGIAR expenditures on POR have grown substantially over time, both in absolute terms and as a fraction of the system wide research portfolio. Walker, Ryan, and Kelley (2010) estimated that overall funding for CGIAR policy research grew by roughly 85 percent between early 1992 and 2005—from 9 percent to 18 percent of the total system wide budget (Walker, Ryan, and Kelley 2010).

Interest in ascertaining the return on these investments comes from various stakeholders. The donor community that finances much of this research has an obvious interest in knowing the payoffs to those investments. CGIAR System itself, as well as its member centers and CGIAR Research Programs (CRPs), have an interest in knowing the returns to POR *vis-à-vis* competing research programs (genetic improvement, natural resource management, etc.) for internal resource allocation purposes. The research community has a clear stake in understanding how the knowledge created by policy research does or does not translate into actions with real-world significance.

Assessing the impact of policy-oriented research on agricultural and rural development outcomes and their subsequent welfare impacts represents a continuing challenge within (and outside) CGIAR. In contrast to other types of CGIAR research—notably, work on genetic improvement, pest management, and to some extent natural resource management (Maredia and Raitzer 2006)—relatively few studies have sought to quantify the *ex post* impacts of policy-oriented research (Renkow and Byerlee 2010). Indeed, the body of quantitative impact analyses is mainly confined to a set of rate-of-return studies commissioned by SPIA in 2007 and published over the next few years—the so-called "PORIA Case Studies" (Walker and Ryan 2010). This dearth of quantitative evaluations is somewhat surprising given that the large and growing investments in POR by donors and national governments are undertaken in a competitive, project-based funding environment and among a host of rival development assistance domains.

On the other hand, as will be discussed below, Centers and CRPs within CGIAR continue to contribute to policy outcomes within countries where they have a presence; transnationally in regional geographic contexts; and within global institutional settings. And a growing number of qualitative "influence studies" document the role that CGIAR research played in the policy process.

Facilitating POR impact assessment was an explicit goal of SPIA's Strengthening Impact Assessment in the CGIAR (SIAC) project. This paper seeks to gauge progress that has been made toward that goal over the past decade or so (since the PORIA Case Studies project was undertaken). I

[1] Policy-oriented research is defined here as research which identifies new or improved policies, regulations, or institutions (or their management) that enhance economic, social, and/or environmental welfare (Raitzer and Ryan 2008). Consistent with nomenclature used within the CGIAR, I term these policy, regulatory, or institutional changes "policy outcomes" (CGIAR Science Council, 2006).

proceed in two parts. In the next section of the paper I briefly describe and review efforts over the past decade to evaluate—or at least, move us in the direction of being able to evaluate—the welfare impacts of POR conducted under the auspices of CGIAR. Little in the way of full-blown quantitative impact assessments has occurred since publication of the PORIA case studies. Rather, POR impact assessment activities within the system have taken a more qualitative emphasis, focusing on illuminating impact pathways and establishing the contribution of policy research toward effecting policy outcomes (as opposed to quantifying the impacts that flow from those outcomes).

The second section of the paper reflects on what recent experience informs us regarding CGIAR's continuing efforts to understand returns on its investments in the POR portfolio. To do so, I first offer a theory of change for POR's role in agriculture- and food-related policy process—and ultimately, the impact thereof. The theory of change suggests that there are two phases to the process whereby policy-oriented research might produce welfare impacts: a first phase in which research outputs combine with a set of political inputs to produce policy *outcomes* (new laws, regulations, institutions, etc.); and a second, post-implementation phase in which those policy outcomes produce welfare changes (*impacts*) on various populations.

Each of these poses different evaluative challenges. For the first phase, the primary challenge is the "attribution problem"[2] of documenting how, and to what extent, research outputs combine with other, non-research based influences to produce specific policy outcomes. The key challenge in the second (post-outcome) phase lies in identifying and measuring subsequent welfare effects against a plausible counterfactual.

I consider these challenges in reference to the experience over the past decade or so. I conclude with a consideration of the future prospects for more quantitative *ex post* impact assessments of POR to be conducted, as well as the degree to which carefully constructed outcome assessments and influence studies are substitutes for quantitative analyses in the eyes of different stakeholders in government, donor, research management, and academic communities.

2. POR Impact Assessment Activity within CGIAR

Evaluating the impacts of POR is a relatively recent venture, and one that is seemingly confined to a handful of international organizations and donors. Through SPIA, CGIAR has been a leader in efforts to promote "best practices" in quantitative *ex post* impact assessment of its many areas of research—including policy research—through conferences, commissioned studies, and facilitation of a network of impact assessment specialists. The basic framework for POR impact assessments was laid out in a 2001 conference sponsored by the International Food Policy Research Institute (IFPRI) and reported in Pardey and Smith (2004).[3] Subsequent to that conference, most extant efforts to quantify the impacts of POR have been focused primarily on research emanating from CGIAR research centers.[4]

[2] It is well understood that this refers to *contribution*—not *attribution* in the traditional sense—because there are methodological and political challenges associated with establishing direct credit.

[3] Early quantitative POR impact assessments of IFPRI's work in Vietnam (Ryan 1999) and Bangladesh (Babu 2000) predated, and to some extent stimulated, that conference.

[4] An additional increment of quantitative impact assessments of policy research has been conducted by the Australian Centre for International Agricultural Research and are reviewed by Byerlee and Bernstein (2013).These analyses focused mainly on POR outcomes that were quite location-specific and hence generated modest aggregate benefits.

Since 2010, there have been at least four major reviews of POR impact assessment studies conducted by four different institutions—SPIA (Raitzer and Ryan 2008; Walker, Ryan, and Kelley 2010), Australian Centre for International Agricultural Research (Lindner 2011), Institute for Development Studies (Masset, Mulmi, and Summer 2011), and USAID (Byerlee and Bernstein 2013). All of these reviews cover essentially the same set of impact assessment studies and provide detailed descriptions of each study. In this section, I draw upon these reviews to briefly summarize efforts to date to assess impacts of policy-oriented research within CGIAR.

2.1 Quantitative Impact Assessments

SPIA funded a series of quantitative POR impact studies from 2007-2010 (Raitzer and Ryan 2008; Walker, Ryan, and Kelley 2010). An important stimulus to this effort was the World Bank's 2003 meta-evaluation of CGIAR which found a striking lack of credible studies analyzing impacts of the large historical investments in POR (World Bank, 2003). To fill this gap in evaluative evidence, SPIA conducted a scoping study that identified and reviewed 24 *ex post* assessments of CGIAR POR projects (CGIAR Science Council 2006). The studies spanned a range of policy domains, including trade and market policies, property rights, plant genetic resources, and gender. These provided substantial qualitative evidence on how and why POR and the recommendations it generates find their way into real-world policy process. Only three of these 24 studies yielded quantitative estimates of economic impacts, all from IFPRI;[5] the others stopped well short of quantifying impacts on CGIAR core missions of food security, poverty reduction, and environmental sustainability.

As a follow-up to this scoping study, in 2007, SPIA commissioned seven POR impact assessment (PORIA) studies to augment the three quantitative evaluations noted above. These "PORIA Case Studies" (summarized in Table 1) reviewed a wide range of policy interventions—forestry, fertilizer, conditional cash transfers, milk marketing, and pesticide policy. The estimated net benefits of each of these policy research projects were in the tens or hundreds of millions of dollars in net present value—substantial, but an order of magnitude lower than those attributed to CGIAR successes in the biophysical sciences, especially crop germplasm improvement (Renkow and Byerlee 2010). Walker, Ryan, and Kelley (2010) note that impressively high returns on specific POR projects to a large degree reflected modest budgets for POR projects, relatively short gestation periods, and a compressed diffusion process. This suggests that only a small share of all POR would need to be successful to pay the cost of all POR in CGIAR.[6]

Since 2007, it has been hard to find full impact evaluations of POR in CGIAR. Shah, et al. (2008) provide a good analysis of the impact of the change in electricity management in Gujarat state of India to reduce subsidies to tube wells, control groundwater overdraft, and improve supplies to the

[5] Babu (2000) evaluated food policy reforms in Bangladesh, the abolition of Rural Rationing Program and implementation of Food for Education Program (FFE). Ryan (2002) evaluated impacts of policy reforms for rice trade in Vietnam, particularly a reduction in the export tax, following recommendations of IFPRI research. Ryan and Meng (2004) estimated the impact that IFPRI research and related activities had on the initiation, evolution, and impact of the food for education program in Bangladesh. These studies estimated that the IFPRI POR delivered benefits in the tens of millions of dollars (US$ 27-US$ 166 million in the case of Bangladesh rice reforms, US$ 248 million for the FFE program, and US$ 45 million for Vietnam) for a relatively small investment in POR. Table 1 provides summaries of these three studies.

[6] All of the PORIA Case Studies were country studies conducted within a particular, country-specific policy environment. Most produced knowledge potentially relevant to policy domains in other countries. However, documentation of such spillovers is quite difficult, particularly given the sporadic, "right time, right place" nature of policy changes. Only two studies – Behrman's 2010 analysis of IFPRI's contribution to Mexico's conditional cash transfers program and Ryan's 2002 analysis of IFPRI's contribution to policy change in Vietnam's rice sector – quantified these spillovers, both finding that the value of these spillovers alone exceeded the projects' costs (Behrman 2010; Ryan 2002).

nonfarm sector. This policy change appears to have been a major success story in terms of economic and sustainability benefits, although it harmed marginal farmers. The proposed policy reform was attributed to the International Water Management Institute (IWMI) (Shah et al. 2008). However, Merrey (2015) notes in a recent review that while IWMI's claims of responsibility for the policy change are "credible... the rapid adoption of the recommendations may have been the result of the reputation and social-political network of the lead researcher" rather than resulting from specific research outputs produced by IWMI.

More recently, a couple of IFPRI studies offer some modest quantitative assessments of impacts of policy changes for which attribution to IFPRI research was fairly clear: India's Rural Roads Program (Renkow 2010) and Ethiopia's Productive Safety Nets Program (Renkow and Slade 2013). While these were rather rudimentary exercises—more back-of-the-envelope calculations than full blown empirical assessments—they too are suggestive of net benefits far in excess of research costs.

Finally, recent research by Mills, Nelson and Achdiawan (2017) on forest co-management systems in Guinea analyzed long-run household and environmental benefits of a policy innovation promoted by CIFOR between 1999 and 2005. Using quasi-experimental methods, that work found evidence of moderate environmental benefits (in the form of reduced deforestation and sequestered carbon) in adopting villages *vis-à-vis* control villages. However, no measurable impacts on household well-being were detected.

2.2 Assessments of Influence on Policy Outcomes

Given the difficulty of isolating the contribution of a specific program of research to actual policy outcomes, many studies focus their efforts on establishing influence of POR on subsequent policy decisions and do not attempt to go further to document welfare outcomes. These qualitative types of evaluations have been carried out by the Canadian International Development Research Center, and the UK Overseas Development Institute for their multi-sectoral policy research and have been found to be useful in learning about policy processes and impact pathways (Raitzer and Ryan 2008).

Since the PORIA Case Studies project ended, most evaluations of POR within CGIAR have focused on how the research has influenced the policy process. Of particular note, since 2008, IFPRI has conducted a substantial number of more qualitative studies of influence of a wide range of their research programs in an Impact Assessment series housed on the IFPRI website (www.ifpri.org/topic/impact). These generally stopped short of quantifying welfare effects. Rather, they are for the most part supply-led assessments that start from a particular body of policy research and then trace its influences inductively throughout the impact pathway. Most go no further than documenting the contributions of IFPRI research to important policy outcomes.[7] Nonetheless, they represent a large and growing body of evidence and insights into how research informs policy.

[7] The same critique applies to earlier evaluations of CGIAR policy research prior to the POR Case Studies. Of the 21 studies reviewed by Raitzer and Ryan (2008), 10 confined themselves to documenting influences, generally relying on interviews of relevant stakeholders as "data." Subsequently, the seven commissioned PORIA Case Studies established a high standard for documentation of uptake and influence of POR (Walker, Ryan and Kelley 2010).

2.3 Policy Outcomes Databases

As something of a reaction to the dearth of quantitative POR impact assessment activity since the PORIA Case Studies, SPIA's SIAC project called for the development of a viable mechanism for systematically and regularly tracking outcomes of CGIAR research that have influenced significant policy changes related to agriculture, food and nutrition at the regional, national or global level. The orientation of this effort was decidedly supply-side, its goal being to make available to CGIAR stakeholders the best available information on outcomes that are plausibly attributable to CGIAR policy research outputs. It was also hoped that development of a roster of outcomes might "prime the pump" for further quantitative IA work by establishing a set of candidates for such analysis.

Pursuant to this goal, two databases of significant policy outcomes attributable to CGIAR policy research were compiled—one for the period 2006-2010 and the other for the period 2011-2014 (Renkow 2014; 2015). These databases employ a common template which includes a description of the policy constraint or problem, a listing of key research outputs, a statement describing the outcome, and evidence connecting the research to the outcome.

The 2006-2010 database was compiled based on information contained in the Science Council's (now-defunct) Performance Management System (PMS). The PMS required Centers to submit a set of "outcome statements" each year as part of their annual management review.[8] Those outcome statements were then subjected to both internal and external peer review and scoring. From that database, 67 policy outcomes were identified as having sufficient evidence of a plausible link between Center research outputs and a specific change in policy or practice (as well as having received a median or better review score). These are briefly summarized in Appendix Table 1.

The PMS system was discontinued in 2010, so after that time there exists no externally-reviewed source for identifying policy outcomes attributable to CGIAR research. For the period 2011-2014, a careful review of Center and CRP annual reports and websites was undertaken—by a consultant and a SPIA staff member—to identify purported policy outcomes from CGIAR research. Fifteen candidate outcomes were identified. These candidate outcomes were then distributed to the relevant Centers and CRP Directors for validation and substantiation;[9] of these, 10 were so validated. Respondents[10] were also offered the opportunity to provide additional—and similarly documented—outcomes that occurred during the 2011-2014 time frame; this yielded an additional 17 outcomes. Appendix Table 2 contains brief summaries of the 27 outcomes for 2011-2014.

From Appendix Tables 1 and 2 it is clear that there is no shortage of policy outcomes that can be linked to the research activities of the various CGIAR centers and research programs. Not surprisingly, Centers with explicit policy mandates— Bioversity, CIFOR, IFPRI, and IWMI—accounted for the majority of these; however, all but one of the other Centers reported at least one policy outcome for which they could plausibly claim some credit. Some of the reported outcomes later

[8] Over that five year period that the PMS was in operation, a total of 390 outcomes were reported. These represents a wealth of information of all types of outcomes emanating from CGIAR research (i.e., across all lines of research, not just policy research). The policy outcomes in the 2006-2010 database were drawn from that larger data set.

[9] Specifically, Centers and CRPs were asked to (a) verify that the outcomes contained in the database were accurate; (b) substantiate that new policies, changes in existing policies or prevention of negative policy change were plausibly linked to Center/CRP outputs; (c) document what those specific outputs were; (d) provide a brief narrative description describing how Center or CRP outputs contributed to the policy change, as well as the relative contribution of CGIAR research vis-à-vis other stakeholder inputs; and, (e) provide plausible sources of evidence linking research outputs to the policy outcomes in question.

[10] This was limited to those Centers and CRPs for which POR outcomes were identified. However, all 15 Centers had at least one outcome, and hence had an opportunity to respond with additional Center- or CRP-related outcomes for 2011-2014. CCAFS was the only CRP individually contacted.

figured in impact evaluation studies; but with the exception of an IFPRI-reported outcome related to their work on conditional cash transfer program (Behrman 2010), none have received a serious, benefit/cost-style quantitative analysis of welfare impacts.

The mix of topic areas for the reported outcomes corresponds in a general way to the Center and CRP mandates (Figure 2)—i.e., Centers like CIFOR, ICRAF, and IWMI generally report outcomes related to natural resource management (NRM), while outcomes produced by Centers with commodity-oriented mandates (e.g., ILRI, IITA, WorldFish) tended to be related to agricultural policies. Overall, slightly more than 60 percent of the outcomes reported in Appendix Tables 1 and 2 focus on agricultural policies; a bit more than 30 percent relate to NRM policies; and the remainder (7 percent) comprise contributions to the implementation of social safety net policies.

In terms of scale, 18 percent of the outcomes were related to global policies, 26 percent occurred in more than one country and the rest took place in a single country or, in a few cases, institution (multilateral organization, NGO or donor). Of the policy outcomes that were regional or national, 42 percent were in Africa, 38 percent in Asia and the rest in the Americas.

The reported outcomes span a range of types of policy interventions:

- ***changes in laws and regulations governing economic incentives in agriculture or natural resource management***—for example, agricultural, macro-economic, trade, nutrition/health, and environmental policies;
- ***creation of institutions***—for example, the formation of the Ethiopian Commodity Exchange or the agreement between India, Nepal, and Bangladesh to share rice varietal evaluation data among their respective countries to facilitate more rapid release and commercialization;
- ***changes in government investment priorities and budget allocations***—for example, increases in the share of budgets devoted to agricultural research associated with the Comprehensive Africa Agriculture Development Programme (CAADP);
- ***innovations in the operations and management (O&M) for government agencies and projects***—for example, monitoring and evaluation activities associated with operating social safety net programs like the Mexican PROGRESA conditional cash transfer program or the Ethiopian Productive Safety Nets Programme;
- ***international treaties, declarations, or agreements among parties reached at major policy conferences***—for example, Bioversity's influence on decisions adopted by the 7th Conference of Parties (COP) to the Convention on Biological Diversity (CBD) or the substantial involvement of CCAFS (via multiple Centers) in crafting international climate treaties.

Figure 1 provides a breakdown of how the reported outcomes are distributed across these types of interventions for the 2006-2010 and 2011-2014 periods, respectively. For both periods, a large fraction of these outcomes involved changes in laws and regulations. For the latter period, a large number of reported outcomes relate to some aspect of global climate change. To some extent, this likely reflects an increasing urgency with which scientists at multiple Centers have engaged in research focusing on climate change adaptation and mitigation strategies.[11]

[11] Note, however, that the reported outcomes for the 2011-2014 were submitted voluntarily. That is, they do not constitute a representative random sample of all policy outcomes related to the research taking place across the member Centers and CRPs. Rather, they reflect to some degree the differing levels of enthusiasm with which Center or CRP research administrators responded to the call for outcome statements. For example, research leaders from CCAFS were particularly responsive, hence the relatively large number of

Also of interest is the large number of reported policy outcomes in the 2006-2010 period related to operations and management across a variety of institutional dimensions, including government agencies, NGOs, and international donor organizations. Research-based innovations on how government agencies and/or programs are operated are commonly linked substantially to a specific policy research provider—for example, IFPRI's work with monitoring and evaluation of social safety net programs. As will be discussed later, these types of efforts generally tend to have clearer, if more limited, impacts on specific stakeholders, and hence become more amenable to quantitative analysis. In addition, such interventions frequently involve training activities for domestic partners. The human capital created by such capacity building represents, at least potentially, a source of positive externalities over and above any benefits attributable to improved delivery of services or implementation of government priorities.

3. From Research to Policy Impact: Evaluative Challenges in Perspective

Writing in 2010 on the heels of the PORIA Case Studies, Walker, Ryan, and Kelley threw down the following gauntlet:

> Now that the concern about the paucity of (quantitative impact assessments of POR) in international agricultural research has been highlighted and some good-practice examples have been nurtured and developed, the number of similar studies forthcoming in the next 5 years should be a good indicator of the impact of this initiative. Five years from now we should be in a good position to determine whether these first-generation case studies were the tip of an iceberg or the bottom of the barrel. (Walker, Ryan, and Kelley 2010, p. 1459)

After seven years, it is clear that those authors' hopes for a proliferation of quantitative, *ex post* impact assessments of CGIAR's policy-oriented research remains unfulfilled. The dearth of such studies since 2010 is striking. Instead, evaluative work over that time period has focused on isolating institutional contributions to policy outcomes and qualitative assessments of outcome pathways.

I now turn to considering why this might be the case, i.e., why haven't we seen more quantitative impact studies since the PORIA Case Studies project? And how well does the growing body of more qualitative evaluative evidence analyses position CGIAR in its efforts to understand returns on its investments in its POR portfolio (for both internal and external audiences)? Addressing these questions requires a theory of change with regard to POR's role in agricultural and rural development policies—and ultimately, the impact thereof. The theory of change proposed below serves to clarify key challenges in fully evaluating the welfare impacts attributable to a program of policy research.

outcomes related to climate change research. By contrast, each Center was required by the Science Council to report a set number of outcomes for 2006-2010—typically five, although that number varied a bit by Center and by year.

3.1 From Policy-Oriented Research to Policy-Related Outcomes: A Theory of Change

Policy-oriented research in CGIAR typically seeks to support governments in identifying, understanding, and adopting policies that are technically and economically efficient, socially equitable, environmentally benign, and politically palatable (Slade and Renkow 2014). Within the broad nexus of policy formation and policy influence, the pathway whereby a research institution can produce positive impacts is often characterized as follows (Gardner 2008): A policy problem or issue justifies the outlay of human and financial resources on a set of research activities. This leads to ***outputs*** (research papers, briefs, conferences, and the like) that are ingredients in an interactive and iterative advocacy process involving many stakeholders and unpredictable windows of political opportunity. From this advocacy process emerge ***outcomes*** in the form of a sufficient consensus for change to give effect to the new or changed policy, regulation, institution, or program. Last, those outcomes deliver ***impact*** in the form of welfare gains—both to a defined population of beneficiaries and to non-targeted groups in the form of knowledge or welfare spillovers.

The linearity in this simple model is not generally found in practice, however. The process within which policy-relevant research outputs contribute to policy outcomes generally depends on a number of variables affecting the formation of advocacy coalitions around a particular policy issue, as well as the efficacy of those coalitions in pursuing their policy-related goals (Weible, Sabatier, and McQueen 2009). Such coalitions engage in a number of messaging, convening, financing, and lobbying activities to influence political outcomes. In addition, deficits in local capacity for both policy interpretation and implementation may require substantial efforts to first be directed at augmenting human capital then enhancing (or creating) the local institutions within which that human capital is employed. Both of these factors mean that there may well be long time lags in the delivery of policy change and the achievement of welfare gains therefrom.

Neither can the opening of windows of political opportunity be ignored, unpredictable as they might be. Such political opportunities are commonly brought about by new leadership or a sharp change in economic fortunes, such as a fiscal crisis. Leadership changes may slam those windows shut, as well. Certain actors or institutions may be involved in both the research process generating policy insights and the political process wherein policies are formed—e.g., donors and government—which in turn might confer on these actors a larger degree of influence over the policymaking process (Slade and Renkow 2014).

Figure 3 depicts the impact pathway characterized above, paying particular attention to the central role played by advocacy processes in the policy process. Policy formulation combines research outputs with a set of political inputs that are rooted to a large degree in ideology, vested interests, or institutional inertia. Importantly, research-based knowledge is only one input to this process, and often a minor one at that, though it could be stronger in the later stages of the process that are focused more on how policies will be implemented rather than in the earlier phases that determine what the policy should be. Within the policymaking process, the means by which research outputs might gain traction include a number of inter-related political, communication, and financing activities. A multitude of organizational variables are important, too, not the least of which are (a) institutional reputations, which in the case of research institutions centers prominently on scholarly impact; and (b) idiosyncratic leadership skills of those delivering policy messages. While very difficult to quantify, both of these characteristics of research-generating institutions inarguably

affect the probability that efforts to effect policy change are successful or not (Slade and Renkow 2014).

Figure 3 makes clear that there are two distinct and sequential phases in the process whereby research contributes to policy change and subsequent policy impact: a first phase in which research outputs combine with a set of political and other inputs to produce policy-related outcomes (new laws, regulations, institutions, etc.); and a second phase in which those outcomes result in welfare changes (direct and indirect impacts) on various populations.[12] Each of these poses different evaluative challenges requiring different investigative approaches. For the first phase, the primary challenge is to document how, and to what extent, research outputs combine with other, non-research based influences to produce specific policy outcomes. This is akin to the adoption question in other areas of agricultural research. However, unlike an improved crop cultivar, a policy change cannot be uniquely identified and linked to a research institute—hence an attribution problem. The key challenge in the second (post-outcome) phase lies in identifying and measuring subsequent welfare effects against a credible counterfactual. These challenges are summarized in Table 2 and discussed in more depth below.

3.2 Attribution/Contribution

It is widely agreed that attribution is a huge challenge to impact evaluation of POR (Byerlee and Bernstein 2013; Place and Hazell 2015). Table 2 illustrates three specific areas where attribution might be debated. In order of increasing evaluative difficulty, these are: (a) parceling out "ownership shares" of a research idea formulated, analyzed and validated by researchers from different institutions, either separately or collaboratively; (b) determining ownership of research ideas by organizations that fund the research—e.g., sponsored research commissioned by a donor to validate empirically a pre-existing policy position; and (c) establishing the relative contribution of knowledge creation versus advocacy processes in policy change.

The first two of these typically can be handled in a rather straightforward manner via interviews and surveys of key informants—both consumers and suppliers of policy research insights. External measures of research influence, such as bibliometric and webmetric measures, have also been used to varying effect to apportion "credit" among researchers and their respective institutions. For example, where multiple research outputs emanate from separate sources, citation counts in key policy documents are commonly used to sort out how influential are "competing" outputs. But, even in these cases, interviews and surveys of key informants are often employed to corroborate these external measures of influence.[13]

By far the most difficult attribution challenge lies in unraveling the contributions of research outputs versus other, non-research based influences in the creation of a policy outcome. The public administration literature raises significant questions about the role of research-based knowledge *vis-à-vis* other forms of information as a driver in public policy making. For example, referring to empirical evidence from surveys of policymakers, Weiss (1979) notes the "the major use of social

[12] The characterization of the impact pathway in Figure 3 bears some similarities to a framework developed by Gillespie et al. (2013) to understand how to cultivate enabling environment for promoting changes in nutrition policies.

[13] For example, a study of the impacts of IFPRI's research program on intra-household allocation concluded that collaboration among academic researchers was substantially greater than would have been the case absent IFPRI's key role in facilitating research partnerships and networks (Jackson 2005, TANGO 2017). That insight could only be gained via directly surveying key informants: simply counting up the authorships would have overlooked IFPRI's contribution to promoting some of those research partnerships.

research is not the application of specific data to specific decisions. Rather, government decision makers tend to use research indirectly, as a source of ideas, information, and orientations to the world." Thus, the selective or partial use of research-generated information by policymakers also complicates the research output to policy outcome pathway.

Indeed, some political scientists have identified examples of policy makers opting in favor of inefficient programs or non-competitive rent-seeking opportunities that maximize the well-being of specific (loyal) interest groups (Bates 1998).[14] This is, of course, a view that is strikingly at odds with the conventional view taken by economists of decision makers as social welfare maximizers. Relatedly, the widely observed importance of so-called "policy champions" in the advocacy process reinforces the relative importance of advocacy processes *vis-à-vis* research-based knowledge creation in apportioning credit for a particular policy outcome.[15]

On the other hand, anecdotal examples do exist of high-level decision makers who are well educated and attentive to research findings, particularly if those findings are generated by a well-respected research institution[16]. Generally speaking, this should be considered as a comparative advantage of CGIAR. Note, however, that effectively reaching those decision makers generally requires a range of messaging mechanisms beyond research papers. These might include policy briefs, organized conferences and workshops, social media, or interpersonal networking. Even very high quality research may have limited influence absent effective "marketing". As such, sorting out attribution issues requires evaluators to go beyond journal articles and project reports to focus on these "softer" outputs.[17]

The upshot here is that the influence of research outputs on the policy process will be highly context-dependent, and the approaches required to validate those influences are more rhetorical than statistical. [18] Existing efforts to assess the impact of specific body of policy research typically devote a large amount of effort to teasing out those context-dependent influences of that research within the advocacy process. This has been done mainly via interviews and surveys of key stakeholders. To date, the norm for incorporating the qualitative insights so generated into quantitative impact assessments has been to assert a percentage "attribution share"—or a range of possible attribution shares—in order to compute rates of return or benefit-cost ratios for specific research programs. Such an assertion is only as convincing as the contextual, key informant-sourced evidence supporting it, of course. Nonetheless, it is difficult to conceive of any sort of alternative that might be more immune to criticism.

Finally, it is worth noting that some authors have argued for the use of Bayesian approaches to facilitate attributing policy outcomes to policy research. This would involve eliciting information on

[14] This view is consistent with the "poisoned well" problem discussed by Pardey and Smith (2004), wherein POR is induced by rent seeking behavior that leads to welfare reducing policies—for example, research promoted by producer organizations that leads to increased tariff protection of farm products and higher prices to poor consumers.

[15] Note, however, that in some cases a representative of the research institute generating POR outputs under consideration is herself a "policy champion" for a particular research-based policy recommendation. In such cases, attribution might be relatively straightforward. Hence, a particular individual may be highly instrumental in effecting the establishment of a new institution—for example, the central role of the director of IFPRI's Ethiopian Strategy Support Program in the creation of the Ethiopian Commodity Exchange (Renkow and Slade 2013). And in some instances, a researcher may be highly instrumental in effecting new pricing policies, as in the case of revision of electricity pricing for irrigation in India (Shah, et al. 2008).

[16] For instance, J-PAL Government Partnership Initiative (J-PAL GPI) was catalyzed in part by positive experiences gained via a series of pilot evaluations, of programs promoting evidence-based policy design for central and state governments, in India.

[17] In this vein, an interesting recent paper by Masset et al. (2013) uses an RCT to investigate the impact of a policy brief on policymakers' understanding or opinion of a particular issue. They found that the while such written information might help some decision makers to form an opinion, there was no evidence that it changed those individuals' prior beliefs.

[18] The critical role of context underpins "realist" methods of impact assessment that focus on how institutional, organizational and political 'mechanisms' complement specific interventions to produce—or not produce—a particular impact (Pawson and Tilley 1997).

the subjective beliefs of decision-makers such that a probability distribution of decision-maker beliefs would be tracked over time and related to specific POR (Schimmelpfennig, O'Donnell, and Norton 2006; Gardner 2004; Lindner 2004). While conceptually appealing, such approaches have not yet been demonstrated to be practicable.

3.3 Measurement of the Impacts from Policy Outcomes

In 2014, CRP Policies, Institutions and Markets (PIM), IFPRI, and SPIA co-hosted a workshop entitled Best Practice Methods of Assessing the Impact of Policy-Oriented Research. The workshop brought together a variety of participants comprising researchers, government officials, and representatives of donor agencies. The overarching goals of the workshop were to (a) discuss how alternative approaches to evaluating POR best meet the needs of the research and donor communities; and (b) define best practices in the conduct of POR impact assessment.

Place and Hazell (2015) summarize those proceedings in detail. Their summary of key steps in pursuing *ep*IA of policy-oriented research—reported in Table 2—echoes the discussion earlier of two distinct phases of the pathway from research to policy change to policy impact. They too find that narrative (qualitative) methods are of prime importance for evaluating influence. Interestingly, the authors additionally report substantial consensus around the idea that narrative evaluation techniques are of significant importance in the second, quantification-of-welfare-impacts phase.

The primary challenge in quantifying benefits streams from POR lies in defining an appropriate counterfactual—the alternative state of knowledge that would have existed absent the research (Baker 2000). Place and Hazell (2015) describe the challenges in defining appropriate counterfactuals under three possible situations: (a) there was going to be a policy change anyway, and the POR may have led to a more informed change with a better outcome; (b) the policy would not have changed without the POR; or (c) the POR convinces policymakers not to make a planned change to the existing policy, thus preventing a worse outcome (Table 2). In all these cases, the contextual information elicited via key informant-style investigations is critical to informing judgements about the timing, scope, and means of transmission of welfare impacts among various populations of interest.[19]

A common approach is to assume a counterfactual in which implementation of a particular policy decision occurs later or more slowly than actually occurred (e.g., Ryan, 2002; Raitzer 2008). As with attribution issues, making a convincing case for this sort of "advance the clock" counterfactual requires collecting contextual information via direct interactions with key informants and stakeholders. Here, too, narrative evaluation techniques have been the norm to date, and it is difficult to foresee this changing any time soon.[20]

Frequently, though, policy change occurs at pivotal moments when some sort of policy change is bound to occur. Those cases require development of counterfactuals that center on alternative policy outcomes that might have occurred, not just alterations in the timing of the specific policy that was enacted. Imposing a range of alternative counterfactuals would seem to be relatively

[19] A lack of benchmark data also featured prominently in discussions at the workshop. It was noted to be a substantial barrier to research programs being able to confidently carry out quantitative analyses.

[20] Some efforts have been made to elicit subjective probabilities of whether any policy would have ever occurred absent the specific research under study (Ryan 1999; Babu 2000; Shideed et al. 2008). However, as Masset, Mulmi, and Summer (2011) note, the reliability of these subjective assessments is debatable.

straightforward for policy research that relies on simulation-based methodologies—for example, IFPRI's development of computable general equilibrium (CGE) models to assist policymakers implement alternative budgetary allocations as part of the Comprehensive Africa Agriculture Development Programme (CAADP). Such models allow for a range of alternative scenarios, although the estimates from these exercises are obviously only as good as the models that generate them.[21]

Experimental or quasi-experimental approaches to quantifying the *ex post* impacts of agricultural policy research—as opposed to testing alternative approaches as part of policy research—remain largely unexploited. There has been an explosion of applications of experimental approaches to assess a variety of interventions related to technology adoption and social protection/safety net programs (deJanvry, Dustan, and Sadoulet 2011). In the policy realm, a growing body of literature employs randomized controlled trials to assess policies related to health care (Gertler and Vermeersch 2013), corruption (Olken 2007), teacher performance (Muralidharan and Sundararaman 2009), and school vouchers (Angrist et al. 2002). But to date I am aware of no applications of these methods to assess the *ex post* impacts of agricultural policy outcomes.

Finally, a few words on positive spillovers are merited here. Policy advice may often be relevant beyond the country where it was first developed. Such features are deliberately sought within CGIAR in pursuit of generating international public goods (IPGs). For embodied technologies (like improved germplasm) whose suitability may be—with adaptation—trans-national, impact assessment often requires explicit consideration of outcomes occurring in a variety of countries. With respect to policy-oriented research, however, the situation would appear somewhat different (particularly for major policy changes). Political realities vary widely across countries. So while the same kind of policy might be adopted in different places, the advocacy processes extant in those places—and the difficulties that those processes pose for attribution—will generally be highly variable.

Not surprisingly, then, efforts to quantify the contribution of policy-oriented IPGs are rare. This in no way diminishes the importance of the contribution of IPGs to the ambient state of knowledge, nor their contribution to the reputation (and hence influence) of the institutions responsible for generating them. However, it would appear that supply-side efforts to directly (and convincingly) link the generation of knowledge-based IPGs to specific outcomes occurring elsewhere are likely to be rather unproductive exercises vis-à-vis approaches oriented toward understanding underlying political and institutional forces underpinning demands for evidence-informed policy (Newman, Fisher, and Shaxson 2012).

3.4 Synthesis

The theory of change offered above suggests that there are two phases to impact evaluation of policy research: (a) a first phase in which research outputs combine with other, non-research based influences to produce policy outcomes; and (b) a second phase in which the welfare effects resulting from implementation of those policies are identified and measured. Each of these poses different evaluative challenges. Table 3 summarizes these challenges and examples of how they have been addressed for different types of policy outcomes.

[21] Note, however, that reliance on model-based estimates from policy research to project impacts of policy outcomes *based on those same estimates* runs afoul of the so-called Lucas critique, which holds that it is naive to try to predict the effects of a change in economic policy entirely on the basis of relationships observed in historical data, especially highly aggregated historical data (Lucas 1976).

Two key points from the previous discussion of attribution challenges are illuminated by Table 3. First, the larger the number of actors required to bring about particular policy changes, the greater the difficulty in disentangling both the genesis of policy ideas (e.g., when multiple institutional entities are pursuing similar veins of research) and the process whereby those ideas are transformed into specific policy interventions. In general, policy outcomes relating to international agreements—e.g., world trade agreements or treaties governing the exchange of plant genetic resources—will involve a larger number of actors and institutions than regulatory or legal policy outcomes occurring nationally or sub-nationally. Correspondingly, disentangling the contributions of various actors to international agreements will be more formidable in general.

This is particularly relevant to assessing the contribution of CGIAR research to altering national and (especially) international legal and institutional environments governing adaptation or mitigation to global climate change. As noted earlier, a sizeable and growing body of research by multiple Centers under the aegis of CCAFS, is claimed to have contributed to a number of climate change-related policy outcomes. The welfare impacts of such policy interventions are likely to be huge. But tracing those impacts with a meaningful degree of rigor back to the research activities of specific research institution is a formidable task. Moreover, the large number of scientists and scientific organizations pursuing similar research agenda renders it more difficult to argue that a particular policy-relevant research insight developed by one research team would not have been discovered by someone else, albeit at a later date.

Second, understanding and documenting the interactions of researchers and key movers and shakers in the policymaking process will in many circumstances be crucial. As was noted, such "policy champions" are typically not researchers themselves. Indeed, they may have little detailed knowledge of specific research questions or approaches, but nonetheless possess an overriding interest in promoting policy solutions that are congruent with research findings. In such cases, the challenge is to establish that such correspondence between research outputs and policy recommendations exist; and to provide evidence that the policy champion was in fact aware of that correspondence.[22]

Table 3 also highlights the challenges to quantifying impacts of the research underpinning policy outcomes. As was noted earlier, these chiefly relate to development of meaningful counterfactuals against which to measure observed welfare impacts. These challenges would appear to be most severe for CGIAR research that has influenced the global agenda around some of the central issues of our time—e.g., climate change or institutions governing biodiversity and genetic conservation. There can be no question of the impactfulness of such research along many dimensions. But the multitude of interwoven effects created by such policy outcomes renders extremely difficult the quantification of income generation or poverty reduction impacts for specific types of economic agents—priority goals within CGIAR's Strategy and Results Framework.

Here too, research affecting the policy environment within which nations adapt to climate change, individually or collectively, might pose particular challenges for pursuing quantitative impact assessment. In particular, the vast disparity in predictions by various climate models on what exactly the future holds in store does not lend itself to developing meaningful counterfactual scenarios with

[22] Gillespie et al. (2013) make similar points *apropos* of the political economy of nutrition policy change. In particular, they focus on interactions between researchers and non-researchers as being critical to creating an enabling environment for effecting nutrition policy. Such interactions are important both for creating the momentum needed to alter policies, as well as for maintaining support for such policies once they are effected.

which to compare observed welfare changes. Of course, even though quantification—especially, *ex post* quantification—of key welfare impacts from specific policy research activities may be exceedingly difficult, consumers and funders of such research may nonetheless value such research very highly. Indeed, continuing funding of CGIAR Centers and CRPs for conducting policy research provides *prima facie* evidence of that.

On the other hand, other types of policy outcomes with a more limited geographical or institutional footprint are probably more fertile choices for quantitative *ex post* impact assessment activities in the future. As was noted earlier, a sizeable share of the reported policy outcomes for 2006-2010 centered on operations and management across a variety of institutional dimensions (Appendix Table 1). For these sorts of programs, the relatively linear pathway from research outputs to program formulation (or reformulation) simplifies issues associated with disentangling who contributed to the outcome. The outcomes produced tend to revolve around improving the effectiveness with which benefits transfers are made to beneficiaries, many of whom are key target groups for CGIAR. Moreover, the measurement and evaluation protocols used to bring about those improvements lend themselves readily to quantitative impact assessment (e.g., Aker 2013).

4. Summary and Conclusions

Existing impact studies of POR have greatly expanded our understanding of how such research can influence policies and welfare. They have highlighted the importance of networks of influence, messaging (dissemination), windows of opportunity, as well as the key role played by participatory processes for the design and implementation of POR in close interaction with policy- and other decision-makers, as ways to enhance influence. However, it is also clear that progress towards quantifying welfare benefits of POR has stalled since publication of the PORIA Case Studies.

The theory of change offered here suggests that there are two phases to impact evaluation of policy research: (a) a first phase in which research outputs combine with other, non-research based influences to produce policy-related outcomes; and (b) a second phase in which the welfare effects resulting from the policy-related outcomes are identified and measured. Each of these poses different evaluative challenges.

The primary challenge to analysts in the first phase lies in delineating what share of policy outcomes can meaningfully and credibly be attributed to research. The literature reveals no agreed upon methods for doing this. Some authors have argued for the use of Bayesian approaches to assess changes in the subjective beliefs of decision-makers has been proposed wherein a probability distribution of decision-maker beliefs would be tracked over time and related to specific POR. However, such approaches have not proven practicable. Instead, narrative evaluations—adapted to each particular situation and informed by bibliometric analysis and one-on-one interactions with relevant stakeholders—are the norm to date for addressing the attribution issue.

With regard to quantifying impacts—the second phase—the primary challenge lies in defining a counterfactual against which to measure observed outcomes. This is a vexing problem for impact assessment for all types of research; but for policy research there is the seemingly intractable problem of defining the alternative state of knowledge that would have existed absent the research. Here as well, narrative evaluation techniques have proven critical to informing and justifying specific counterfactuals chosen. In a sense, then, this qualitative sort of investigative process does double

duty, informing both counterfactual definition and attribution of policy changes to POR. Finally, the proliferation of new experimental and quasi-experimental empirical approaches to program evaluation is noteworthy in this regard. Application of these techniques—either as a supplement to or replacement for traditional econometric modeling approaches—is already taking place for some nonagricultural policy interventions, and holds promise for future application to agricultural policy. However, it seems likely that the value of these techniques for evaluation of impacts of policy changes will be limited to relatively localized interventions.

It has been noted here that the dearth of quantitative *ex post* impact assessments of CGIAR's policy-oriented research over the past decade cannot be ascribed to a lack of research-based policy outcomes to evaluate. And while challenges in both phases of POR impact assessment are significant, various methods of dealing with them have been documented (CGIAR Science Council 2006; Place and Hazell 2015). Indeed, the PORIA Case Studies provide ample evidence that they can be surmounted, at least in some cases. But doing so is costly in terms of both time and money. In short, the most obvious explanation for the paucity of quantitative analyses is that from the perspective of CGIAR researchers and administrators managing that research, the costs of meaningfully deriving such quantitative assessments outweigh the benefits that such assessments confer on their institutions.

One takeaway lesson from this is that if promoting quantitative impact evaluation is indeed an urgent priority to research managers within CGIAR, then greater investment in such activities will be required—perhaps in the form of another round of commissioned impact studies. This view is supported by the fact that relative to aggregate CGIAR investment in policy-oriented research, very little is spent on impact evaluations of that research. More to the point, it would appear that absent an outside "push"—like the PORIA Case Studies project—such quantitative evaluations are unlikely to materialize.

A related issue, though, is the extent to which impact evaluations of POR should attempt to quantify welfare benefits versus focusing on qualitative studies that document influence. A substantial number of more qualitative, influence studies have been produced within CGIAR, especially by IFPRI, in the period since PORIA Case Studies. Under some circumstances, creating a compelling narrative that connects policy research to a specific high-profile outcome may be sufficient for some consumers of policy evaluation (e.g., donors who need to convince their constituents of the value of funding certain research activities), even if quantifying the benefits and costs of those outcomes is infeasible.

In this regard, an insight gleaned from a session on donor perspectives and interests at the 2014 IFPRI-PIM-SPIA workshop on best practices in POR impact assessment is interesting:

> Quantitative assessments, which allow for comparison with impacts from other types of investment such as plant breeding, would be nice. But what donors most need are evidence-based narratives that are convincing within their agencies, bearing in mind that most of their staff are not economists (Place and Hazell 2015, p. 13).

The implication here is that, at least from the perspective of some donors, there is significant demand for "story-telling" *vis-à-vis* quantification. Indeed, several Centers and CRPs now feature links to "outcome stories" on their website—in part, presumably, to meet such demands. Moreover, much is being learned from these qualitative studies about policy processes and impact pathways that in turn should help increase the number of cases in which it is feasible to pursue full-blown quantitative impact evaluations (Belcher 2017). And as has been pointed out here, (qualitative)

narrative evaluation techniques are typically a prerequisite for informing the development of meaningful counterfactuals for measuring welfare benefits. Given these complementarities, any effort to promote quantitative studies at the expense of the solid qualitative work that is on-going should be viewed as an undesirable outcome. Indeed, from an institutional perspective it would seem preferable to invest in expanding the existing set of influence studies, regardless of whether or not targeted efforts are made to facilitate quantitative work.

Finally, it is important to note that many outputs of POR may provide benefits beyond immediate changes in policy decisions. Much POR produces new knowledge and data that influence future generations of research. Over time this new knowledge may also serve to modify ideological beliefs as well, something more targeted POR may not do (Masset et al. 2013), although this process likely plays out over a rather long period of time. In a similar vein, POR conducted in some CGIAR Centers also has had a strong focus on capacity building at the country level, which should ultimately lead to better policy decisions as well. Almost all evidence to date is from international or donor organizations (Renkow and Byerlee 2014). In future evaluations of POR impacts, it would be desirable to include national institutions conducting POR as evaluators. Local policy researchers may be more in tune with country policy processes and priorities, as well as being more cost effective.

References

Aker, J. 2013. "Cash or Coupons? Testing the Impacts of Cash versus Vouchers in the Democratic Republic of Congo." CGD Working Paper 320. Washington, DC: Center for Global Development.

Angrist, J., E. Bettinger, E. Bloom, E. King, and M. Kremer. (2002) "Vouchers for Private Schooling in Colombia: Evidence from a Randomized Natural Experiment." *American Economic Review* 92(5): 1535-1558.

Babu, S. 2000. "Impact of IFPRI's Policy Research on Resource Allocation and Food Security in Bangladesh." Impact Assessment Discussion Paper No. 13. Washington, DC: International Food Policy Research Institute.

Baker, J.L. 2000. *Evaluating the Impact of Development Projects on Poverty: A Handbook for Practitioners.* Washington, DC: The World Bank.

Bates, R.H. 1998. "The Political Framework for Agricultural Policy Decisions." in C. K. Eicher and J. M. Staatz (eds.), *International Agricultural Development, 3rd Edition*. Baltimore, MD: Johns Hopkins University Press, pp. 234–239.

Behrman, J.R. 2010. "The International Food Policy Research Institute (IFPRI) and the Mexican PROGRESA Anti-poverty and Human Resource Investment Conditional Cash." *World Development* 38(10): 1473-1485.

Belcher, B. 2017. "Theory-based Evaluation of Policy-Relevant Research: Lessons from a Series of Case Studies." Paper presented at the Workshop on the Impacts of International Agricultural Research: Rigorous Evidence for Policy, Nairobi, Kenya, July 6-8, 2017.

Byerlee, D. with J. Bernstein. 2013. *Feed the Future Learning Agenda Literature Review: Improving Research and Development*. Rockville, MD: Westat.

CGIAR Science Council. 2006. *Impact Assessment of Policy-Oriented Research in the CGIAR: A Scoping Study Report.* Rome: Science Council Secretariat.

CGIAR Science Council. 2009. *Stripe Review of Social Sciences in the CGIAR.* Rome: Science Council Secretariat.

de Janvry, A., A. Dustan, and E. Sadoulet. 2011. "Recent Advances in Impact Analysis Methods for ex-post Impact Assessments of Agricultural Technology: Options for the CGIAR." Report prepared for the workshop: Increasing the rigor of ex-post impact assessment of agricultural research: A discussion on estimating treatment effects, organized by the CGIAR Standing Panel on Impact Assessment (SPIA), 2 October, 2010, Berkeley, CA. Rome, Italy: Independent Science and Partnership Council Secretariat.

Gardner, B.L. 2004. "Returns to Policy-Related Social Science Research in Agriculture," in P.G. Pardey and V.H. Smith (eds.), *What's Economics Worth? Valuing Policy Research*. Baltimore, MD: The Johns Hopkins University Press, pp. 201-222.

Gardner, B. L. 2008. "Methods of Assessing Policy-Oriented Research: A Review." In CGIAR Science Council (ed.), *Impact Assessment of Policy-Oriented Research in the CGIAR: Evidence and Insights from Case Studies.* Study commissioned by the Science Council Standing Panel on Impact Assessment. Rome, Italy: CGIAR Science Council Secretariat.

Gertler, P. and C. Vermeersch. 2013. "Using Performance Incentives to Improve Medical Care Productivity and Health Outcomes." NBER Working Paper No. 19046. Cambridge, MA: National Bureau of Economic Research.

Gillespie, S., L. Haddad, V. Mannar, P. Menon, N. Nisbett. 2013. "The Politics of Reducing Malnutrition: Building Commitment and Accelerating Progress." *Lancet* 382: 552-569.

Gotor, E., F. Caracciolo, and J. Watts. 2010. "The Perceived Impact of the In-Trust Agreements on CGIAR Germplasm Availability: An Assessment of Bioversity International's Institutional Activities." *World Development* 38(10): 1486–1493.

Hewitt, J. 2008. "Impact Evaluation of research by the International Food Policy Research Institute on Agricultural Trade Liberalization, Developing Countries, and WTO's Doha Negotiations." IFPRI Impact Assessment Paper No. 28. Washington, DC: International Food Policy Research Institute.

Jackson. C. 2005. "Strengthening Food Policy through Gender and Intrahousehold Analysis: Impact Assessment of IFPRI Multicountry Research." Impact Assessment Discussion Paper No. 23. Washington, DC: International Food Policy Research Institute.

Kaitibie, S., A. Omore, K. Rich, B. Salasya, N. Hooten, D. Mwero and Patti Kristjanson. 2008. "Policy Change in Dairy marketing in Kenya: Economic Impact and Pathways to Influence from Research." PORIA Case Study, CGIAR Science Council.

Lindner. R. 2004. "Second Thought on a Framework for Evaluating Agricultural Economics Research," in P.G. Pardey and V.H. Smith (eds.), *What's Economics Worth? Valuing Policy Research*. Baltimore, MD: The Johns Hopkins University Press, pp. 153-173.

Lindner, R. 2011. "Frameworks for Assessing Policy Research and ACIAR's Investment in Policy-Oriented Projects in Indonesia." ACIAR Impact Assessment Report No. 72. Canberra: Australian Centre for International Agricultural Research.

Lucas, R. 1976. "Econometric Policy Evaluation: A Critique," in K. Brunner and A. Meltzer, *The Phillips Curve and Labor Markets*. Carnegie-Rochester Conference Series on Public Policy 1. New York: American Elsevier. pp. 19–46.

Maredia, M., and D.A. Raitzer. 2006. "CGIAR and NARS partner research in sub-Saharan Africa: evidence of impact to date." Study commissioned by the Science Council Standing Panel on Impact Assessment. Rome, Italy: CGIAR Science Council Secretariat. 78 pp.

Masset, E., M. Gaarder, P. Beynon, and C. Chapoy. 2013. "What Is the impact of a Policy Brief? Results of an Experiment in Research Dissemination." *Journal of Development Effectiveness* 5(1): 60-73.

Masset, E., R. Mulmi, and A. Summer. 2011. "Does Research Reduce Poverty?: Assessing the Welfare Impacts of Policy-Oriented Research in Agriculture." IDS Working Paper No. 360. Sussex: Institute for Development Studies.

Merrey, D.J. 2015. *An Evaluation of CGIAR Centers' Impact Assessment Work on Irrigation and Water Management Research*. Rome, Italy: Standing Panel on Impact Assessment, CGIAR Independent Science and Partnership Council (ISPC).

Mills, B.F., C. Nelson, and R. Achdiawan. 2017. "Into the Forest With or Without a Trace: A Multi-Level Analysis of Forest Co-Management in Guinea." Final Report to the CGIAR Standing Panel on Impact Assessment: Documenting the Impact of Under-Evaluated Areas of CGIAR Research.

Muralidharan, K and V. Sundararaman. 2009. "Teacher Performance Pay: Experimental Evidence from India." NBER Working Paper No. 15323. Cambridge, MA: National Bureau of Economic Research.

Newman, K., C. Fisher, and L. Shaxson. 2012. "Stimulating Demand for Research Evidence: What Role for Capacity-building?" *IDS Bulletin Number 43(5).*

Olken, B.A. 2007. "Monitoring Corruption: Evidence from a Field Experiment in Indonesia." *Journal of Political Economy* 115(2): 200-249.

Pardey, P.G. and V.H. Smith. 2004. *What's Economics Worth? Valuing Policy Research.* Baltimore, MD: Johns Hopkins University Press.

Pawson, R. and N. Tilley. 1997. *Realistic Evaluation.* Thousand Oaks, CA: SAGE Publishing.

Place, F. and P.B.R. Hazell. 2015. "Workshop on Best Practice Methods of Assessing the Impact of Policy-Oriented Research: Summary and Recommendations for the CGIAR." Independent Impact Assessment Report No. 41. Washington, DC: International Food Policy Research Institute.

Raitzer, D.A. 2008. "Assessing the Impact of CIFOR's Influence on Policy and Practice in the Indonesian Pulp and Paper Sector." PORIA Case Study, CGIAR Science Council.

Raitzer, D.A. and J.G. Ryan. 2008. "State of the Art in Impact Assessment of Policy-Oriented International Agricultural Research." *Evidence and Policy* 4(1): 5-30.

Renkow, M. 2010. "Impacts of IFPRI's 'Priorities for Pro-Poor Public Investment' Global Research Program." IFPRI Impact Assessment Discussion Paper No. 35. Washington, DC: International Food Policy Research Institute.

Renkow, M. 2014. "Consultancy With CGIAR Standing Panel On Impact Assessment For SIAC Activity 2.3 – Tracking Policy-Oriented Research Outcomes (Phase 1): Summary Report." Project Report.

Renkow, M. 2015. "Consultancy With CGIAR Standing Panel On Impact Assessment For SIAC Activity 2.3 – Tracking Policy-Oriented Research Outcomes (Phase 2): Updating the POR Outcome Database." Project Report.

Renkow, M. and D. Byerlee. 2010. "The Impacts of CGIAR Research: A Review of Recent Evidence." *Food Policy* 35(5): 391-402.

Renkow, M. and D. Byerlee. 2014. "Assessing the Impact of Policy-Oriented Research: A Stocktaking." Paper presented at a Workshop on Assessing the Impact of Policy-Oriented Research, Washington D.C. November 11-12, 2014.

Renkow, M. and R. Slade. 2013. "An Assessment of IFPRI's Work in Ethiopia 1995-2010: Ideology, Influence and Idiosyncrasy." IFPRI Impact Assessment Discussion Paper No. 35. Washington, DC: International Food Policy Research Institute.

Ryan, J.G. 1999. "Assessing the Impact of Rice Policy Changes in Vietnam and the Contribution of Policy Research." Impact Assessment Discussion Paper No. 8. Washington, DC: International Food Policy Research Institute.

Ryan, J.G. 2002. "Assessing the Impact of Food Policy Research: Rice Trade Policies in Vietnam." *Food Policy* 27(1): 1-29.

Ryan, J.G. and X. Meng. 2004. "The Contribution of IFPRI Research and the Impact of the Food for Education Program in Bangladesh on Schooling Outcomes and Earnings." Impact Assessment Discussion Paper No. 22. Washington, DC: International Food Policy Research Institute.

Schimmelpfennig, D.E., C.J. O'Donnell, and G.W. Norton. 2006. "Efficiency Effects of Agricultural Research in the United States." *Agricultural Economics* 34(3): 273-280.

Shah, T., S. Bhatt, R.K. Shah, and J. Talati. 2008. "Groundwater Governance Through Electricity Supply Management: Assessing an Innovative Intervention in Gujarat, Western India", *Agricultural Water Management* 95(11): 1233-1242.

Shideed, K., A. Mazid, M.A.M. Ahmed, and Z. Zuhair. 2008. "Returns to Policy-Oriented Agricultural Research: The Case of Barley Fertilization in Syria." PORIA Case Study, CGIAR Science Council.

Slade, R. and M. Renkow. 2014. "Independence or Influence: Tradeoffs in Development Policy Research," in D.E. Sahn (ed.), *New Directions in the Fight Against Hunger and Malnutrition: A Festschrift in Honor of Per Pinstrup-Andersen*. New York: Oxford University Press.

TANGO. 2017. Assessing the Impact of IFPRI's Intra-Household Research Program, 1995-2000, on the Field Practice of INGOs. Unpublished report submitted to SPIA. Rome, Italy: Standing Panel on Impact Assessment, CGIAR Independent Science and Partnership Council (ISPC).

Templeton, D. and N. Jamora. 2008. "Economic Assessment of Policy-Oriented Research on the Private Health Costs of Pesticide Use in the Philippines." PORIA Case Study, CGIAR Science Council.

Walker, T., J. Ryan, and T. Kelley. 2010. "Impact Assessment of Policy-Oriented International Agricultural Research: Evidence and Insights from Case Studies." *World Development* 38 (10): 1453–1461.

Weible, C.M., P.A. Sabatier, and K. McQueen. 2009. "Themes and Variations: Taking Stock of the Advocacy Coalition Framework." *The Policy Studies Journal* 37(1): 121-140.

Weiss, C.H. 1979. "The Many Meanings of Research Utilization." *Public Administration Review* 39(5): 426-431.

World Bank. 2003. *The CGIAR at 31: An Independent Meta-Evaluation of the CGIAR.* Washington DC: World Bank.

Table 1. Notable POR Impact Assessments Conducted by CGIAR Centers

Center (Timing)	Location (Scale)	Program Assessed	Qualitative Impacts	Quantitative Assessment
Bioversity (1994 -)	Global	Establishment of In-Trust Agreements formalizing legal status of *ex situ* CGIAR germplasm	(a) More rapid agreement on the Convention on Biological Diversity; (b) Maintenance of integrity of CGIAR germplasm as global public good	n/a
	Vietnam (all rice consumers and producers)	Research on liberal-ization of rice prices toward export parity	Relaxation of rice export quotas and internal restrictions on rice trade	NPV of total benefits = $45 - 91 million 56 < b/c < 114
IFPRI (1991-2003)	Bangladesh (17,811 schools, 2.1 million students)	Food for Education program	20-30% increase in school participation rates. IFPRI influenced (a) program conception, (b) program evaluation, (c) improved program targeting, and (d) training and capacity building.	NPV of total benefits = $248 million IRR=64-96%
IFPRI (1992-2000)	Bangladesh (all consumers)	Rural Rationing program	Abolishment of the program; promotion of private tendering of food; lowered food prices; downward adjustment of food stocks.	Median NPV of total benefit=$41.1million 11.7 < b/c < 60 Median IRR = 98%
CIFOR (2000-2006)	Indonesia (107,000 ha conserved, 32,000-76,000 ha not cleared	Political economy of the pulp and paper sector, fiber sourcing practices	Improvements in sustainability of pulp production practices, regulation of the pulp and paper sector, and due diligence for forestry investments.	NPV of total benefit = $19-21 million 0.96 <b/c<6.2
ICARDA (1984-2005)	Syria (1.5 million ha)	Fertilizer distribution/ pricing policy for barley in arid zones	Increased barley output, improved livestock nutrition due to more efficient fertilizer use	NPV of total benefits = $73.4 million b/c = 41 IRR = 70.2%

Table 1 (continued)

Center (Timing)	Location (Scale)	Program Assessed	Qualitative Impacts	Quantitative Assessment
ILRI (1996-2004)	Kenya (all milk consumers and producers)	Decriminalization of marketing by small-scale milk vendors	Reduced marketing margins, increases in both consumer and producer surplus	NPV of total benefits = $44-283 million IRR = 62-108%
IFPRI (1997-2000)	Mexico (5 million families)	Monitoring and evaluation of *PROGRESA* program of conditional cash transfers	(a) faster program implementation; (b) improved program evaluation and project manager training; (c) enhanced likelihood of program continuation beyond political regime changes; (d) spillovers to programs in other countries.	Median NPV of total benefits=$992/student (a) b/c =16.4 (b) b/c = 5.8 (c) b/c =57.1 (d) b/c = 4.9
IRRI (1989-2008)	Philippines (90%/80% of Philippine rice area/ rice farmers	Private health cost savings of pesticide use policies	(a) regulation of highly toxic insecticides in rice production; (b) labeling requirements; (c) training of rural health officers.	NPV of realized benefit=$117 million b/c = 98; IRR = 65%

Sources (in order): Gotor, Caracciolo, and Watt (2010); Ryan (1999); Ryan and Meng (2004); Babu (2000); Raitzer (2008); Shideed et al. (2008); Kaitibie et al. (2008); Behrman (2010); Templeton and Jamora (2008)

Table 2. Key Steps for Pursuing ex post Impact Assessment of Policy-Oriented Research

Stage of POR / PORIA	PORIA Method
Onset of POR research	• Determine major outcomes and impacts to be targeted • Develop a theory of change
During POR research	• Track outreach activities • Accumulate evidence for use of outputs in policy decision-making (compile documents, conduct strategic interviews) • POR may itself be an evaluation of a pilot policy intervention and results may be useful to *ex post* evaluation
Policy outcome	• Document the change that had made • External professional to assess influence of research • Select policy outcomes to be followed up by impact analyses
Post-policy outcome	• Identify key indicators for the targeted impacts to measure • Collect or compile baseline measures of indicators (before the policy outcome takes effect)
Policy impact	• Measure quantitative impacts from the policy outcome, likely through use of modeling • Use qualitative methods to assess certain types of impacts and the contribution of policy outcome to the impacts

Source: Place and Hazell (2015)

Table 3. Attribution and Impact Measurement Challenges by Policy Outcome Types

Type of Policy Outcome	Attribution Challenges	Impact Measurement Challenges	Examples
Laws and regulations at the national and local levels	• Large number of actors needed to bring about regulatory/legal changes • Political inputs significant (e.g. trading votes for other policy objectives)	• "Advance the clock" approach is the norm for counterfactuals in existing studies • Impacts may play out over an extended period of time	• Changes to rice trade policy in Vietnam (Ryan 2002); • Milk marketing policy changes in Kenya (Kaitibie, et al. 2008)
Creation (or radical change) of institutions	• Large number of actors needed to bring about large institutional changes • In some cases key policy champions linked to a specific research center (e.g., IFPRI's link to the Ethiopian Commodity Exchange)	• Huge number of effects. • Impacts of research influencing the global policy agenda not readily quantified in terms of income generation and poverty reduction	• In-Trust Agreements formalizing legal status of CGIAR germplasm (Gotor, Caracciolo, and Watt 2010); • IFPRI contribution to formation of the Ethiopian Commodity Exchange
Government investment priorities and budget allocations	• May require relatively few actors, few ministries to coordinate • The "right" policy champion linked to research center may be highly effective	• Requires evidence of higher payoffs to new govt investment portfolio *vis-à-vis* payoffs to prior investment portfolio • Amenable to CGE modeling	Support for country participation in CAADP, leading to increased budget shares for agricultural research
Operational and management (O&M) innovations for government agencies and projects	Need to establish superiority of outcome(s) *vis-à-vis* alternative providers or ways of providing the same O&M services	Where model-based research results drive policy change, the temptation is to use the same model to measure (or forecast) impacts	• PROGRESA (Behrman 2010); • Ethiopia's Productive Safety Nets Program (Renkow and Slade 2013)
International treaties, declarations, or agreements reached among global or regional parties (e.g. at major policy conferences)	• Large number of actors needed to enact changes • Often part of much larger agreements (e.g., IPCC, WTO)	• Amenable to "advance the clock" approach • Impacts may play out over an extended period of time • Impacts of research influencing the global policy agenda not readily quantified in terms of income generation and poverty reduction	• IFPRI contribution to Doha round (Hewitt 2008); • Contributions of ICRAF, CIFOR to UN Framework Convention on Climate Change (UNFCCC)

Figure 1. CGIAR Policy Outcomes by Type, 2006-2014

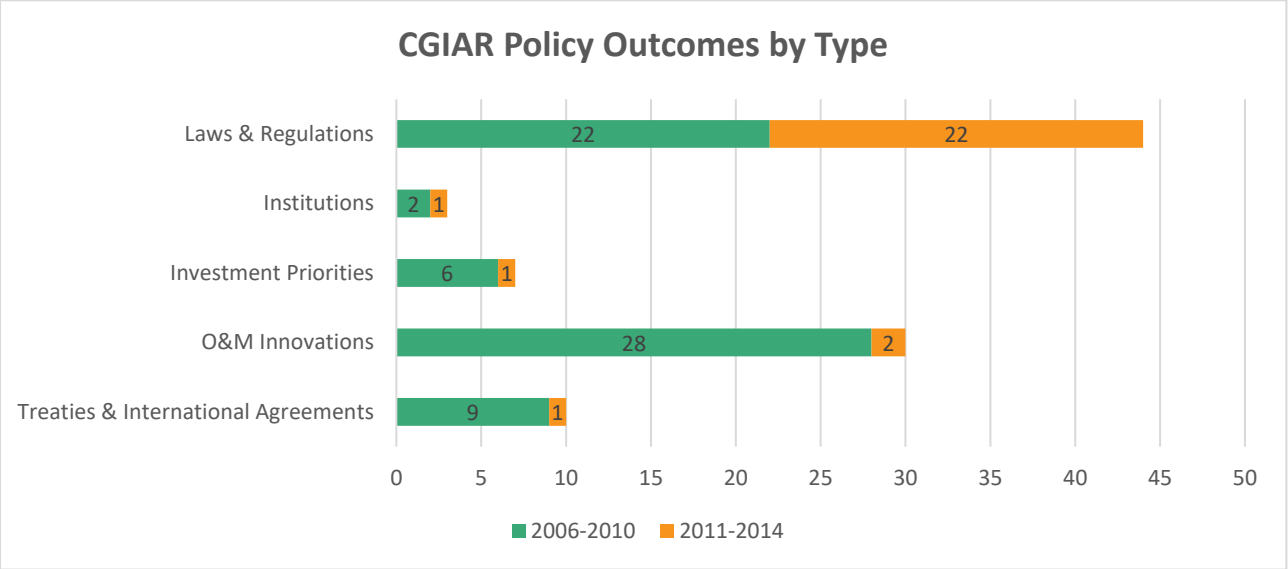


Figure 2. CGIAR Policy Outcomes by Center/CRP and by Topic Areas, 2006-2014

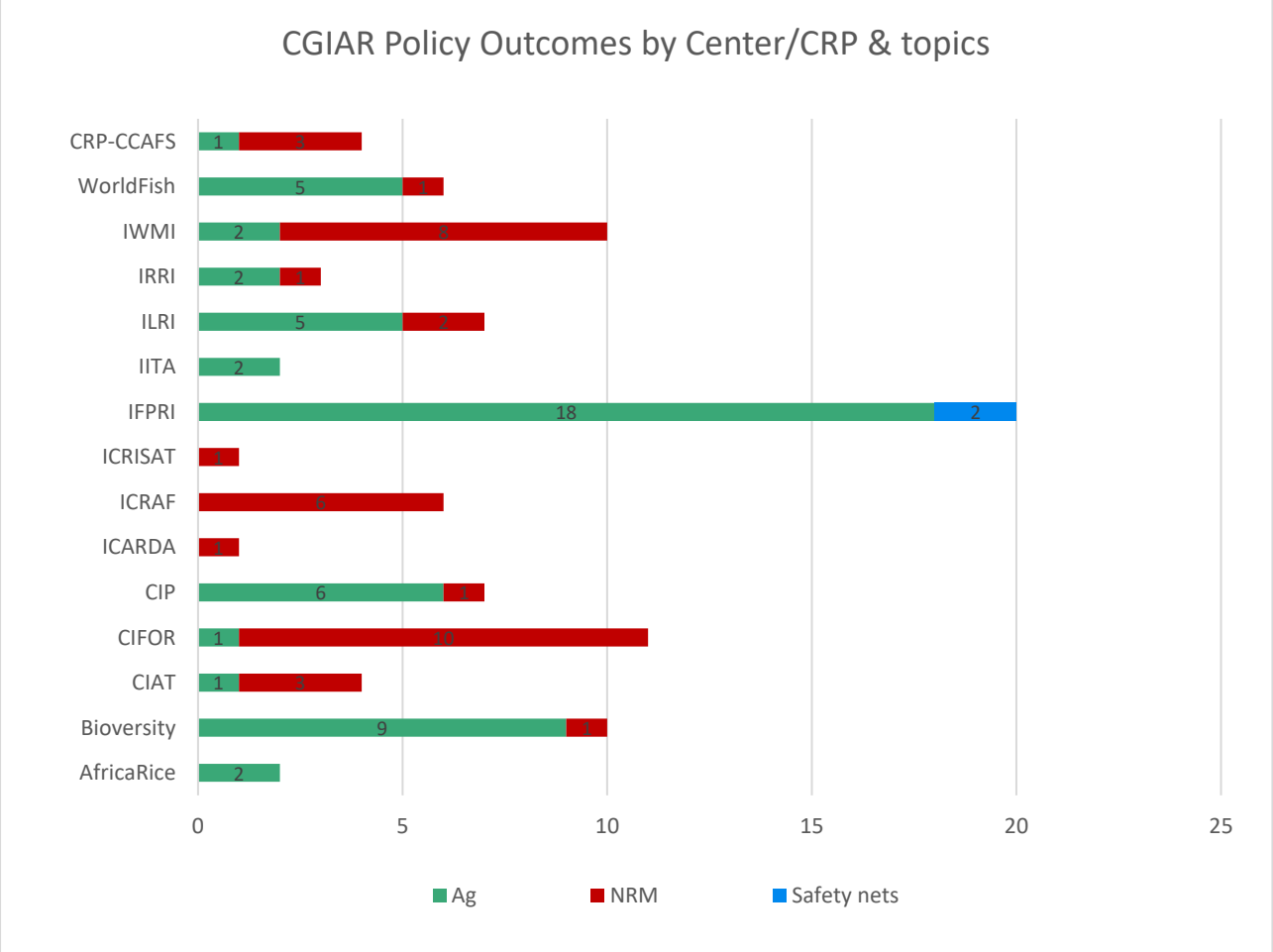
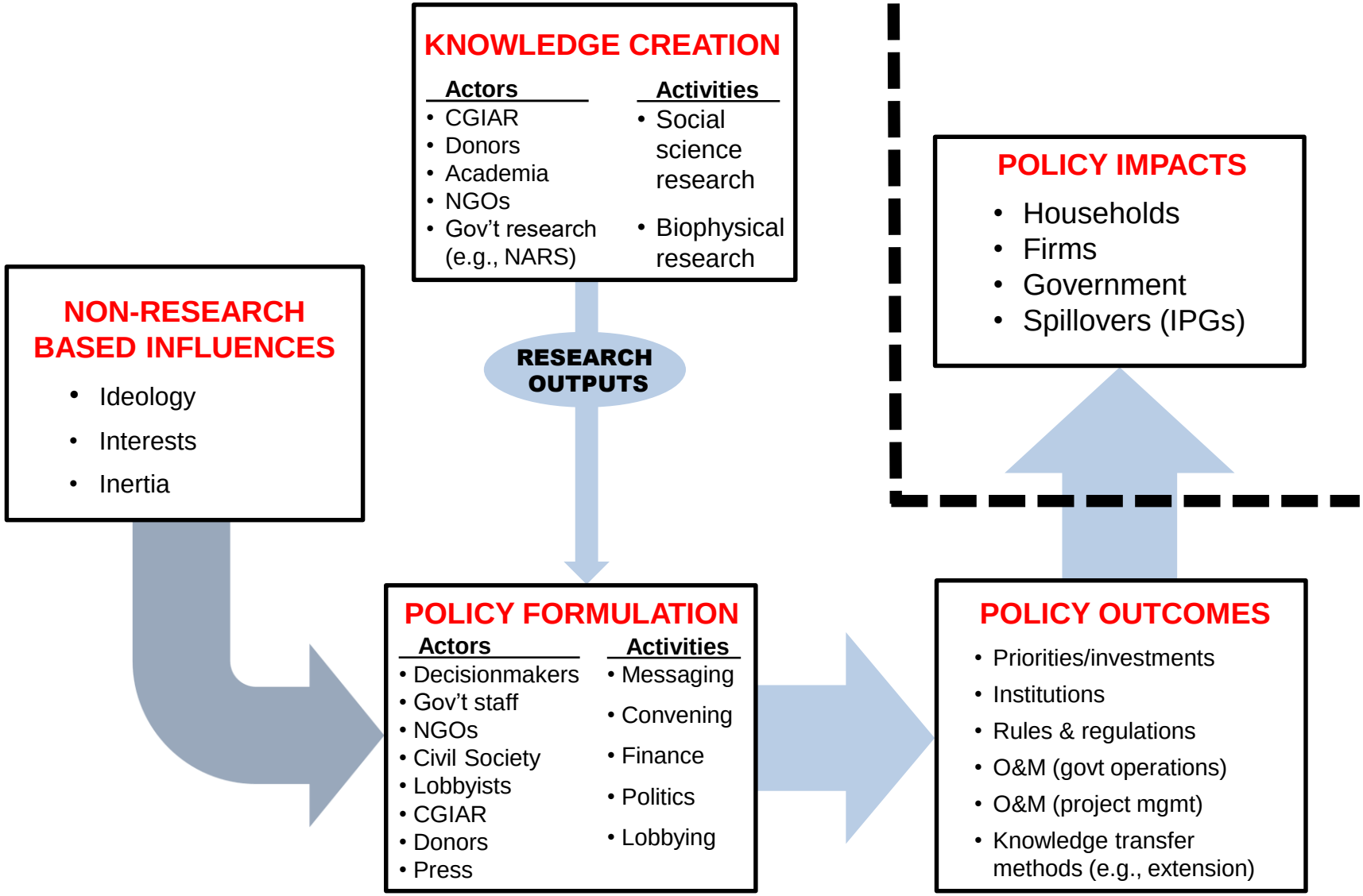


Figure 3. Impact Pathway for Policy-Oriented Research



Appendix Table 1. Policy Outcomes Plausibly Attributable to CGIAR Research, 2006-2010

Center/ Year[1]	Outcome	Venue	Type
ARC 2010	Effective responses by AfricaRice member states to the rice crisis leading to significant increase in rice production	Africa	Laws and regulations
BIO 1 2006	Decisions Adopted by the Conference of the Parties to the Convention on Biological Diversity at its Seventh Meeting	Global	Treaty
BIO 2 2007	Nepal Seed Law modified to allow the release of farmer varieties	Nepal	Laws and regulations
BIO 3 2008	Peruvian national seed certification authority agrees to facilitate the process for seed certification for varieties included in the national register of indigenous crops	Peru	Laws and regulations
BIO 4 2009	Ministry of Agricultural and Rural Development of Vietnam to recognize, encourage and impose quality conditions to informal seed systems	Vietnam	Laws and regulations
BIO 5 2009*	Influence of Bioversity on the Governing Body of the Int'l Treaty on Plant Genetic Resources for Food and Agriculture (and use of the Standard Material Transfer Agreement by CGIAR Centres)	Global	Treaty
BIO 6 2009	Bioversity influences the Peruvian Ministry of Agriculture to officially recognize a National Registry of Potato Varieties	Peru	Laws and regulations
BIO 7 2010	Draft of revised EU novel Food Regulation that accommodates developing country concerns in terms of reduced food safety requirements for the admission to the EU market of biodiversity-derived food products	EU	Laws and regulations
BIO 8 2010	Use of management plans for conserving Crop Wild Relatives in protected areas by five countries	Armenia, Uzbekistan, Madagascar, Bolivia, Sri Lanka	Operations and management
CIAT 2010	US Patent and Trademark decision to revoke an existing patent on the Enola bean patent	US	Laws and regulations
CIFOR 1 2006	Policymakers in Indonesia are persuaded by CIFOR's research to remove a ban on rattan export that threatened livelihood options for poor rattan farmers	Indonesia	Laws and regulations
CIFOR 2 2007	Restrictive regulations on the transport of forest products in Brazil is abolished	Brazil	Laws and regulations
CIFOR 3 2007	CIFOR's research helps to target the World Bank's Indonesia Forest Strategy	World Bank	Investment and budget
CIFOR 4 2008	Freeing up the transport of forest products derived from smallholder and community forestry in Indonesia	Indonesia	Laws and regulations
CIFOR 5 2009	New approaches improve conservation planning for millions of hectares via use of Multidisciplinary Landscape Assessment approach	Indonesia	Operations and management
CIFOR 6 2009	Changing Cameroon's legal framework on forest management	Cameroon	Laws and regulations

Appendix Table 1 (continued)

Center/ Year	Outcome	Venue	Type
CIFOR 7 2009*	Regulatory reform: Equity for half a million forest people in the Brazilian Amazon	Brazil	Laws and regulations
CIFOR 8 2009*	Reforming participatory forest management in Guinea and beyond	Guinea (with int'l spillovers)	Operations and management
CIFOR 9 2010	CIFOR research and capacity building enabled forest and land-use managers to implement strategies for addressing climate change mitigation in Latin America	Latin America	Operations and management
CIFOR 10 2010	CIFOR research on biodiversity and logging made a fundamental contribution 2009 ITTO/IUCN Guidelines for the Conservation and Sustainable Use of Biodiversity in Tropical Timber Production Forests	Global	Operations and management
CIFOR 11 2010	CIFOR research informed recommendations adopted by the Indonesian Central Bank in its policy and legal framework for preventing money laundering and terrorist financing funded by illegal logging and timber trade	Indonesia	Laws and regulations
CIP 1 2008	CIP's policy influence on reforms of laws governing urban farming in Kenya and Peru	Kenya, Peru	Laws and regulations
CIP 2 2009	Adoption of the farmer field school method by governmental and non-governmental research and development oriented institutions	Peru	Operations and management
ICARDA 2008	Dryland agro-biodiversity project promotes use of native fruit tree wild species in afforestation and introduction of biodiversity conservation into educational curricula	Jordan, Syria, Lebanon, and the Palestinian Authority	Operations and management
ICRAF 1 2008	ICRAF research on the importance of trees in farming landscapes to adaptation and mitigation feed into deliberations and reports of the UNFCCC and IPCC.	Africa	Treaty
ICRAF 2 2008	Influence on Indonesia's Ministry of Forestry plans for implementing REDD mechanisms at the 13th Conference of Parties in the UN Framework Convention on Climate Change (UNFCCC)	Indonesia	Treaty
ICRAF 3 2008	Use of a GIS tool for the mapping and analysis of rainwater harvesting potentials applied in 12 African countries and 10 cities	Africa	Operations and management
ICRAF 4 2009	Research on potential and constraints of agroforestry for mitigation and adaptation to climate change used by the IPCC and the UN Framework Convention on Climate Change	Global	Treaty
ICRAF 5 2010	World Bank adopts the ASB Opportunity Cost analysis of Reducing Emissions from Deforestation and Land Use Change as part of its FCPF Capacity Building Program for REDD implementation	World Bank	Operations and management
ICRISAT 2008	Adoption of the watershed consortium approach developed by ICRISAT and its NARS partners for enhancement of rainfed areas in 250 drought prone districts in India	India	Operations and management

Appendix Table 1 (continued)

Center/ Year[1]	Outcome	Venue	Type
IFPRI 1 2006*	Expansion of coverage and benefits for Conditional Cash Transfer Programs	Mexico, Nicaragua	Operations and management
IFPRI 2 2006*	IFPRI's Gender and Intra-household Analysis assists in the development of policies, programs, and projects that take into account gender and other intra-household resource allocation processes	Global	Operations and management
IFPRI 3 2007	Ethiopian Market Reforms and formation of the Ethiopian Commodity Exchange	Ethiopia	Institutions
IFPRI 4 2007*	Regional HIV/AIDS Network (RENEWAL) influences the U.S. Presidential Emergency Plan for AIDS Relief and a WHO Resolution	Malawi, Zambia Uganda, Kenya, South Africa,	Institutions
IFPRI 5 2007*	IFPRI contributions to Doha Round WTO negotiations	Global	Treaty
IFPRI 6 2008*	IFPRI research affects composition of government investment portfolio to Uganda's Poverty Reduction Strategy	Uganda	Investment and budget
IFPRI 7 2008*	IFPRI contributions to the Comprehensive Africa Agriculture Development Programme (CAADP)	Africa	Laws and regulations
IFPRI 8 2009*	IFPRI support to governments in responding to the 2008 food price crisis	Global	Laws and regulations
IFPRI 9 2009	Investment in early childhood nutrition is now one of the most common interventions in poor countries & guides World Bank and UNICEF activities	World Bank, UNICEF	Operations and management
IFPRI 10 2010	Developing Population-Level Indicators of the Quality of Infant and Young Child Feeding Practices used by WHO, USAID and many NGOs	WHO, USAID, NGOs	Operations and management
IFPRI 11 2010*	2020 Vision for Food, Agriculture, and the Environment conferences affect policy debates within multilateral and bilateral donors and NGOs	Global	Operations and management
IFPRI 12 2010	Uganda Strategy Support Program contributes to design of the Plan for the Modernization of Agriculture	Uganda	Investment and budget
IFPRI 13 2009	East Africa biosafety programs instrumental in passage of Kenyan Biosafety Bill and approval of confined field trials for banana and cotton in Uganda and cotton in Malawi and Kenya	Uganda, Kenya, Malawi	Laws and regulations
IFPRI 14 2008	IFPRI study on World Vision program impacts alters USAID Title II program orientation	NGOs, USAID	Operations and management
IITA 1 2007	Reduction of child labor incidents on cocoa farms in Ghana	Ghana	Operations and management
IITA 2 2008	Strengthening the National Committee on Food and Nutrition and Establishment of the Nigeria National Nutrition Council	Nigeria	Institutions
ILRI 1 2006	ILRI's poverty and livestock dynamics analysis methodology adopted by governments of Peru and Kenya	Peru, Kenya	Operations and management
ILRI 2 2006	ILRI Research helps targeting IFAD dairy investment in Kenya	Kenya	Operations and management

Appendix Table 1 (continued)

Center/ Year[1]	Outcome	Venue	Type
ILRI 3 2007	Poor pastoral communities in Kenya and Tanzania use ILRI's research evidence in negotiations with policy makers to change land use and policy regulations and livestock improvement efforts	Kenya, Tanzania	Laws and regulations
ILRI 4 2007	Policy-makers and regulators adopt new institutional approaches and appropriate technologies to harmonize standards and improvement of informal milk markets across the region.	Rwanda, Tanzania, Uganda	Laws and regulations
ILRI 5 2009	Using African climate vulnerability and poverty maps to inform national, regional and global R&D priorities and efforts aimed at sustainable poverty reduction	Africa	Investment and budget
ILRI 6 2010	Approval of 18 new methane emission factors for African domestic ruminants for inclusion in the IPCC's Emissions Factor Database	Global	Operations and management
ILRI 7 2010	An action plan improves the policy environment for smallholder dairy farmers	East Africa, India	Operations and management
IRRI 2006	'Three Reductions, Three Gains' practices adopted and up-scaled by Vietnamese Government.	Vietnam	Operations and management
IWMI 1 2006	Revision of WHO guidelines for safe use of wastewater in agriculture	WHO	Operations and management
IWMI 2 2006	Improved protection of public health and long-term livelihoods of cadmium exposed communities in northwestern Thailand.	Thailand	Operations and management
IWMI 3 2007	Water User Associations Transform Canal Management in Central Asia	Central Asia	Operations and management
IWMI 4 2007*	Gujarat institutes IWMI recommendations on co-management of electricity and groundwater	India	Operations and management
IWMI 5 2008	Promoting the Multiple Use water Services approach for integrated water resource management at local and global scales	Bolivia, Ethiopia, Thailand, Nepal, India, Colombia, South Africa, Zimbabwe	Operations and management
IWMI 6 2009	Integrated and informed emergency relief and post-tsunami water supply rehabilitation in Sri Lanka	Sri Lanka	Operations and management
IWMI 7 2009	IWMI's Global Environmental Flow Calculator informs water resources assessments and planning at multiple scales	EU, WWF	Operations and management
IWMI 8 2010	Enactment of the Punjab preservation of Sub-Soil Water Act improved groundwater governance	India	Laws and regulations
WF 1 2006	Contribution to Indonesian Strategy for rehabilitation and restoration of capture fisheries, leading to improved fisheries livelihoods for coastal communities and improved fisheries management.	Indonesia	Operations and management

Appendix Table 1 (continued)

Center/ Year	Outcome	Venue	Type
WF 2 2006	Government of Malawi actively promotes Integrated Aquaculture-Agriculture as a priority investment in the national food security program and civil society organizations respond	Malawi	Operations and management
WF 3 2010	WorldFish research and policy partnerships strengthen development investment in Fisheries and Aquaculture in Africa under CAADP	Africa	Investment and budget
WF 4 2010	WorldFish's insights on post-tsunami rehabilitation of fisheries and aquaculture in Aceh and Bangladesh incorporated into emergency planning for multiple countries	Bangladesh	Operations and management
WF 5 2010	Inclusion of Community- Based Fisheries Management in the Bangladesh Department of Fisheries Inland Capture Fisheries Strategy and implementation program informs its operational and strategic directions for inland fisheries management	Bangladesh	Operations and management

Note: * Indicates POR outcomes that have been the subject of quantitative IAs.

Appendix Table 2. Policy Outcomes Plausibly Attributable to CGIAR Research, 2011-2014

Center/ Year	Outcome	Venue	Type
ARC 2011-14	AfricaRice strengthened policies to increase rice production and achieve rice self-sufficiency in ARC member countries and regional organizations	Sub-Saharan Africa	Laws and regulations
BIO 1 2013	Bioversity contributions to developing legal mechanisms for participation in ITPGRFA	Global	Treaty
BIO 2 2014	Food Security Bill Supports Climate-Smart Agriculture in India through Sourcing of Climate-Resilient, Nutritious Cereals (Reported by CCAFS)	India	Laws and regulations
CIAT 1 2013-14	Contribution to establishing PES Scheme in Peru's Cañete River Basin	Peru	Operations and management
CIAT 2 2013	CIAT science influences national adaptation policy in Nicaragua, which leverages a large scale IFAD investment to support adaptation policy (Reported by CCAFS)	Nicaragua	Laws and regulations
CIAT 3 2014	Using CIAT science, Colombian government prioritizes Nationally Appropriate Mitigation Action (NAMA) for reconverting pastures into fruit crops (Reported by CCAFS)	Colombia	Laws and regulations
CIP 1 2012	Promoting non-conventional seed production (Peru, Ecuador)	Peru, Ecuador	Laws and regulations
CIP 2 2008-12	Including native potato varieties in seed registries in Peru	Peru	Laws and regulations
CIP 3 2014	Including native-potatoes in Peru's National Strategy for Food Security and Nutrition 2013-2021	Peru	Laws and regulations
CIP 4 2004-12	Promoting inclusion of biofortified foods (OFSP) in National Agricultural Policies for Mozambique, Tanzania and Nigeria	Mozambique, Tanzania, Nigeria	Laws and regulations
CIP 5 2012	Formal seed certification of sweet potato planting material in Ethiopia	Ethiopia	Operations and management
ICRAF 2014	Bringing the National Agro-forestry Policy of India forward (Reported by CCAFS)	India	Laws and regulations
IFPRI 1 2011, 2013	Contributions to management and operations of Conditional Cash Transfer programs in Tanzania and Bangladesh (Also reported by PIM)	Bangladesh, Tanzania	Operations and management
IFPRI 2 2013-14	Contributions of the Program for Biosafety (PBS) to policy change in Vietnam, Kenya, Uganda, Malawi, and Tanzania (Also reported by PIM)	Global	Laws and regulations
IFPRI 3	Contributions to lifting of maize export ban in Tanzania (Also reported by PIM)	Tanzania	Laws and regulations
IFPRI 4 2014	Contributions to Nigeria's decision to lower its rice tariff (Also reported by PIM)	Nigeria	Laws and regulations
IFPRI 5 2012	Contribution to EU Biofuels Policy reform (Also reported by PIM)	EU	Laws and regulations

Appendix Table 2 (continued)

Center/ Year	Outcome	Venue	Type
IFPRI 6 2012	Monitoring and evaluation of programs under Ethiopia's Ag. Growth Programme	Ethiopia	Operations and management
IRRI 1 2014	Historic agreement between India, Nepal, and Bangladesh Cooperative Agreement on the joint evaluation rice varietal data for release and commercialization in those countries	Bangladesh, India, Nepal	Institutions
IRRI 2 2013	Integration of Alternate Wetting and Drying (AWD) irrigation management into Vietnam's climate change mitigation campaign (e.g. 20-20-20 strategy) (Reported by CCAFS)	Vietnam	Operations and management
IWMI 1 2014	IWMI's Vulnerability Mapping included into Sri Lankan National Climate Change Adaptation Strategy for 2011-2016 (Reported by CCAFS)	Sri Lanka	Operations and management
IWMI 2 2014	Contributions to National Irrigation Management Fund priorities and commitments pursuant to India's 12th Five Year Plan (2012-2017) (Also reported by WLE)	India	Investment and budget
WF 2012-13	From Conflict to Collaboration in Zambia: STARGO has helped lake communities in Zambia, Cambodia and Uganda lay a foundation for sustainable management of natural resources.	Zambia	Operations and management
CCAFS 1 2012	Findings from Commission on Sustainable Agriculture and Climate Change penetrate diverse policy forums: Mexico, Kenya, CFS	Mexico, Kenya, Global	Laws and regulations
CCAFS 2 2012	Taking Forward the Implementation of the Agricultural Priority Actions in the Kenya National Climate Change Action Plan (NCCAP) 2013 – 2017 (Multi-center)	Kenya	Laws and regulations
CCAFS 3 2012	CCAFS informs large-scale global and national investments in food security and CC	Global	Investment and budget
CCAFS 4 2012	Cambodian Climate Change Priorities Action Plan for Agriculture (CCPAP)	Cambodia	Laws and regulations

CGIAR Independent Science & Partnership Council (ISPC) Secretariat
c/o FAO, Viale delle Terme di Caracalla 00153 Rome, Italy
t: +39 06 570 52103 - e: ISPC-Secretariat@fao.org
http://ispc.cgiar.org

CGIAR | Independent Science and Partnership Council