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## Science Forum 2016 Special Issue Inception Workshop June 2017



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#### BACKGROUND AND CONTEXT

The ISPC's biennial Science Forum (SF) has been used to catalyze discussion, to convene scientific groups external to the CGIAR around important issues, and to foster partnerships that complement the expertise of the CGIAR and its partners on agricultural research initiatives and for development impacts. For each of the Science Fora, the ISPC has developed relevant special issues of journal publications including key papers that can inform CGIAR research and the field at large.

The fourth SF took place in April 2016 at the UN Conference Centre, Addis Ababa, Ethiopia, and was co-hosted by the United Nations Economic Commission for Africa (UNECA). The theme was: "*Agricultural Research for Rural Prosperity: Rethinking the Pathways*."<sup>1</sup> The objective was to reassess the pathways for agricultural research to stimulate inclusive development of rural economies in an era of climate change. The SF aimed to marshal evidence and build on lessons learned to date, in order to suggest an updated list of priority research areas for poverty reduction and approaches that

involve more strategic and inclusive engagement with partners.

At SF 2016, participants were asked to submit note cards suggesting various pathways to impact on CGIAR's System-Level Outcome 1 (SLO 1) of reducing poverty, drawing on evidence and/or experience. Following SF 2016, the ISPC worked through various materials from the Forum to produce an ex-ante list of 18 impact pathways, linking agricultural research for development (AR4D) with poverty reduction in a results-based management format. The impact pathways framework was then used to generate an idealized "wish list" table of contents for a special issue, proposing research papers that in most cases are intended to cover more than one pathway.

This set of papers does not constitute the proceedings of the Forum. Instead, the ISPC has endeavored to use the insights from the Forum to frame a coherent and comprehensive collection of research papers on this strategically-important topic from a systems perspective. The aim of the special issue is to explore the pathways through which agricultural research can have practical impacts on poverty,

1 <http://www.scienceforum2016.org>

using evidence and perspectives from a range of disciplines and in many cases transcending conventional disciplinary boundaries. In addition to debunking myths, by identifying knowledge gaps and constraints or barriers that impede progress along the impact pathways, papers in the special issue will suggest priority research questions as well as implications for research methods/design, and for necessary AR4D partnerships.

A workshop for lead authors was held at Oxford University (12-13 December 2016) to critique outlines and to ensure that all papers in the proposed collection were on track in terms of focus, scope, and research quality and that the whole set provided a comprehensive, evidence-based analysis of prospects within these interacting AR4D pathways.

## FOOD AND AGRICULTURAL INNOVATION PATHWAYS FOR PROSPERITY

Lead authors presented an outline of their papers (including methodology to be employed: meta-analysis, realist synthesis, or case studies) followed by a discussion and in-depth critique. Key messages from the presentations and ensuing deliberations are summarized here.

Agriculture remains a major source of income in developing countries and plays a central role in reducing poverty. However, it is not the only route to reducing poverty. Furthermore, poverty reduction is a multidimensional concept that is not limited to increasing incomes. The links between agricultural research and poverty reduction are complex and interdependent, and depending on context, there may be multiple, interacting pathways through which agricultural research could contribute to reductions in poverty and associated vulnerabilities. These pathways may involve innovations to increase agricultural productivity; innovations to minimize agricultural production risks; addressing market imperfections and failures; agricultural diversification; improving natural resource management, governance, property rights, and rural livelihoods; improving human nutrition and health; enhancing food supply and reducing food system waste; creating and managing

food safety nets; and enhancing national food and agricultural policies and programs.

### **Innovations to increase agricultural productivity:**

Productivity growth and lower food prices have been a major engine of poverty reduction (e.g. the Green Revolution). Poverty reduction via this route requires widespread adoption, substantial reduction in per-unit cost of production, and appropriate market conditions. For some technologies, poor producers face obstacles to adoption, e.g. those needing complementary inputs. Diffusion and Impact of Improved Varieties in Africa (DIIVA)<sup>2</sup> (and other) studies have demonstrated that poor producers adopt improved varieties of many staple crops (stronger evidence for maize and wheat, weaker for potatoes and sweet potatoes). However, small areas under production for poor producers limit major income gains. Market conditions also limit income gains; if national or local prices fall, non-adopters lose and gains to adopters are attenuated.

### **Innovations to minimize agricultural production risks:**

Farming is inherently risky. The major risks that farmers face include climatic risk (affecting yields), pests and diseases, fluctuating cost of inputs and prices received for products (market risk), and storage risk (loss of quality and health risks, e.g. aflatoxins). In semi-arid regions, low-input systems farmers are most affected by climatic risk, which is exacerbated by low soil fertility and poor agronomic management. Farmers cope with climate risk through timing of planting, selection of crop types (e.g. drought tolerance vs. yield), selection of crop varieties (growing period, e.g. short vs. long season), in-season adjustment of inputs (fertilizers, fungicides, herbicides, labor), and in-season adjustment of the target output (grain vs. graze). Commercial farmers might also use forward selling, contracts, insurance; identifying constraints and ameliorating/managing the constraints; and, seasonal climate forecasting. In addition to practical innovations, influencing how people conceptualize risk can have similar effects to introducing new technologies. Mental models are important for learning how people understand different topics. What information

2 [http://impact.cgiar.org/sites/default/files/pdf/DIIVA\\_book-2015.pdf](http://impact.cgiar.org/sites/default/files/pdf/DIIVA_book-2015.pdf)

do different kinds of people trust? Whether and where do women/men get information? An important mechanism in risk reduction is investment. Vulnerability reduction leads to increased ability to bear risk, and increased ability to invest.

**Addressing market imperfections and failures:**

There is rapid transformation of food systems in developing regions - this comprises a confluence of interdependent changes, including urban market development plus rural purchase market development; diet changes of urban and rural consumers; and, farm input supply chains to farmers and mid-stream/downstream supply chains to urban and rural consumers. Urbanization is driving increased demand for food products – the urban share in national food consumption and markets is bigger than the urban share in the population. Additionally, the share of purchased food in total rural food expenditures is high, implying rural-rural and urban-rural supply chains. While high amounts of processed food (as a share of the total) are linked to health problems, the processing boom is a big source of women’s employment, in addition to reducing seasonality and integrating national markets.

Productivity of and investment in supply chains can be as important as investment in farming. Output supply chain post-farmgate segments are important to consumer costs since about 60 percent of the costs of the food system (value chains) are formed after the farmgate, while input supply chains are crucial to formation of costs of farmers. Farm investment relies on supply chain investment/technology and vice versa - surveys in Africa have found that farmers who sell into urban markets are 13 times more likely to use fertilizer, manure and soil conservation investments than subsistence farmers. Finally, waste in supply chains seems to be far lower than commonly said (5 percent instead of 40 percent).

**Agricultural diversification:** Diversification can be a pathway to poverty reduction but the pathways are themselves diverse. Evidence shows the complexity of the pathways involved with potential for both increases and decreases in welfare depending on type of diversification and farming conditions (either increased marginalization of subsistence pro-

ducers or integration into diversified value chains). Thus, it is important to identify “best bets” for welfare enhancing diversification. Poverty is reduced by increasing incomes of farm and rural households through two mechanisms: increased farm income for those who diversify (assuming they are competitive producers and have access to markets), and increased wages for farm laborers (assuming increases in demand for labor, labor supply in agriculture is limited and there is limited use/possibility of labor saving technologies). Strong donor interest in nutrition and commercialization raises interest in the potential role of various types of diversification strategies. Diversification is also considered a key adaptation strategy for smallholder farmers under climate change – and is increasingly promoted. Further research could help to characterize some of the factors that influence the chance of success from different types of interventions and explore the different parameters of success.

**Improving natural resource assets:** Natural resource assets, especially land, are important for poverty reduction. Projects that unambiguously benefit households may have mixed effects on individuals within those households, especially women. The Gender, Agriculture and Assets Project (GAAP) conceptual framework provides the basis for identifying pathways by which women’s land rights could reduce poverty and increase the well-being of women and their households in rural areas. Contributions of women’s land rights to poverty reduction can operate through investment in natural resources which, in turn, can increase agricultural productivity; access to insurance; access to credit, either for investment or consumption smoothing; increase likelihood of receiving government services such as agricultural extension, irrigation, water supply and sanitation, and electricity; livelihood effects in employment and livelihood diversification; strengthen bargaining power in the household; and, empowerment. There is evidence supporting the conceptual framework; however the outcomes are complex and often imply trade-offs. More research is needed to understand and measure how assets affect and are affected by agricultural development, in different contexts. A gender-assets perspective focuses on differences in barriers that men and women face. A gendered

perspective also sharpens the focus on well-being, more broadly defined, and links agricultural research to health and nutrition outcomes.

**Improving human nutrition and health:** Malnutrition remains a pervasive public health problem in many low- and middle-income countries, and it often co-exists with infectious diseases such as malaria. The multi-directional linkages of agricultural productivity, health, and nutrition seem obvious, but evidence of the key pathways through income and food is still largely lacking. In the absence of well-functioning labor (and/or other) markets, illness of household members directly affects the use of farm labor and therefore productivity. However, most existing studies fail to consider seasonal variations and gender-related intra-household dynamics. Labor use in agriculture is highly seasonal, and critical periods in the farming calendar often coincide with both malnutrition and major peaks in transmission of malaria. This may delay planting, hamper weeding, and thus reduce harvests with ensuing, severe impacts on food self-sufficiency and income. Gender considerations are of utmost importance as women are not only agricultural laborers, but also take charge of healthcare within the household.

**Enhancing national food and agricultural policies and programs:** The four “A” model (access, assurance, ability, and attitude vis-à-vis resources, institutions, technology and culture) helps in analyzing public policies through a prism of autonomy and agency. In many countries, poverty reduction is slower because the autonomy of institutions providing resources and individuals trying to use those resources efficiently may be impaired. In some other cases, autonomy may exist but the actors may lack agency to use the available autonomy and make changes in their production and consumption environment. Cultural factors shape not only attitudes but also influence the way access, assurance, and ability play a role in food security and climate resilience.

## CONCLUSIONS AND WAY FORWARD

Each writing team is expected to critically assess the evidence for the key causal connections linking AR4D to poverty reduction for their focal pathway(s): How much evidence is available? What is the degree of agreement in interpretation of that available evidence? What primary conclusions (or contrasting interpretations) does the available evidence suggest? What are the key gaps in the available evidence (either where evidence is insufficient or major controversies persist in its interpretation)? Lead authors should bear in mind the gender dimensions of their focal pathway(s) and other implications for potential for “winners” and “losers” from AR4D investments. Moreover, where relevant, they should consider climate change and urbanization, which are two major drivers that likely will shape constraints and opportunities going forward along each of these pathways.

The concluding paper in the special issue will draw lessons from recent evidence, especially the other papers in the special issue, and attempt to cluster these impact pathways into operational AR4D impact networks. Stand-alone pathways are rare and there are complementarities and dependencies among pathways, with some pathways possibly being more important than others in some contexts. What does the analysis of impact pathways (possibly reconceived as impact networks) suggest about partnership priorities to achieve development impact? Implications for priority setting will be derived from foregoing insights on the interplay of pathways and partnerships.

Next steps include contacting additional potential authors and collaborators (for pathways not discussed) and receiving revised abstracts, followed by draft manuscripts that will be peer-reviewed. The special issue is expected to be published by the end of 2017.

