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Assessing How Agricultural Technologies can Change Gender Dynamics and Food Security

A Three-Part Toolkit

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Introduction

The Sustainable Development Goals (SDGs) launched in September 2015 both reaffirmed and expanded the earlier Millennium Development Goals (MDGs) (2000-2015). Goal 5 on gender equality similarly expands the previously narrow focus on reaching education and health targets to the comprehensive goal of ending all discrimination and violence against women and girls. A key component targets unpaid work and equal access to and benefit from productive resources. Given that the preponderance of women whose unpaid work and unequal access to resources involves agriculture, SDG 5 has special resonance for strengthening women's economic empowerment in the agriculture sector.

SDG 5 asserts that gender equality is both a goal in its own right as well as a pathway towards achieving other development goals such as improved nutrition and increased agricultural productivity. The INGENAES technology assessment toolkit builds on this fundamental principle, detailing a data collection and analytical process that offers opportunities to strengthen gender equality and women's empowerment in tandem with the achievement of other agricultural development goals.

This approach aligns with the U.S. Government's Global Food Security Strategy 2017-2021 ratified by Congress in 2016. The strategy reaffirmed the U.S. Government's commitment to achieving global food security, and reducing hunger, undernutrition, and extreme poverty. Growth in the agriculture sector remains a key pillar of this strategy for its widely recognized role in driving poverty reduction. Other components of the strategy include a strong focus on nutrition and resilience (Box 1). Achieving the objectives of this new strategy will depend significantly on ensuring that agricultural technologies are translated into economic and nutritional gains that are within reach of men, women, and their families.

Box 1 Objectives of the U.S. Government Global Food Security Strategy

Objective 1: Inclusive and sustainability agricultural-led economic growth

Objective 2: Strengthened resilience among people and systems

Objective 3: A well-nourished population, especially among women and children

Source: U.S. Government 2016.

Advances in the development and adoption of agricultural technologies are critical. Innovations in science and technology are the foundation of increased agricultural productivity, strengthened food security, and opportunities for enhancing nutrition. Technology offers the possibility of greater control of the environment and use of natural resources; can improve the timing of tasks, reduce drudgery, and make labor more efficient; and improve the quality and quantity of food, feed, fiber, and fuel. The gains made during the Green Revolution are a testament to our ability to use technology to advance agricultural development and human progress, expanding off-farm employment and spurring economic growth. That experience is also a reminder that technological progress has both winners and losers, that there are challenges associated with adoption, and that there remains a critical need for continued innovation in the face of climate change, demographic shifts, instability, and conflict.

Agricultural research and agricultural extension and advisory services (EAS) are key services that bring farmers the innovations needed to increase productivity and strengthen the nutritional value of foods, often helping to reduce the time and labor needed to carry out agricultural and food processing tasks, and helping farmers to gain greater benefit from their efforts. Research and extension and advisory actors have changed over time. Where fifty or sixty years ago, these services were dominated by public service employees in national government agencies, land-grant style universities in the US and overseas, and

donor-funded international organizations, today's agricultural systems are more pluralistic, including not only these actors but also NGOs and private firms.

Challenges remain at different levels. For example, government policies may delay the approval of improved seed or animal varieties. General constraints include limited availability and poor-quality seed and ineffective distribution systems, including problems of counterfeit seeds, and relatively high costs for most smallholder farmers. For example, in Tanzania, only 16.8% of farmers report using improved seed, with 69% stating cost was the main constraint (World Bank 2012:12). Rigid extension systems limit communication between the different actors in the farming system, and two-way channels between farmers and extension systems are still uncommon. New approaches of human-centered design that put the user first and re-envisioning the skills needed for the "new extensionist" are starting to close the gap between technology development and technology adoption.[1]

Equally if not more challenging, however, are the constraints to research, adoption, and scaling of technologies related to gender issues. To ensure that investments and research pay off, technology developers and the actors with whom they work in design and dissemination can do more to ensure that new technologies will benefit both men and women farmers, addressing not only general but also gender-based constraints. Awareness that technology is not designed in a vacuum but reflects and responds to policies, institutions, and social values is increasing, especially in technological fields such as personal electronics, but is not yet a mainstream perspective in agriculture. Too often, research and/or AES do not differentiate between different types of farmers and their respective needs, including differences between men and women farmers that might limit the benefits that each group might receive, including higher productivity, reduced labor, and increased access to income and improved nutrition.

As a result, gender gaps in productivity and access to resources persist despite the wide recognition of the importance of gender equality and women's empowerment for agricultural and human development, now codified in the Sustainable Development Goal Number 5, "To achieve gender equality and empower all women and girls." Recent analyses using data from the World Bank's Living Standards Measurement Surveys reveal that when accounting for plot size and region, productivity gaps between men and women plot managers range from 23-25 percent in Tanzania, Ethiopia, and Malawi to 66 percent in Niger and 46 percent in northern Nigeria (O'Sullivan et al. 2014). Even when men and women farmers have the same access to productive resources, women's returns are lower than men's, suggesting that the inputs and technologies themselves are less effective and do not meet women farmer's needs (O'Sullivan et al. 2014). Increasingly, attention is being drawn beyond production to the importance of expanding and improving opportunities for women in input supply, post-harvest handling, and the commercialization of plant and animal crops (Clugston and Williamson 2016). More than thirty years of research highlights how overlooking the gender gaps in agriculture has missed opportunities for increasing agricultural output and reducing hunger and poverty (FAO 2011).

This toolkit, "Assessing how Agricultural Technologies can change Gender Dynamics and Food Security Outcomes," was written in this context. It was developed under the United States Agency for International Development-funded (USAID) Integrating Gender and Nutrition within Agricultural Extension Services (INGENAES) project led by the University of Illinois-Urbana-Champaign. The INGENAES project aims to

[1] See for example the work of the Global Forum for Rural Advisory Services: http://www.g-fras.org/en/157-the-new-extensionist

reduce gender gaps in agriculture, increase empowerment of women farmers, and improve the integration of and attention to gender and nutrition, both in and through agricultural and EAS.

Cultural Practice, LLC (CP), a consortium partner of the INGENAES project, developed a methodology to assess whether agricultural technologies are gender-responsive and nutrition-sensitive in terms of design, use, and dissemination. The INGENAES technology assessment can be used to improve the design and dissemination of agricultural technologies in ways that increase adoption by men and women farmers. The assessment methodology was piloted between 2015 and 2017 in Bangladesh, Zambia, Nepal, and Sierra Leone. The pilot consisted of two components: 1) Design and delivery of training materials and 2) Production of technology profiles. Four workshops were delivered with practitioners and US and developing country university students (graduate and undergraduate) to test the methodology. The workshops also offered insights into the framing and content of this toolkit. During the pilot phase, 11 technology profiles were produced either in conjunction with the workshop or as a separate activity, describing the gender dimensions of technologies such as beehives and digital fat testers to mini-tillers and treadle pumps as well as integrated farming practices related to fish ponds and gardening (Box 2). The profiles are one of the analytical outputs of the methodology.

Box 2: INGENAES Technology Profiles

- Rice Processing Machines, Sierra Leone
- Mini-tillers, Nepal
- Fish Feed, Sierra Leone
- Conservation Practices, Nepal
- Fertilizer Deep Placement, Bangladesh
- Aflasafe, Zambia
- Household Ponds and Homestead Gardening, Bangladesh
- Digital Fat Tester, Bangladesh
- Langstroth Beehives, Bangladesh
- Purdue Improve Crop Storage Bags, Zambia
- Treadle Pumps, Zambia

This toolkit consists of a guide in three parts: Learn, Apply, and Share (Table 1). It offers readers with an understanding of the relationships between gender, nutrition, and agricultural technologies and how to address these issues systematically.

Who should use this toolkit

If you are reading this guide, we expect that you are an agricultural researcher or practitioner interested in learning how to address gender and nutrition issues in your work. You may work at a national or international agricultural research center, a private firm, a university, or a civil society organization. Academics (students and faculty) may also find the guide helpful in illustrating the application of gender analysis to a concrete problem. We expect that as a reader you are interested in learning how to enhance the value of agricultural technologies for men and women, contributing to higher incomes and healthier households.

The toolkit was developed for readers with a basic understanding of gender and nutrition issues. Where possible, the guide also highlights resources to help you deepen your understanding of different issues.

How to use the toolkit

In this toolkit, you can expect to find information about gender, nutrition, and agricultural technologies. It is divided into three sections, each with its own purpose (Table 1). We understand that readers may need different information at different times and for different purposes. The toolkit is structured to help meet those differing needs.

References to the INGENAES technology profiles are made throughout Part 1. These can be identified by their green font.

Table 1 The three components of the toolkit

Part 1: Learn	**Part 2: Apply**	**Part 3: Share**
This section of the toolkit discusses the relationships between gender, nutrition, and agricultural technologies. It is divided into short thematic chapters that each describe one of three areas of inquiry: • time and labor, • food availability, access, safely, and quality, • and income and assets.	This section of the toolkit introduces a gender analysis framework and a range of tools that can be used to enhance the design and dissemination of agricultural technologies.	This section of the toolkit is a facilitator's guide for designing and conducting a workshop on the methodology. The facilitator's guide is made up of slides and exercises that over the course of the pilot's four (4) workshops we found to be most useful in sharing the methodology.

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