Perspectives

Responding to global change: A theory of change approach to making agricultural research for development outcome-based

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ABSTRACT

Agricultural research for development has made important contributions to poverty reduction and food security over the last 40 years. Nevertheless, it is likely that both the speed of global change and its impacts on natural and socio-economic systems are being under-estimated. Coupled with the moral imperative to justify the use of public resources for which there are multiple, competing claims, research for development needs to become more effective and efficient in terms of contributing towards longer-term development goals. Currently there is considerable debate about the ways in which this may be achieved. Here we describe an approach based on theory of change. This includes a monitoring, evaluation and learning system that combines indicators of progress in research along with indicators of change aimed at understanding the factors that enable or inhibit the behavioural changes that can bring about development impacts. Theory of change represents our best understanding of how engagement and learning can enable change as well as how progress towards outcomes might be measured. We describe the application of this approach and highlight some key lessons learned. Although robust evidence is currently lacking, a theory of change approach appears to have considerable potential to achieve impacts that balance the drive to generate new knowledge in agricultural research with the priorities and urgency of the users and beneficiaries of research results, helping to bridge the gap between knowledge generation and development outcomes.

1. Introduction

The last 25 years have seen substantial improvements in human wellbeing. Between 1990–92 and 2012–14, there was a 42% reduction in the prevalence of undernourished people in developing regions (FAO, 2015). Considerable regional differences exist in the progress that has been made against poverty and hunger in the time span, however: in South Asia progress has been limited, and in sub-Saharan Africa the situation regarding poverty and hunger has become worse (FAO, 2015). There were still 805 million people who were chronically undernourished in 2012–2014 (FAO, 2015), almost all in developing countries. Clearly, there is much to be done to reach the targets for 2030 as articulated in the Sustainable Development Goals (UN, 2015), particularly Goal 2 on ending hunger, achieving food security and improved nutrition and promoting sustainable agriculture. With an expected extra 2–3 billion people to feed over the next 40 years, this will require targeted efforts to achieve making 70% more food available to keep up with rapidly rising demand (Alexandratos and Bruinsma, 2012). At the same time, climate change is already affecting agriculture in many developing countries, and the effects will become increasingly challenging in the future (Thornton et al., 2014a).

Several approaches are being used to address poverty, and in developing countries agricultural development is one. The role of agriculture in reducing poverty is relatively well studied; enhancing agriculture is often seen as a critical entry-point in designing effective poverty reduction strategies (Christiaensen et al., 2006; Alston, 2010), with agricultural research for development (AR4D) a key mechanism. The adoption of improved agricultural practices, technologies and policies, such as high-yielding rice and wheat varieties, fertilizers, pesticides, irrigation and enabling policies, has had strong and positive impacts relative to research investment (Renkow and Byerlee, 2010; Raitzer and Kelley, 2008). Nevertheless, the world food system continues to face challenges of persistent food insecurity and rural poverty in places. The adoption of improved agricultural technologies and practices by farmers has often been less than expected, despite demonstrated benefits. There are many contributing factors, including inherent limitations of supply-led approaches to development and dissemination, limited attention to context-specificity and to farmers' priorities beyond increased agricultural productivity, and lack of appreciation of the socio-

economic, political and institutional contexts within which smallholder farmers operate (Orr, 2012). A technology or intervention may need to be much more than "scientifically proven" if it is to be adopted; good social management and appropriate implementation processes are likely to be needed as well (Pachico and Fujisaka, 2004; Hartmann and Linn, 2008). In addition, the rate of change in many socio-economic and earth system trends appears to be accelerating (Steffen et al., 2015), perhaps to the point where the past is no longer a good indicator of the future. Considerable behavioural shifts will be needed on the part of all stakeholders if food security is to be achieved for the more than 9 billion people on the planet by 2050.

AR4D has huge challenges ahead, and ways are needed to do it more effectively and efficiently. Here we outline one approach to AR4D that may have some potential for addressing issues of effectiveness and efficiency – an approach based on theory of change and impact pathway thinking. This approach is illustrated with reference to the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), a global partnership that unites organisations engaged in research and capacity development for a food secure future. This is among the first examples of a large AR4D program being orientated this way. Although we are not yet at the stage of being able to carry out a robust evaluation of CCAFS with respect to the effectiveness of a theory of change approach, its implementation to date has generated important lessons that we believe can enhance its effectiveness at scale. In the next section, we provide some background on theory of change. In Section 3 we discuss progress so far in implementing the approach in CCAFS, focusing on program design and systems for planning and reporting. We conclude with a discussion of some of the lessons learnt regarding institutional change, monitoring and evaluation, and behavioural change.

2. Background

AR4D can be thought of as a set of applied research approaches that aim to contribute directly to the achievement of international development targets such as the Sustainable Development Goals (UN, 2015) through growth of and innovation in the agricultural sector. This broad definition allows for a wide understanding of the concept. In what follows, we assume that the research element of AR4D is carried out with broader development outcomes in mind, and that this involves demand-led prioritization of research, participatory and action research, and stakeholder involvement and capacity development (Harrington and Fisher, 2014).

Over the last 40 years, agricultural research has undergone several different "framings" regarding the role of research and its effect upon the world, but current ideas generally crystallise around a logical sequence of events as shown in Fig. 1, though recognising that this is never a linear process. Resources are utilised in a set of research activities, which produce research outputs that are then used. The use of these outputs contributes to behavioural changes, manifested in changes in knowledge, attitudes, skills and practices of a wide set of non-research next users such as development practitioners, extension services, farmers and policy makers. These outcomes in turn lead to impact, such as increased food security or reduced poverty. Fig. 1 is no more than a caricature of these processes, but it illustrates that while research focuses mostly on producing research outputs and development on producing outcomes and impact, AR4D is an attempt to bridge the two. Some of the key characteristics of agricultural research, development and AR4D are listed in Table 1. The boundaries of these realms are necessarily fuzzy, and the characteristics related to evaluation and timeframes in particular are somewhat idealised and may not reflect current practice in use-orientated research (Nowotny et al., 2003). Nevertheless, the distinctions are important; the aim of AR4D is not to take over the work of development agencies but to ensure that the outputs of research maintain their integrity and are appropriately contextualized (translated, communicated, and disseminated). Working in this way at the boundaries of science, knowledge and action means that different kinds of partnership are needed if AR4D is to be effective (Clark et al., 2011). AR4D has to tread a careful line between the "R" and the "D". On the one side, research is a risky business, its results uncertain, and its application sometimes very far from obvious (for instance, the development of quantum physics and computers in the early and mid-twentieth century, respectively – daily life now is unimaginable without them). On the other side, the nature of development is very different to that of research, involving different aims, skills, partners, and time frames.

The different framings of agricultural research in a development context have been driven largely by development agencies and funding agencies. Such organisations often face common challenges: how to strengthen their accountability for the use of public resources, how to deal with analytical issues of attributing impacts and aggregating results, how to establish effective performance measurement systems, how to ensure a distinct yet complementary role for evaluation, and how to establish organisational incentives and processes to stimulate the use of performance information in management decision-making (Binnendijk, 2000). Often, such organisations have been instrumental in implementing new or modified approaches to AR4D.

Canada's International Development Research Centre (IDRC) made early efforts to articulate how AR4D could contribute to desired behavioural changes or outcomes (Earl et al., 2001). This articulation revolves around defining in some detail, during project planning, how the project team envisages the logical chain of Fig. 1 to unfold in practice. The resulting theory of change represents the team's best understanding or hypothesis, at that point in time, of how engagement and other approaches can bridge the gap between research outputs and outcomes in development. There is no single definition of a theory of change and no set methodology; rather, the approach allows flexibility according to the needs of the user or implementer (Vogel, 2012). A theory of change provides a detailed narrative description of an impact pathway (the logical causal chain from input to impact as shown in Fig. 1) and how changes are anticipated to happen, based on assumptions made by the people who are undertaking the work. (While theories of change
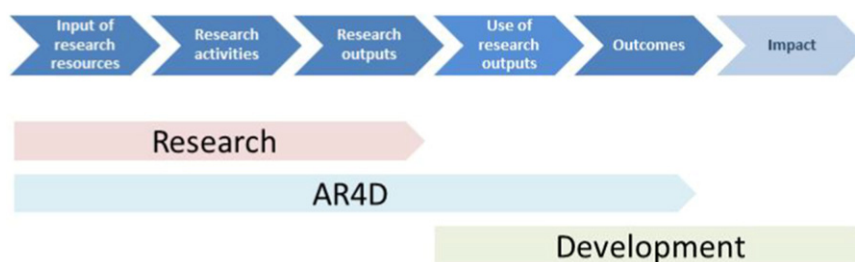

Fig. 1. A logical causal chain from research inputs to impact, and the domains of research, development, and agricultural research for development (AR4D). This is highly simplified from what may be a complex, iterative process.