Chapter 15

THE JOURNEY TO R4D: AN INSTITUTIONAL HISTORY OF AN AUSTRALIAN INITIATIVE ON FOOD SECURITY IN AFRICA

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Abstract

Recent years have seen a growing interest in agricultural research for development (R4D) initiatives designed to address the need to make more effective use of research investments in the development process. While there remains some ambiguity about the precise nature of R4D, it is nevertheless clear that a shift to this approach is going to require considerable institutional change in research practice. This chapter presents a brief case study of the experiences of a group of Australian, African and international agricultural research organizations which, together, initiated an explicit R4D programme. A key feature of this case study is the contestation that arises in the journey to R4D, with different points of view and patterns of practice vying for legitimacy and prominence. Contestation and negotiation is always a feature of bringing new practices into use and reflects that institutions are continuously 'in the making'. Orchestrating 'conversations' with key R4D stakeholders about emerging modalities of research, and fuelling these conversations with evidence of the impact of new practices, would help progress the institutional change process needed to sustain a more effective deployment of research in the development process.

Keywords: Research for development, Innovation, Institutional change, Impact, Contestation

Introduction

Recent years have seen a growing interest in a cluster of 'for development' (4D) agricultural research initiatives designed to address the need to make more effective use of research investments in the development process. These initiatives are branded in different ways: agricultural research for development (AR4D); integrated agricultural research for development (IAR4D) or simply R4D (the term we use in this chapter).

The discourse associated with R4D draws from a range of existing ideas: participatory approaches, action research, social learning and innovation systems (IS). An ambition to be systems-oriented is usually explicit. However, the precise nature of these R4D approaches in both conception and practice remains fluid and ambiguous and can often be little more than a statement of intent (Hall et al., 2012). What is clear is that making the ambition of R4D a reality is not a case of simply developing and applying a set of tools, although these may well help. Rather, it demands rethinking traditional agricultural research and development (R&D) practices and the institutional arrangements that underpin them (Hawkins et al., 2009).

This chapter presents a brief case study of the experiences of a group of Australian, African and international agricultural research organizations which, together, initiated an explicit R4D programme. The case study – of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Australian Department of Foreign Affairs and Trade (DFAT) Africa Food Security Initiative (AFSI) within a broader Australian programme on Food Security in Africa – involved a partnership between CSIRO and Biosciences eastern and central Africa (BecA) Hub in Eastern Africa, and CSIRO and West and Central African Council for Agricultural Research and Development (CORAF/WECARD) in West and Central Africa, with financial support from DFAT[1].

The scope of the chapter is not to document the considerable research portfolio and development successes supported by AFSI (McMillan, 2011; Adakal et al., 2013; Etwire et al., 2013; Harvey, 2013). Instead the focus is to reveal the challenges and implications of the institutional change agenda associated with the shift to R4D practice. These deliberations draw on an independent mid-term review[2] of AFSI completed in 2012 (AusAID, 2012) and thereafter on the process of redesigning AFSI to better gear it towards enhancing the implementation of an R4D approach. The key message is that such a shift is a contested space. The chapter attempts to capture this contestation by articulating a number of different viewpoints and tensions that emerged during the implementation of AFSI. The chapter concludes that, while 'how to' manuals on R4D have a role to play, of greater importance are efforts to orchestrate constructive dialogue among R4D stakeholders to resolve differences and move forward. These dialogues need to be underpinned by an evidence-base of the impact effectiveness of different research modalities and be conducted in the reflective R4D spirit of 'learning by doing'.

[1.] AusAID commissioned AFSI in 2010 and was merged into DFAT in 2013.

[2.] The review was led by the lead author of this mid-term review, prior to joining CSIRO in 2014.

Origins and Understandings of R4D

The practice of agricultural research in international development has a long history of progressive development of approaches aimed at addressing the challenge of making more effective use of science as a driver of agricultural-led growth (Biggs and Clay, 1981; World Bank, 2006; Ison and Russell, 2007; Röling, 2008; World Bank, 2008; Hounkonnou et al., 2012). The origins of R4D can probably be traced back to the late 1990s and the crisis that agricultural research was facing at that time. This was an era of declining funding and research organizations were under increasing scrutiny to not just deliver research outputs, but also to demonstrate their impacts on poverty. Over the intervening years, a range of 4D-styled research approaches have emerged in response to the ongoing search for more effective ways of using research in the agricultural innovation process: AR4D (Mbabu and Ochieng, 2006; Daane, 2009); IAR4D (FARA, 2007; Hawkins et al., 2009; Adekunle et al., 2014); or simply R4D.

Definitions of these modalities of research vary considerably, although they generally point to systems thinking as a founding concept (Hawkins et al., 2009; Foran et al., 2014). Depending on the operational traditions and the epistemologies of advocates and practitioners, different R4D modalities give different emphasis to farmer empowerment, learning and capacity building and the role of research as the key operational focus. Recent reviews of the R4D documentation (Hall et al., 2012; Foran et al., 2014) point out that R4D is not a disciplinary approach in the conventional sense, but a modality of research informed by a systemic understanding of innovation and change that requires interaction and learning at multiple levels. A key challenge, for many organizations that seek to adopt R4D is that, in general, definitions are fluid, and conceptual underpinnings are contested and largely lack the protocols required to inform new modalities of research practice.

Adopting a more systemic modality of research practice implies a move out of the comfort zone of tried disciplinary protocols and the systematic adoption and application of 'tried and tested' tools. It implies moving into the domain of broad principles to shape practice in contexts characterized by uncertainty and complex patterns of interactions between stakeholders and their social, institutional and physical environment. Not surprisingly, this level of ambiguity and unfamiliarity of working systemically (rather than systematically) has led to many organizations latching onto specific 'R4D tools'. These tools have then become synonymous with R4D. Most notable among these tools is the idea of an innovation platform (IP)[3], an idea that, for many, has come to be itself a definition of R4D (Tenywa et al., 2011).

Like R4D, there are different definitions of IPs (FARA, 2007; Nederlof et al., 2011), but all acknowledge physical or virtual, vertical and horizontal linkages, and interactions between homogenous and heterogeneous stakeholders to provide solutions to challenges and to identify opportunities in the target platform (Ison et al., 2014). All too often, however, these definitions overlook the

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[3.] An IP is a mechanism to foster the interactions that facilitate information exchange and learning among different actors, which then leads to innovation. Such platforms usually have a generic organizing theme that focuses on a shared challenge or opportunity, which the platform seeks to address through innovation (Röling, 1994).

broader learning system dimensions implied by the systemic framing of R4D (Hall, 2011; Hall and Mbabu, 2012; Clark, 2016). As a result, IPs are increasingly used as a tool that bolts on to the end of the technology delivery pipeline, without any appreciation of the wider institutional learning and change agenda implied by R4D (Röling et al., 2014). Without institutional change, existing modalities of research remain unaltered, challenging the scale and sustainability of outcomes and impacts achieved.

What Would Idealized R4D Look Like in Practice?

There will likely be no general agreement on the precise nature of R4D practice. However, the discourse around the topic and the proposition that IS can be an underpinning concept suggests that projects and programmes in this framing would have a number of key characteristic features. These features include[4]:

1. *Expanded scope of research and learning*: Projects are both multidisciplinary (combining different skills) and interdisciplinary (combining concepts from different disciplines) in order to investigate biophysical phenomena as part of the wider IS of institutions, markets, and policy and development processes. Projects use diagnostic tools to define systems research questions and entry point activities and identify relevant partners and stakeholders.

2. *In-built impact pathways*: Projects are designed to combine R&D activities through partnerships and networking. This networking develops links to users of research and other sources of information and learning as well as complementary investments and activities that strengthen impact. Projects use multi-stakeholder approaches, including IPs, to define and address objectives in ways that encourage wider stakeholder collaboration at different levels – farmer, research community, development community, market actors and policymakers.

3. *Capacity building in organizing for learning*: Projects and programmes experiment with ways of organizing learning to improve the effectiveness of using R4D. Projects and programmes use research, process monitoring, knowledge management, innovation communication and training to improve and share lessons on the effectiveness of multi-stakeholder and other approaches that support technical, organizational, institutional and policy learning.

4. *Multiple pathways to impact*: Projects achieve impacts as a result of innovations emerging in production, marketing and consumption systems in the domain of project activities. Projects can also have impacts by contributing to the development of the capacity of R4D systems by generating lessons that stimulate institutional and policy changes. Social capital developed among project actors leads to impact as it enhances the capacity of actors to organize when novel situations emerge demanding a R4D response.

[4.] This list of idealised R4D characteristics was developed by the lead author (AusAID, 2012) based on observations, IS concepts and previous programme experience (Hall et al., 2008).

5. ***Funding and design frameworks that support flexibility and adaptive management****:* A flexible design enables projects to navigate the evolving development context within which R&D are undertaken. Funding structures allow resources to be redirected towards emerging opportunities. Monitoring and evaluation (M&E) frameworks are designed to capture unexpected outcomes. Project cycles are of sufficient length to allow the strengthening of partnerships that underpin innovation and impact. Projects may be led by research organizations or by development or commercial organizations, depending on the context.

6. ***A framing that integrates different types of research and action and integrates different types of learning****:* The above characteristics of idealized R4D projects suggest that the ambition to better use R4D requires a framework that helps with two types of integration. The first concerns the integration of research (of different types) with market and capacity development activities. The second concerns integrating different forms of learning so that there is a continuous process of both technical change, but also a continuous process of strengthening the capacity to use R4D. This capacity has policy and institutional dimensions. R4D does not give primacy to any particular mode of research (basic, adaptive, communicative, demand-driven, supply-driven) or development practice (public-led, private-led, top down, bottom up). Instead, it is about assembling the tools, resources, organizations and modalities that are appropriate to supporting, at a particular moment in time, a systemic engagement with development opportunities and challenges being tackled.

This view of R4D implies a new and different role for research that, in addition to knowledge and technology generation, involves brokering, capacity building and designing the 'systems' that enable innovation (Hounkonnou et al., 2012). New skills and competencies as well as new configurations of relationships – both within the research community and between the research community and others in the innovation landscape – are obligatory. Also required are new notions of what research investment can and should deliver and over what timeframes. This, in turn, has implications for accountability, funding timelines and M&E arrangements. With the success of this approach resting on such a daunting set of institutional changes, the shift to R4D is and will continue to be both challenging and prolonged. Given the varying 'starting points' and historically-derived practices and perspectives of the organizations engaging in AFSI (our case study), such challenges clearly needed to be met.

Origins and Features of AFSI

In response to the food price shocks of 2007/08 (Mitchell, 2008), the Australian Government established the AFSI in 2009 that included a linked set of two partnership programmes led by CSIRO with R4D organizations – CORAF/WECARD and BecA Hub. The partners and their roles are described in Box 1. The CSIRO-led AFSI[5] ran from 2010 to 2014 and aimed to improve food security and agricultural productivity in Africa through joint research, working with and building the capacity of the African partner organizations. The partnership had a number of key design principles:

- It had an overarching development objective that was to be delivered through research, with impact indicators couched in the same terms as Australia's Africa Food Security Strategy (household welfare indicators).
- It sought to align with existing African R&D organizations, programmes, plans and systems and associated regional and sub-regional development plans, particularly the Comprehensive Africa Agriculture Development Programme – an initiative launched by the African Union Commission in 2002 (Badiane et al., 2011).
- As part of this alignment the programme had a strong capacity building emphasis, seeking to strengthen research expertise, but also addressing institutional development needs in partner organizations and related delivery systems.
- It had a strong systems orientation, both in terms of research approaches adopted, but also in terms of engagement in impact pathways and the use of an M&E approach adapted to this systems orientation.
- The partnership used a combination of competitive and commissioning processes to identify research projects that addressed the priorities of the African partner organizations.

These principles, articulated in the partnership document, do not have the level of detail or emphasis needed to align with the six R4D characteristics mentioned earlier. These do, however, signal a shift to achieving development impacts within the life of a research programme; albeit a research programme that, at the time, was envisaged as extending beyond the current phase.

In West Africa the partnership developed seven projects; one on seed systems, one on animal health (tick control), a policy pathways project and four on integrated crop livestock systems. In Eastern Africa it developed seven projects; three on animal health, three on nutrition and one on food safety.

CSIRO was involved in the selection and development of these projects in collaboration with its partners. Once approved, CSIRO identified expertise, both from within CSIRO and Australia more generally, to collaborate and mentor these projects. CSIRO also provided a range of institutional development support, including: collaborating and mentoring in M&E, impact pathway analysis, communication/engagement, research ethics and, in West Africa, the implementation of an IAR4D approach. As well as the informal capacity building which occurred at all levels of the partnership, CSIRO helped organize and design formal capacity building efforts, most notably in Eastern Africa, where it established a novel bioscience fellowship programme for young African scientists[6].

A further activity within the programme was a cross-partnership learning project. This was originally conceived as an embedded part of the M&E system, with the rationale of elevating learning on using R4D to become a research inquiry in its own right. However, this learning component did not become fully implemented as there were divergent views about its value to the overall

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[6.] The Africa Biosciences Challenge Fund is managed by the BecA-ILRI Hub http://hub.africabiosciences.org/component/students/?view=studentdetails&layout=studentmap

agenda of the programme. During AFSI implementation the learning project operated with a restricted mandate of exploring lessons for CSIRO on the R4D process (Ison et al., 2014).

> **Box 1. About the partners**
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> CSIRO is Australia's national public research organization and a world leader in basic and applied science, including farming systems research and biosciences applications to improve agricultural productivity and sustainability, animal health, plant improvement and human nutrition. CSIRO's role in the programme was both as the managing agency and as a source of research and related capacity building expertise.
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> The partner organization in West and Central Africa was CORAF/WECARD, a sub-regional agricultural organization mandated to coordinate agricultural research and technology dissemination by 22 national agricultural research institutes in West and Central Africa. In 2014, CORAF/WECARD started its second operational plan, to further roll out IAR4D among its members.
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> The partner in Eastern Africa was BecA Hub, a joint activity of African Union/New Partnership for Africa's Development and the International Livestock Research Institute (ILRI). The BecA Hub is a shared agricultural research and biosciences platform located at the Nairobi campus of ILRI. BecA provides access to first class research laboratories for African scientists and post-graduate fellows to conduct their research in Africa and address African agricultural/food security problems. The research projects implemented at the BecA Hub are directed towards delivering products useful for improving productivity and ensuring food security for smallholder farmers and regional communities in Africa.

R4D in the Partnership

While CSIRO has a long history of undertaking farming systems research in Africa (McCown et al., 1992; Whitbread et al., 2010), leading the AFSI partnerships represented a new undertaking for the organization. The dual roles of managing the design and implementation of a substantial government programme and being an active partner in the research met CSIRO's strategic aspiration to proactively contribute to whole-of-government responses to issues around Australia's portfolio of agricultural R4D initiatives. This new positioning of CSIRO realigned its relationships within Australia's development community and provided the opportunity for it to highlight research as a legitimate path to development impacts. AFSI represents a discernible shift in CSIRO from a provider of farming systems research to an aspiring broker in IS and R4D approaches that deliver development results.

The AFSI partnerships in West and Eastern Africa approached R4D in different ways, which reflected the mandates and organizational focus of the two partnering African organizations. In West Africa the partnership design had an overall objective of "assisting CORAF/WECARD to more effectively discharge its responsibility to drive improved agricultural research in West and Central Africa." CORAF/WECARD's then strategic plan (CORAF/WECARD, 2007) mapped out how this responsibility would be addressed and placed significant emphasis on the explicit use of an IAR4D approach. The elements of which were described as "engagement and partnership with

a full range of stakeholders, targeting change and adoption of new practices at various scales from on-farm to policy, and an embedded capacity building and learning focus for all stakeholders."

This objective of helping CORAF/WECARD "discharge its responsibility" was critical as it implied a very specific programme logic relating to the way CORAF/WECARD was using IAR4D to drive its strategic and operational plans. The essence of this was that CORAF/WECARD would not only support a portfolio of R4D projects seeking to have impact in the domain of these projects, but it would also use these as a way of learning about how to have impact and use this to drive the transformation of its 22 member agricultural R&D organizations in the region. In other words, projects were not only seeking to achieve direct immediate impacts by working with communities and others, but were also seeking to have long-term and large-scale impacts by stimulating institutional and policy changes in the wider agricultural R&D landscape.

At the time of the mid-term review it was found that this logic was poorly understood in the partnership programme and, indeed, CORAF/WECARD was itself struggling to implement this logic in its operational plan (AusAID, 2012). However, what it meant was that CSIRO, following the principle of working with the partner organization's extant commitments, agreed to work with CORAF/WECARD's IAR4D approach. CORAF/WECARD's main IAR4D implementation tool was the IP and it also became the main implementation vehicle adopted in the partnership programme.

The use of IPs was new territory for both the West African R&D organizations leading the partnership projects, but also for most CSIRO scientists. As part of the partnership programme CORAF/WECARD organized IP training for its projects with the help of an external consultant. This, however, focused on the organizational issues of establishing and running IPs and did not explore the wider role of platforms as ways of stimulating institutional and policy changes in the broader R4D system. In other words the emphasis was on (IA)R4D tools rather than on the framing of research as part of an integrated and interactive innovation process operating from farm to policy domains (i.e. IS research).

The mid-term review (AusAID, 2012) also found considerable debate and confusion among researchers in the projects about what IA4RD actually implied. Some saw it as merely a way of transferring research results. Some saw it as a way of empowering farmers. Others saw it as another way of operationalizing farming systems research. IAR4D was mainly seen as synonymous with IPs. With limited guidance on IAR4D, either in CORAF/WECARD or CSIRO, many research participants were frustrated by the approach, seeing it as a distraction rather than a way of reframing research as part of a wider process of innovation and change.

In addition to IPs, CORAF/WECARD had put in place other programme structures to help address the learning dimension of the IAR4D approach, notably communication and knowledge management programmes and an M&E programme. However, these programmes functioned along conventional lines, the former being focused on technical information dissemination and public relations and the latter mainly focused on accountability indicators (IDL, 2013). The net result was that, despite good intentions, the systemic dimension of R4D and its implied

impact pathway, through policy and institutional change in regional R&D systems, was not well supported by the partnership. This shortfall was due in part to poor conceptual understanding of IAR4D and to capacity and institutional challenges that the partnership was unable to address or did not give sufficient attention to. The earlier mentioned learning project could have played a key role in driving systemic learning, but CSIRO was unable to internally legitimize the learning project as an embedded element of the programme (Ison et al., 2014).

CORAF/WECARD's Dissemination of New Agricultural Technologies in Africa programme, which ran parallel to the AFSI collaboration with CSIRO, also featured IPs that were built around the dissemination of hybrid maize and varieties of cassava that were resistant to Cassava Mosaic Virus (Sanyang et al., 2016). This programme also faced a number of challenges in its reliance on IPs as its main intervention vehicle.

In the Eastern African partnership the adoption of a distinctive R4D approach was less explicitly articulated. However, the objective of the partnership was aligned to BecA's business plan, current at the time of the design, which stated its ultimate goal as "harnessing and applying modern biosciences and related innovations to increase the productivity and sustainability of agricultural systems in Africa". This implied a desire to go beyond research discovery and engage with stakeholders in the process of innovation and impact. In practice, the Eastern Africa partnership projects made an explicit attempt to define impact pathways at the outset of the research process; they placed a strong emphasis on developing partnerships with a diverse range of stakeholders in impact pathways, including from the private sector and the policy arena. They also attempted to set up monitoring and learning arrangements to improve the impact performance of research and programme investments.

The institutional setting of the BecA partnership as a bioscience programme meant that AFSI projects were operationalized and challenged in different ways to the West African partnership. The concept of platforms was used here (although not always explicitly called IPs) but one of these was conceived as a technology platform; for example, as an aflatoxin diagnostic platform[7]. This reflected BecA's mandate of building a critical mass of bioscience expertise in Africa. Aligned with its mandate were paths to impact for most projects where stakeholders participated more as recipients of 'innovations' from bioscience rather than as part and parcel of the innovation process. A notable exception was a project on African swine fever that succeeded in developing meaningful modes of collaboration with stakeholders (Ison et al., 2013).

M&E arrangements also followed conventional lines. In some projects, despite impact pathway logic based on the development of coalitions of stakeholders, the M&E arrangements did not emphasize collecting data on the development of these stakeholder coalitions, which could have helped fine-tune the projects' implementation approach.

[7.] A regional mycotoxin analytical platform was established to enable reduced aflatoxin contamination of Kenyan and Tanzanian maize http://hub.africabiosciences.org/activities/research/299-capacity-and-action-for-aflatoxin-reduction-in-eastern-africa-caarea

The partnership also established a highly successful capacity building programme for young African bio-scientists. From the outset the programme was designed to have a strong focus on building the research capacity of under-represented organizations and scientists (especially women) in the BecA region. Fellowships and training largely focused on building skills in bioscience applications. The focus was not on exposing scientists to the policy and institutional challenges of developing effective delivery systems for their research. This is not to suggest that bio-scientists should become innovation specialists. Rather it suggests that bio-scientists of the future need to understand the systemic challenges of research and innovation in complex application environments that impinge on the utility and effectiveness of science. There is an equally important case to be made for ensuring that social scientists need a stronger grounding in biophysical aspects of innovation and impact. This would help professional interactions among disciplines.

The mid-term review (AusAID, 2012) also observed that many bio-scientists working on the partnership saw the 4D discussions as a distraction to laboratory-based investigations. They had some justification for this frustration. However, it was also observed that limited access to social and economic expertise meant that there were limited opportunities to link laboratory-based work with development stakeholders, and limited skills to investigate the effectiveness of impact delivery arrangements.

Mid-Term Progress

The mid-term review (AusAID, 2012) found that in both West and Eastern Africa the partnership had made useful steps in moving towards R4D. Highly appreciated and genuine partnerships had been developed between CSIRO and its African partners and a relevant portfolio of research projects had been established. Most encouraging of all was that CSIRO and its partners acknowledged that they were struggling with the implementation of an R4D approach and that the time was now right to shift more firmly in this direction. The mid-term review recognized the scope and willingness for mid-course correction and made a number of observations and recommendations specific to each partnership, as well as a generic set applicable to the partnership as a whole:

- *Further attention needs to be given to intervention logic and impact pathways*. In particular, a continuous critical analysis of impact pathways and their effectiveness was encouraged, rather than simply asking for a potential pathway as a funding requirement at the project proposal stage.
- *A specific research agenda on how to achieve impact should be established*. A learning focus will have a double effect: enhancing the impact of research done through adaptive management feedback loops, while also identifying lessons for wider application and building capacity in AR4D.
- *The research envelope must be expanded to deliver impact and investigate delivery mechanisms*. It was recommended that in the partnership portfolio, some projects needed to be focused more on near impact activities and less on foundational research. These projects should actively involve impact pathway stakeholders throughout the research process and aspire to deliver impact during the life of the programme. The rationale was also that it was

necessary to achieve impact in order for delivery mechanisms to be understood and engaged and this, in turn, would inform future programme design.

- *More attention should be given to policy, institutional and livelihood aspects of research*. The review noted that effective conduct, delivery, adoption and impact of research were subject to complexity in spheres beyond biological sciences. It was recommended that the partnership needed to better access and use expertise on policy, institutional and livelihood dimensions of its research in order to maximize potential impacts.
- *The support provided by CSIRO needed to be revised*. The review did not express a criticism of the quality of expertise provided by CSIRO, but noted that a wider set of expertise was required and that CSIRO needed to act as a broker of excellence in addition to being a supplier of expertise in areas where it had an acknowledged comparative advantage.

In charting a possible way forward the review also suggested establishing an R4D learning hub to serve both partnerships. The logic behind this was to enable lessons to be shared on how to use research to achieve impact. These lessons could be used to influence wider policy and programme design in the region and the international community more widely and that this would create another impact pathway with wide-scale reach.

The Redesign of AFSI

After the mid-term review was completed in late 2012, a prolonged redesign process took place. The redesign process was punctuated and prolonged by a change in the Government in Australia, the subsequent merging of the Australian Agency for International Development with DFAT, and a consequent change in Australian aid priorities.

The process of redesign involved partnership responses to the mid-term review and a formal design process for a proposed next phase of funding for AFSI (2014-2018). In early 2013, a first design mission resulted in draft proposals developed by CSIRO. However, donor critiques of these proposals raised concerns that there was an insufficient shift in emphasis towards development and delivering impacts. Further design development was stalled until after the Australian election in September 2013, from which one consequence was the policy decision by DFAT to concentrate its African programmes post-2014 in Southern and Eastern Africa.

A second design mission and proposal development exercise followed in November 2013. This focused only on Eastern Africa, reflecting the re-alignment of the partnership with the Government's revised geographic priorities for the African region. The drafting of this design was led by an external development consultant at the request of DFAT. The redesign process involved project-level development stakeholder workshops arranged by BecA and CSIRO. These were used to shape the proposed new research and to devise the implementation strategy that actively involved these stakeholders as partners. The overall framing of the proposal was aimed firmly at delivery of impacts through value chain and other policy and institutional developments. The projects themselves are articulated as coalitions for innovation. Learning and innovation are placed centre-stage in each project and are supported by an overarching learning and performance management system, with provision made to recruit new expertise to service this role.

The proposal clearly articulates the understanding of projects contributing to the overall capacity of the agricultural IS in Eastern Africa and the institutional and policy development dimension of this task.

While there were plans to curtail AFSI activities in West Africa post 2015, a redesign process took place for the last 12 months of the partnership which ended in March 2015. This focused on identifying IPs that showed promise for achieving impact and providing additional support with monitoring, evaluation and learning activities. The emphasis in this redesign was to develop a better understanding of the factors associated with using IPs as both a vehicle for project-level impacts as well as stimulus for institutional and policy change within wider R4D systems that constitute the enabling environment for innovation and impact.

Tensions on the Journey to R4D

The above narrative suggests that the findings of the mid-term review seamlessly led to a rede-signed AFSI programme that incorporates the recommended elements of an R4D programme. In reality, the redesign terms of reference, the mid-term review recommendations and the role for research in development were contested and reinterpreted through different personal, profes-sional, organizational, bureaucratic and institutional filters during the redesign process. These tensions manifested themselves as different points of view about how R4D should be organized and practised; some were resolved, others remain outstanding. Such differences emerge from both the traditions, norms and policies of different organizational stakeholders (research, devel-opment and donor partners), as well as the perspectives and agency of individuals. The main issues include:

1. ***The demand for development impacts from research organizations***. An increas-ingly adamant prerequisite for a redesigned AFSI programme (in addition to research), to take direct responsibility for delivering on-ground impacts, was viewed by some as outside the mandate (and possibly undermining the comparative advantage) of the mostly biophysical research organizations involved in the partnership. Furthermore, the mid-term review recom-mendations to strengthen emphasis on learning and on researching innovation processes were questioned as competing with both science and impact imperatives. Such negotiations and views are, of course, an issue of balance, complementarities and priorities. However, what it does reveal are challenges to the legitimacy of research organizations leading the impact process and to investment in critically analysing the effectiveness of R4D programmes.

2. ***Capacity strengthening as an impact pathway***. The notion of using research projects as a means of strengthening capacity for the delivery of development impacts is discounted relative to the demand for immediate on-ground impacts. A systems capacity strengthening agenda within R4D projects could be used to influence regional and international research practice, with potential for wide-scale impact, albeit at extended timeframes and uncertain pathways to change. At their commencement, both the CORAF/WECARD and BecA part-nerships expressly included a focus on capacity strengthening for these reasons. The AFSI redesign of the final 12 months of the West Africa partnership led to prolonged debates about

whether capacity strengthening should remain a priority in a run-out phase seeking to demonstrate legacy impacts on smallholder farmers.

3. ***Changing programme expectations and framings***. Over the course of AFSI, views on the programme deliverables changed. At the beginning there was a level of comfort with a programme logic that viewed research, capacity building and other institutional and behavioural outcomes as milestones to the longer-term achievement of impacts. Today, the demands on the AFSI project portfolio are for impacts of the sort associated with straight development projects, transferring resources and services to the poor. The redesign of AFSI aspires to a portfolio of R4D projects that cover a spectrum of deliverables, from quality science, pilot-scale impacts within project timeframes, to impacts at scale delivered through development partners. However, the underlying logic of this portfolio is about delivering at scale, over longer timeframes, stimulated through capacity strengthening and institutional and policy changes.

4. ***R4D or research in development***. During the redesign phase, differences surfaced about who should lead AFSI projects; development agencies who then draw in research, or research organizations who link their work to development trajectories and processes. There is probably no consensus answer to this debate, it being an empirical question of which arrangements best suit different problem sets. However, these discussions reveal that research organizations and development funders both need to better understand R4D in order to reach an accommodation on how they best work together.

5. ***Capability gaps in R4D for research organizations***. The review and redesign process highlighted the need for a wider set of expertise to service R4D projects than was widely available in CSIRO, BecA and CORAF/WECARD. Much of this expertise concerns social and economic research and allied expertise – for example in monitoring, evaluation and learning. Not only is this expertise thinly spread and hard to access but a tension remains about whether resources are more effectively spent on this type of expertise rather than bioscience.

6. ***Communicating across disciplines and paradigms***. Part of the capability challenge undoubtedly arises from the ambiguity in R4D approaches and in the conceptual language preferred by social scientists, which their bioscience colleagues can struggle to comprehend. Within both the social and biophysical sciences there are tensions around modes of research practice, e.g. research on, or with, as well as limited expertise in, systemic action research approaches (Ison, 2008). There are also underlying tensions arising from different points of views about how innovation takes place – as a research-led process of discovery and application or a systemic process that combines technological and institutional adaptation. These oft-argued views are not irreconcilable. However, the R4D community has yet to fully develop a language and accessible narrative that explains the compatibility and promotes synergy between these two views.

7. ***Science and impact tensions***. An understanding of R4D as an applied research or technology uptake approach creates tension between approaches that deal with short-term

adaptive, impact-orientated tasks and the need to make long-term investments in foundational biophysical science and associated scientific capabilities. Some of this tension arises from the way R4D is commonly interpreted – that it excludes biophysical science when it need not. Regardless, short-term impact agendas (and the approaches these reward) can cause underinvestment in long-term research that will underpin the ability of agricultural systems to respond to the unpredictable challenges and opportunities of the future. This tension does not seem to be adequately addressed in the policy research associated with R4D programmes.

8. ***Research-driven or opportunity-driven tensions***. Projects under the AFSI partnership mostly are led by research organizations and CSIRO manages the programme as a whole. This has tended to influence the type of entry points that projects and their IPs have chosen. A desire to identify where existing research procedures, findings and tools can best be put into use has been explicit and caused some degree of path dependence. Technological breakthroughs from research do represent an opportunity and so IPs are an avenue for progressing institutional and policy innovations needed to make effective use of these technologies. An alternative view is that IPs should be opportunity-driven, seeking entry points emerging from value chains, policy changes, new development investments in roads and other infrastructure, or the emergence of new alliances and partnerships. In these cases research would play a supporting role as part of a wider agenda.

9. ***Publication tensions***. A continuing requirement to publish is often seen as exacerbating these research and innovation tensions. However, in reality, the tension in R4D is more about achieving a balance between disciplinary science publishing and publishing in the innovation science literature.

10. ***Science and innovation broker tensions***. CSIRO is facing a challenge of its changing role from simply a research partner to also being a broker of a wider set of innovation-related activities. This is still new territory for the organization and so it faces the external challenge of persuading those in the development domain that this new role fits alongside its conventional science role. Furthermore, the internal challenge is for those in CSIRO to fully recognize the need to play this role in R4D work and to accept the business case for projects like AFSI that contain brokering and science investments.

11. ***Evaluation tensions***. There is still no widely accepted way of evaluating R4D programmes. Differing views remain about what constitutes an appropriate evaluative framework, the nature of metrics of success applied in evaluations, what disciplinary mix should be used in review teams, and what mix of regional and international expertise needs to be enlisted.

Ways Forward: Institutions in the Making

The tensions described above are not unique to the AFSI partners, but are part of a wider pattern of contestation that is observed in discourses around the agricultural R&D interface (Hall, 2011; Sumberg and Thompson, 2012). However, the range of tensions apparent in the case of AFSI highlights the magnitude of the institutional challenges that the journey to R4D entails. Hawkins

et al. (2009) similarly observe that, beyond new tools and protocols, organizational and professional transformation will be required to enable a shift to R4D. Röling (2009) points to the need for institutional change in the agricultural science profession to allow a different modality of using R4D impact to be pursued. An external review (CPWF, 2014) of a 10-year, US$100 million (€90 million) CGIAR R4D programme, arrived at a similar conclusion.

> "*The experience of CPWF suggests that successful R4D is contingent on people and their enabling environment in programmes. Give the wrong people the right tools and R4D will fail. Get the right people and the wrong programme enabling environment and R4D will fail. The challenge for implementing R4D is that it requires professional and institutional transformation to make it work and this does not seem to be widely understood as a necessary starting condition. This will require new skills, but also new attitudes.*"

Further practical help will certainly be needed in operationalizing the six idealized project characteristics outlined earlier in this chapter. However, the key message from this chapter is that the most help is needed in negotiating into use the practice of R4D in the prevailing institutional setting of R&D practice. The process of institutional change is not one that lends itself to blueprint solutions that can simply be transferred (Biggs and Smith, 2003; Röling, 2009). As Westenholz et al. (2006) explain: institutions (in the sense of new forms of practice and organization) are always 'in the making', emerging in particular historical, political and social settings. In other words, institutional change is rarely characterized by seismic shifts in attitudes and practices, but rather by continuous incremental changes. These changes emerge from human interaction and agreement; they cannot be designed, tested and replicated or scaled up as if they were technologies (Biggs and Smith, 2003).

If we accept that this continuous process of incremental institutional change is the key to unlock R4D, how can this be enabled? Foran et al. (2014) observe the need to orchestrate conversations within and between R&D organizations about the changing practice of research in a policy setting where the balance between research and research for innovation and impact is changing. This would seem to point to the critical, but usually underemphasized, learning dimension of R4D and systemic engagement with the innovation and impact process. However, a call for 'conversations' about changing research practice needs a much sharper legitimacy and operational focus.

The agricultural systems research literature has for many years been calling for a more reflexive mode of monitoring to upgrade the performance of research activities (Klerkx et al., 2012). However, as the case of AFSI demonstrated, embedding and legitimizing a reflexive learning activity in an R4D programme can face its own institutional challenges (Ison et al., 2014). Nevertheless, other programmes have been able to institute these approaches (CoS-SIS, 2013; CPWF, 2014; Jiggins et al., 2016). It is difficult not to draw the conclusion that the agency of key individuals has been critical in ensuring that the institutional learning change agenda is given adequate attention in R4D programme design and implementation.

Over and above institutional learning and change within programmes, the experience of AFSI suggests that institutional change is also needed at a strategic level. There is a need to orchestrate 'conversations' within the research community and between the research community, development organizations and sponsors, as well as with those responsible for setting the policy environment in which R4D practice sits. A useful approach might be to create fora and other dialogue spaces to enable interaction and agreement on new ways of operating around R4D. Clearly, an evidence-base on the effectiveness of new research modalities – what works and what does not – must be accessible. Developing such an evidence base requires not only investigation of development impacts, but also of the processes and institutional arrangements that enable (and disable) these impacts. This could fuel a constructive mode of reflective and collaborative learning about how the power of science and research can be brought to bear on the development challenges of today and the future. Contestation and disagreement won't disappear, but instead could be better harnessed to support the 'institutions in the making' that underpin R4D.

Acknowledgements

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