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Lessons from the Nile Basin Development Challenge Program: An Institutional History

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Project Information

This report was produced as part of the Nile Basin Development Challenge (NBDC) Coordination and Change Project. This project helps the NBDC projects conduct quality, coherent and problem-oriented research that will contribute to beneficial change in the basin. Therefore, the success of the Project depends not only on its own project team but also on excellent cooperation with the other projects in the BDC. The Project and the Basin Leader are responsible for five main areas:

1. Coordination and quality of research
2. Fostering Change
3. Communications
4. Adaptive management
5. Innovation Research

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Contents

Acronyms

ARARI	Amhara Regional Agricultural Research Institute
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
AWM	Agricultural water management
BDC	Basin development challenge
BFP	Basin focal project
BL	Basin leader
CGIAR	Consultative Group for International Agricultural Research
CPWF	Challenge Program on Water and Food
CPWF MT	Challenge Program on Water and Food Management Team
ENTRO	Eastern Nile Technical Regional Office
ESIF	Ethiopian Strategic Investment Framework
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
ICARDA	International Center for Agricultural Research in the Dry Areas
ICRAF	International Center for Agroforestry Research (World Agroforestry Center)
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
IP	Innovation platform
IWMI	International Water Management Institute
KAP	Knowledge, attitudes and practice
KM	Knowledge management
KMIS	Knowledge Management and Information Services [ILRI]
LWP	Livestock water productivity
M&E	Monitoring & evaluation
MoA	Ministry of Agriculture
MWE	Ministry of Water and Energy
MoWR	Ministry of Water Resources [former name]
NBDC	Nile Basin Development Challenge
NBI	Nile Basin Initiative
OARI	Oromia Agricultural Research Institute
ODI	Overseas Development Institute (UK)
OLM	Outcome Logic Model
PAR	Participatory action research
PIPA	Participatory Impact Pathway Analysis
R4D	Research for development
RiPPLE	Research-inspired Policy and Practice Learning in Ethiopia and the Nile region
RIU	Research into Use (Project)
RWM	Rain water management
SC	Steering committee
SCALES	Sustaining Inclusive Collective Action that Links across Economic and Ecological Scales in Upper Watersheds
SLM	Sustainable land management
ToC	Theory of Change
WLE	Water, Land and Ecosystems research program [CGIAR]

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We were happy to have been asked to do this institutional history – it has been a fascinating learning experience. Nevertheless, we are solely responsible for the contents of this report. The views here do not necessarily reflect the official views of the CPWF, IWMI or ILRI. That said, however, we believe most NBDC team members would agree with most of the views expressed.

Douglas J Merrey, Kees Swaans, and Ewen Le Borgne

October 2013

Farmers from Fogera telling their stories using participatory video
Photo: ILRI/Beth Cullen

Summary

Introduction

The Nile Basin Development Challenge (NBDC) program is a multi-disciplinary, multi-institutional participatory "Research for Development" (R4D) partnership. It is aimed at improving the resilience of rural livelihoods in the Ethiopian highlands through a landscape approach to rainwater management (RWM), with a special focuses on the Blue Nile (Abay) River Basin. The R4D paradigm has several elements, including using scientific research as a means to achieve specific development goals rather than as an end in itself; a focus on achieving tangible systemic changes over the long run; the use of a transparent model or "theory of change" to guide the program, against which progress is continually reviewed; inclusive partnerships among all participants based on mutual respect; and a strong emphasis on collectively learning from experience and sharing that experience more widely. The NBDC uses multiple means to learn lessons from its experience as a basis for adapting its activities. This Institutional History consolidates and communicates some of those lessons.

NBDC is part of the Challenge Program on Water and Food (CPWF), a long-term program led by the CGIAR to experiment with new more inclusive partnerships and models for carrying out research on complex agro-ecosystems characterizing large international river basins. At the end of 2013, the CPWF is being integrated into several new CGIAR mega-research programs, including but not only the Water Land and Ecosystem (WLE) Research Program. These programs have been designed in part using the lessons from challenge programs such as the CPWF.

NBDC consists of five mutually supportive "projects". One project was a commissioned review of lessons from previous experiences in Ethiopia, intended as a foundation to guide the design of the remainder of the program (N1). The other projects each had a specific role: detailed field work and experimentation in collaboration with farmers, government officials and other stakeholders in three small local watersheds (N2); modeling and mapping the potential for scaling out promising innovations (N3); modeling to assess the likely basin-wide impacts of widespread implementation of these innovations (N4); and a project aimed at catalyzing platforms for shared learning as well as coordination and communication of results (N5). The latter project is led jointly by the International Livestock Research Institute (ILRI) and the International Water Management Institute (IWMI); the N2-N4 projects are each led by either IWMI or ILRI with multiple international and national partners. These projects were intended to be mutually supportive and integrated.

The NBDC has built on the strong foundations created by about 40 years of research and implementation programs aimed at reversing the rapid degradation of land, natural vegetation and water resources in the Ethiopian Highlands. It works in close partnership with international as well as Ethiopian partners – government, research institutions, universities, civil society organizations, NGOs, development partners, and others – who continue to invest massively in sustainable land management (SLM). Their goal has broadened from resource conservation to assisting rural people to improve their livelihoods while conserving natural resources.

The partners have learned many lessons from their experience. This Institutional History draws on the large collection of documents, informal and formal reports, minutes of meetings, etc. available through the NBDC wiki and website; and interviews of 26 partners and stakeholders to find out their perspectives and views on the program and its lessons. The term institutional histories captures the idea that researchers, farmers, government officials, and others operate in an institutional context, i.e. a set of rules, norms, values and expectations that pattern behavior; therefore a narrow focus on either technology or institutions is incomplete. Institutional histories are a tool that learning organizations can use to enhance

their effectiveness. The emphasis on seeking changes in patterns of behavior – not simply adoption of a new technology within the given institutional framework – goes beyond simple linear research to development paradigms. Implicit in this is an understanding of "innovation" as some combination of technological and institutional change that lead to changes in the behavior and relationships of the actors involved; change is systemic with the potential for new outcomes.

Here we briefly summarize the most critical lessons emerging from the Institutional History. The full report contains many more lessons, many of which are more nuanced than this summary can be. Overall the NBDC has been remarkably successful by any measure. Among others, it has made substantial contributions to capacity building through support of postgraduate students, training programs on specific skills, and exposure of scientists to R4D; it has field-tested innovative tools and approaches for empowering rural communities to participate actively in planning and implementing improved RWM; its National Platform on Land and Water Management has proven an effective means to gain the attention of, and begin to influence, the thinking of senior policy makers regarding the next phase of its large SLM investment program; and it has begun producing some excellent science that promises to contribute to future development. The remainder of this summary emphasizes the lessons learned for future designing and implementing future R4D programs aimed at sustainable management of complex agro-ecosystems for higher productivity and improved human welfare.

Theory of change

In hindsight, the formal theory of change and its accompany tools (outcome logic models, monitoring and evaluation) have not been systematically internalized and used by NBDC. The reasons are both internal and external to NBDC: internal because not much effort was made to use these tools in program management; external because the CPWF initiated this work with little ownership in the basins and later did not provide long-term consistent support to facilitate their use. These reasons tend to be attributed entirely to budget issues, though it also seems to reflect priorities of NBDC and CPWF leadership as well. Nevertheless, through reflection workshops and other mechanisms, the program participants have worked in a learning mode. It may not have fully used these lessons in practice, but it has made changes in its strategy based on experience. There is growing evidence that NBDC is achieving some of its desired outcomes, and is positioned to continue to do so through a potential Ethiopian-led follow-on program.

Research for development paradigm

R4D is the foundation of the NBDC theory of change. It differs significantly from the "normal" understanding of applied research or research intended to support development as understood and practiced by most CGIAR centers and their national partners. It requires researchers to play new roles, cede considerable control of the research to the partners, and requires new skills. The NBDC management and indeed CPWF management did not articulate a clear understanding of R4D, how it should be implemented, and the roles of partners at the start of the program; nor did it make any strong effort to ensure that all parties would have a shared understanding of R4D. Therefore it has had different meanings for different people, based on their own disciplines, experience, and institutional homes.

Nevertheless, NBDC has been a learning experience for the participants; many have learned a great deal about R4D, and are now far better-equipped to implement "real" R4D. Many scientists have gained a deeper understanding of the potential value of R4D and what is required to make it work. R4D has led to the identification and testing of several promising innovations as well as production of new knowledge. The program has provided an effective learning platform for partners and stakeholders, and created a firm foundation for future work to improve RWM in the Nile basin. This includes significant buy-in to the R4D approach to research among the national partners and stakeholders. There is evidence of a strong interest among the partners and stakeholders in building on the NBDC foundation.

Many lessons are yet to be learned. There is no single formula for doing R4D; there is a spectrum of approaches and types and what is appropriate will vary based on the problem to be solved and the social, economic and agro-ecological context. Participatory action research as conceived some decades ago remains a viable approach, especially when the problem is single-dimensional, for example testing a new crop variety or land management method. A more complex approach, involving many more stakeholders, is needed to address complex multi-dimensional problems, such as RWM in a landscape and value chain perspective. This requires a high level of communication, process facilitation and leadership.
Another important unresolved set of issues is the role of the CGIAR centers themselves in the continuum of research and development. To what extent should CGIAR centers stray from retaining a central focus on quality research, versus taking more responsibility for the outcomes and ultimate impacts even if, as some fear, the quality of research is compromised? What should the CGIAR role be in R4D programs that build on the NBDC? In NBDC, the CGIAR centers have played dominant leadership roles, perhaps necessary given the lack of experience with this approach among national partners. However, in future, the CGIAR centers should shift to playing a more supportive role, with the national partners taking the lead. This is exactly what is planned for the next phase of NBDC and leads to the next section on partnerships.

Partnerships

NBDC reflects strong partnerships among some individuals and key institutions, both national and international. In most cases the NBDC experience has strengthened these partnerships. The program has also adapted well in terms of incorporating new partners where relevant. National partners especially appreciate the support for postgraduate students. The NBDC experience offers lessons for achieving stronger partnerships in the future, for example involving national partners from the earliest stages of project or program design, sorting out financial issues in a timely manner, and providing space more effectively for national researchers and partner institutions to play leadership roles.

Stakeholder engagement

While stakeholder engagement has gone well overall, several issues have been raised. One is the extent to which the NBDC over-promised in the beginning, and then lost some credibility as it failed to fulfill all those promises in the limited time period of the program. There has also been a mismatch at times between the schedules of stakeholder engagements and the availability of research results ready to share. Another issue raised is the extent to which NBDC engaged with the right set of stakeholders: perhaps engaging with the wider community of donors investing in SLM, regional state level governmental agencies, civil society organizations, private sector firms, and NGOs working on these issues could have enhanced the potential outcomes of the program. A final issue is the effectiveness of stakeholder involvement in the early planning stage of NBDC: were they part of the program design process, or were they consulted only after many strategic decisions had already been made? Has the process of stakeholder engagement been sufficiently transparent? The national institutions are playing a leading role in preparing a proposal for the next phase of work in order to make that program more demand-driven and create strong ownership.

Innovation and innovations

We make a distinction between the 'innovation' that characterizes the NBDC process itself, and the specific RWM 'innovations' that emerged from the program. NBDC has clearly produced promising innovations and useful knowledge with future innovation potential. The potential impacts of integrating R4D with implementation processes is one of the most promising, as are the participatory planning tools, user-friendly GIS tools, and integrated modeling. Implementing the R4D process itself in a context characterized largely by traditional research for development has been an important innovation in the sense that it has changed knowledge and attitudes and may be leading to new behaviors. The key messages

forming the basis for the "new integrated watershed rainwater management paradigm" emerging from NBDC appear to be gaining traction. Integrating them into a package whose use could significantly improve the outcomes of the current SLM Program, and facilitating their wider uptake remain important challenges.

Knowledge integration

NBDC has not done as well on knowledge integration – working across disciplines and scales – as on other dimensions analyzed. We have identified several likely reasons which worked together to impede integrating knowledge, or learning and sharing lessons. These include the need for a shared analytical framework in the form of a working hypothesis stating relationships among the components of the landscape system, the multiple outcome logic models for each of the projects rather than a single overarching outcome logic model, which in any case were not systematically used as an integrative management tool, and disciplinary and institutional boundaries that were not fully overcome. Overcoming boundaries requires significant changes in behavior which take time. All of these issues can be addressed in future programs. The knowledge integration issues are closely related to the knowledge management and communication component, and also had an effect on the innovativeness of the NBDC.

Knowledge management and communication

We currently have no way to make definitive statements on outcomes and impacts, though the responses at recent stakeholder workshops suggest the high potential for substantial positive outcomes in the long run. It may be useful for the ILRI Knowledge Management and Information Services unit to carry out a survey of external consumers' views of the effectiveness of external communications including an attempt to measure outcomes and impact. While the overall quality of communication and knowledge management has been good, there are also important lessons for the future. These include: strengthening internal program communication and the knowledge sharing culture that supports effective communication (this requires strong leadership as changes in behavior of researchers is critical); using other media to communicate results to people without good internet access; preparing a program publication plan with timelines while encouraging timely scientific publication, and encouraging scientists to play a more active role in communication.

Program design and implementation

Several problems emerged that resulted in part from the program design and in part from issues arising from its implementation. First, the five-project structure to some degree led to teams working in silos with insufficient collaboration and communication across projects. This was recognized by the end of the first year and several steps have been taken to overcome this problem. These include holding regular monthly project meetings, synthesizing specific research findings and lessons learned into "key messages" emerging from the NBDC, and an effort to create an integration model, termed "One NBDC". A second problem has been the weakness of the monitoring and evaluation (M&E) program. Although a critical tool for a learning program, it was never well-funded or given priority; and when severe budget cuts were imposed on the CPWF, it was drastically reduced at both CPWF and basin levels. A third and very serious problem relates to the budget: with hindsight the program was far too ambitious given the planned limited time frame and financial resources. This was compounded by unanticipated major budget cuts imposed on the CPWF in 2012.

Changes in personnel between the early program conception and design and subsequent implementation also affected the program. Several senior scientists who worked on the program design and were responsible for developing the partnerships departed for other institutions; and there was considerable turnover in the leadership of some of the component projects. Newcomers were not always adequately

briefed. The changes in personnel and constant re-writing of work plans and other documentation in the early stages had a significant impact on the project design and subsequent implementation of NBDC. In addition, national partners noted that there was no single institutional representative or focal person of the NBDC from their perspective; they dealt with a variety of scientists from different projects, who changed occasionally with little notice.

Some questions arose over the focus on the Ethiopian Highlands of the Abay Basin (effectively excluding downstream sites) and the choice of the three field sites. Given the basin development challenge, focusing on the Ethiopian Highlands makes sense, but not addressing RWM interventions in a wider basin perspective was a lost opportunity. This focus may also have made participation by regional basin institutions such as the Nile Basin Initiative problematic. The three chosen field sites, while representing three important agro-ecologies, were not sites of current government SLM interventions. This precluded working closely at field level with SLM implementation programs – an approach that has its own problems but might have offered an opportunity to directly affect these large programs.

Gender and participatory program design

A gap in the NBDC program, well recognized by the current NBDC leadership, is the inadequate attention to gender issues. Gender is an extremely salient dimension of power relationships in Ethiopian society. Achieving greater gender equity is an important formal Ethiopian policy goal, and considerable investment is aimed at achieving this. In NBDC, gender dimensions have been taken seriously in participatory activities at the three field sites, but it has not been central or even visible in the overall program implementation. This gap reflects deeper subconscious more than conscious biases among the implementing agencies (including researchers) as well as the stakeholders and partners. Future programs need to have gender specialists in senior positions in the team; explicitly address the complementary roles of women and men and ensure women as well as men are fully engaged; and use R4D as a transformative learning process for all participants.

Another gap, also being rectified in the design process for a proposed follow-on program, is that the initial program design was not sufficiently participatory, and was led by external international organizations and not by national institutions. Real engagement with the stakeholders and partners – the target audience for R4D – began only after the program structure and goal had been designed, calls for proposals issued, and partners chosen. Active participation processes began largely once the proposals had been reviewed and partners selected. A more inclusive and effective participatory process from the earliest stages might have led to a very different program focus and design, including institutional leadership. More important, it might have been more demand-driven from the beginning. Related to this, the program was not designed in partnership with existing SLM-RWM investment programs.

Future programs should be more pro-active and responsive to demand and would have more impact if they are designed with the full participation, indeed leadership, of national and basin-level research, policy, civil society and other stakeholders from the inception. The ideal outcome would be a program led by national and/or regional organizations and supported by the CGIAR and other international partners. It is therefore gratifying that at a July 2013 regional stakeholders' consultation, a task force led by two Ethiopian institutions was formed to develop a proposal for the next phase of NBDC

Looking forward

This Institutional History is intended to contribute both to setting a new rainwater management R4D agenda in the Nile Basin and to the approach taken in future R4D programs such as the CGIAR Research Program on Water, Land and Ecosystems (WLE). We have documented what we believe to be the most important lessons – positive and negative – emerging from the experience of NBDC. The program has

not achieved all of its ambitious goals, and with hindsight there are things it could have done better. Nevertheless, the program has also achieved a lot in terms of better understanding of the potential contribution of improved RWM in the Ethiopian Highlands; new policies, strategies and tools that could lead to dramatic improvements in the outcomes of future investments; and a high degree of interest, buy-in, and enhanced capacity among all of the partners and stakeholders. If NBDC has not yet bent the SLWM trajectory in the Abay Basin, it has at least identified the critical elements of an approach to do this. NBDC refers to this as a "new integrated watershed rainwater management paradigm."

NBDC is now finalizing and sharing widely its results and recommendations, engaging with key policy makers, donors and scientists to communicate the potential value of using the lessons NBDC has learned, and polishing scientific outputs that are critical for the credibility of the work. Key Ethiopian stakeholders are clearly interested in building on and scaling up the NBDC lessons. The NBDC leadership is engaging with key national and Nile Basin stakeholders to explore how a future NBDC program, involving a close partnership driven by national and basin stakeholders, could contribute to the process of consolidation and scaling up and out the use of new tools and implementation strategies.

The proposed program would build on the strong partnerships that have emerged from NBDC. It will draw on many important lessons learned and the foundation built by NBDC. It will combine good science with achieving real outcomes. It will be led by the national and/or basin partners, with strong support from international organizations for research, capacity building, communication, and knowledge management. It will be driven by a shared vision captured in the new integrated watershed management paradigm. And we trust it will attract sufficient long-term support.

1: Introduction

Purpose

The Nile Basin Development Program (NBDC; http://nilebdc.org/) is a multi-partner trans-disciplinary Research for Development program aimed at improving the management of rainwater in the upper Blue Nile River Basin. It is one of six constituent Basin Development Challenge programs constituting the Challenge Program on Water and Food (CPWF; www.waterandfood.org). As the CPWF program comes to a close at the end of 2013, the six constituent Basin Development Challenge programs have prepared "basin stories" as part of an effort to learn lessons from their implementation. The NBDC has chosen to prepare an institutional history that traces its evolution from its roots in Ethiopian sustainable land and water management research and investment projects to the current status of NBDC as a relatively coherent set of projects aligned around an explicit development goal: "to improve the resilience of rural livelihoods in the Ethiopian highlands through a landscape approach to rainwater management." The research focuses on the Blue Nile (Abay) River Basin in the Ethiopian Highlands.

The CPWF and indeed the NBDC partners believe they have learned important lessons on how to effectively implement agricultural and natural resources management research in a way that enhances its value and outcomes. It is a case study of an innovative approach to doing research for development that addresses complex development problems identified by decision-makers (whether farmers or policy makers) through a process that emphasizes partnerships, participation, communication, and a collective reflexive learning process. This approach, referred to here as "Research for Development" (R4D), is based on emerging concepts summarized by terms such as "innovation systems", "learning alliances", and "value chains"; we discuss these concepts in more detail below. There is a growing interest in this approach to research not only within the CGIAR but beyond as well (e.g. Hall 2013). Therefore, our experiences may be of value to those contemplating or already involved in implementing this new research for development paradigm.

We begin with a discussion of the methodology and sources used, followed by a brief history of key events leading up to the launch of the NBDC. Following this, we address a set of key issues, and identify strengths and accomplishments as well as critical gaps and lessons emerging from our analysis. Specifically, we discuss the program design, Theory of Change, Research for Development (R4D), effectiveness of partnerships, stakeholder engagement, innovations and innovation processes, knowledge integration, and knowledge management and communications. We conclude with lessons for the future – building on the NBDC legacy.

Aberra Adie (ILRI) introduces the WAT-A-GAME to farmers as part of NBDC innovation platform work in Fogera
Photo: ILRI/Beth Cullen

2: Methodology and Sources

Institutional or innovation histories are a tool for assisting research organizations seeking to have developmental outcomes and impacts to learn from their experiences[1]. Agricultural research institutions such as CGIAR centers and national agricultural research organizations operate in a complex and dynamic context. Traditionally these organizations have sought to develop technologies to enhance productivity or other goals, with insufficient attention to the institutional context in which technologies are used. It is now clear that both technological and institutional innovations are needed to achieve lasting substantial improvements. The term institutional histories captures the idea that researchers, farmers, government officials, and others operate in an institutional context, i.e. a set of rules, norms, values and expectations that pattern behavior; therefore a narrow focus on either technology or institutions is incomplete. Institutional histories are therefore a tool that learning organizations can use to enhance their effectiveness (Prasad et al. 2006; Douthwaite & Ashby 2005). The emphasis on seeking changes in patterns of behavior – not simply adoption of a new technology within the given institutional framework – goes beyond simple linear research to development paradigms. Implicit in this is an understanding of "innovation" as some combination of technological and institutional change that lead to changes in the behavior and relationships of the actors involved; change is systemic with the potential for new outcomes.

Although there is no specific methodology for carrying out an institutional history, several principles are crucial. These include: 1) the process is as important as the output – participants in the research program should be engaged as much as possible and the entire process needs to be open and transparent; and 2) the process should open up spaces for critical reflection and learning, with a process of sharing drafts and maintaining dialogue (Prasad et al. 2006). Institutional histories can be initiated early in a project and be used as a means for continuous learning over time, though NBDC did not do this.

This NBDC Institutional History has been prepared as a collaborative effort of team members. We developed a timeline specifying the major events, outputs, partnerships, and where appropriate, outcomes, and sought additions and improvements at several program workshops. We used this timeline (Appendix 2) to frame questions and issues for further investigation, intended to elucidate the evolution of the effectiveness of partnerships, shared understandings and perceptions, and lessons emerging from experience. The NBDC throughout its four-year life has sought to be self-critical, and has occasionally even invited outsiders to participate in learning events and provide their insights and recommendations. Because the NBDC uses various internet-based tools for information storage, sharing and communication, there is a substantial body of documentation of processes as well as formal and informal outputs. We have drawn heavily on these. In addition, members of the team preparing this institutional history have interviewed a set of key participants and partners. We promised these would be confidential; therefore we draw a lot of insights from the interviews but we have tried to ensure anonymity. The documentation is too voluminous to list in this report — the reference section lists only those sources directly quoted or used. Appendix 3 lists the people who were interviewed, while Appendix 4 is the interview protocol we used flexibly, as a guide. Not all questions were asked from all interviewees. We have interviewed 26 people: 17 from the CGIAR centers participating in NBDC across disciplines and functions, three from the CPWF Management Team (CPWF MT), four from national research partners, one consultant to the NBDC, one policy maker, and two international research partners. Clearly this is heavily biased toward team members and this should be understood. The topics covered in this report are adapted from topics suggested by the CPWF Program Team as being most relevant for a Research for Development program, and were also the basis for our interview guide.

[1] Douthwaite and Ashby 2005 use the term "innovation history." The methodology is the same, but the emphasis is slightly different. "Innovation institutional histories" might be a more complete title.

3: The Challenge Program on Water and Food

The CPWF was launched as one of several CGIAR "challenge programs" aimed at experimenting with reforms to encourage diversification of partnerships among CGIAR centers themselves and with other institutions. It was designed originally as a fifteen-year program with three phases to enable course correction based on lessons learned. The program is currently at the end of its second phase; there will be no third phase as the new CGIAR Research Programs are absorbing the Challenge Programs. In the first phase (roughly 2003-2009), nine major river basins including the Nile were selected as the foci of the research (referred to as "benchmark basins"). While the CPWF was hosted and managed by the International Water Management Institute (IWMI), strong efforts were made to ensure broad participation of CGIAR and other partners.

In each basin, a regional or national institution was chosen as the overall basin coordinator. In the Nile, this was the Egyptian National Water Research Center (NWRC), an entity within the Egyptian Ministry of Water and Irrigation that coordinates and manages most water-related research in the country. Phase 1 included projects in the Nile Basin on: livestock-water productivity (LWP) led by the International Livestock Research Institute (ILRI) with IWMI and others as partners (PN 37); downstream-upstream interactions in watersheds led by IWMI with other partners (PN 19); improved planning of large dams led by IWMI with the Ethiopian Ministry of Water Resources (MoWR) and other partners (PN 36); and water productivity improvement in cereals and legumes on the Atbara River, Eritrea, led by the International Center for Agricultural Research in the Dry Areas (ICARDA) with other partners (PN 02). There were several other projects that included the Nile plus other basins, for example 'Sustaining Inclusive Collective Action that Links across Economic and Ecological Scales in Upper Watersheds' (SCALES) led by the International Food Policy Research Institute (IFPRI) (PN20) and a project on multiple use water services led by IWMI with multiple partners (PN 28)[2]. The first two, on LWP and downstream-upstream interactions, were the most influential in terms of impact on the design of CPWF phase 2; and the LWP project proved especially innovative in terms of conceptualizing LWP, its findings regarding the role and potential high water productivity of livestock in a broader agro-ecosystem framework, and in cementing the ILRI-IWMI institutional partnership.

Even before these projects were completed, the CPWF recognized that while the first phase projects were producing innovative and interesting findings, they were not leading to a coherent overview of the major trends, development priorities and opportunities in the river basins themselves. Therefore, CPWF launched a set of "Basin Focal Projects" (BFPs). These included the Nile, Niger, Volta and Limpopo basins in Africa. They were assessments of basin trends and challenges based on synthesizing existing knowledge using a broad common framework. IWMI and ILRI led this work for the Nile Basin. A book was published in 2012 (Awulachew et al., eds. 2012), and there are 11 working papers available as well as a special series of *Water International*[3]. These publications and other reports were important inputs to the design of CPWF Phase 2.

CPWF Phase 2

For Phase 2, the CPWF chose a strategy with the following elements: 1) limiting the program to six trans-national river basins chosen from the original nine; 2) identifying a specific focus or "development challenge" in each basin, through consultations with partners and assessment of results emerging from existing research; and 3) in most basins, focusing on specific geographical areas within each basin to concentrate limited resources. The CPWF called for proposals for the first three of the six basins including

[2] See https://sites.google.com/a/cpwf.info/phase1/phase-1-project-completion-reports for a complete list.
[3] See http://waterandfood.org/research-highlights/publications/basin-focal-project-working-paper-series/ for the BFP Working Papers; *Water International* volume 35, issue 5, 2010 and volume 36, issue 1, 2011.

Farmers and IP members planting improved forage on grazing land in Limbichoch village as part of NBDC IP pilot interventions in Fogera.
Photo: ILRI

the Nile, with the following additional features: 1) a pre-designed set of five specific inter-linked projects for each basin, including an innovation/change and coordination project and specification of the budget for each project including the percentage for national partners; and 2) inviting proposals for these projects in an open call. The proposals were prepared using specific formats that emphasized identifying a "theory of change," the target institutions where change would be sought, the specific changes that would be sought in terms of knowledge, attitudes and practice, the outputs that would contribute to these changes, and the outcomes in terms of policy or other changes that would plausibly result over time in reduced poverty and improved ecosystem management[4]. Proposals were also requested to reflect CPWF core values (or principles).

NBDC

Before launching CPWF Phase 2, a small CPWF team interviewed a selected group of stakeholders in each basin to identify the "basin development challenge" (BDC), leading to a concept note (the person chosen later as the Basin Leader [BL], Tilahun Amede, was a member of this team). The proposed NBDC was discussed, validated and adopted at a stakeholder consultation workshop held in May 2009. This was apparently a small and not well-attended workshop: about 20 participants came, of which about half were active participants in the workshop proceedings. The participants used Participatory Impact Pathway

[4] The second set of three basins made heavier use of a commissioning over open call process, based on lessons from the first round. It is important to acknowledge the problem of attribution here: in most cases involving complex institutional and systemic change, it is not possible to claim specific "causal" impacts; rather, a plausible case can be built; see e.g. Patton 2008.

Analysis (PIPA) among other tools to contribute to designing the program (see http://waterandfood.org/2011/10/21/impact-assessment/). The focus on the Ethiopian highlands was largely in response to the observations of the external review team of Phase 1 regarding the need for greater focus in the global program. Rain water management (RWM) had clearly emerged from the Phase 1 work including the BFP as a critical challenge, though at least two alternative development challenges were proposed[5]. Indeed, improving management of land and water has been an extremely high priority of the Ethiopian government and its partners since the 1970s, and programs to improve RWM continue to attract substantial investments (see Appendix 1). Improving land and water management to reverse degradation processes and improve people's livelihoods is important not only for Ethiopia but for the downstream countries as well. Therefore, choosing RWM as the Basin Development Challenge offers an opportunity to contribute to strengthening a high-priority national and basin-wide problem.

The five NBDC projects were defined as follows and were intended to, together, address the prioritized development challenge[6]:

N1: Learning about rainwater management systems. This project reviewed past and ongoing activities, and identified lessons learned and gaps in knowledge as a foundation for planning NBDC (completed in 2010);

N2: Integrating technologies, policies and institutions. This project is developing integrated rainwater management strategies at micro-watershed level – to slow down land degradation and reduce downstream siltation; and it is pilot testing participatory modes of community engagement;

N3: Targeting and scaling out of rainwater management systems. This project sought to better target or 'match' promising technologies with particular environments, thus overcoming the limited success and impact of many past agricultural development efforts (completed in early 2013);

N4: Assessing and anticipating the consequences of innovation in rainwater management systems. This project is quantifying the consequences of improved rainwater management, and measuring downstream, cross-scale consequences of successful innovation in the Ethiopian highlands; and

N5: Catalyzing platforms for learning, communication and coordination. This project provides a multi-stakeholder platform for all the projects in support of improved communication, innovation, monitoring and evaluation (M&E), and adaptive management; it is managed by the Basin Leader (BL) as an overall coordination and communication project supporting the others.

These projects were viewed as being mutually supportive and integrative components of the larger NBDC program. The response to the initial call for proposals in the Nile (and the other two basins in round one) was apparently underwhelming, with only one or two proposals per project. The N1 project was commissioned, while the proposals submitted for N2-N5 were peer-reviewed. In all cases at least one proposal met the minimum criteria; in the Nile these were all led by IWMI and ILRI. The CPWF therefore negotiated with these two institutions to finalize the projects and issue contracts to the implementing centers, IWMI and ILRI in this case[7]. They were responsible for subcontracting other partners – the proposals were required to specify who the partners were, what their roles would be, and to demonstrate their buy-in.

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[5] One alternative was to focus on rehabilitation of the huge expanse of semi-arid degraded grasslands, on the basis of evidence that the amount of water that could be mobilized for productive purposes was orders of magnitude greater than what could be mobilized in the Ethiopian Highlands; the other was to focus on the Nile Delta.

[6] http://nilebdc.org/projects/ The descriptions are modified from this public site.

[7] Based on lessons learned from the first three basins, a quite different approach was followed for the other three; in these basins a more program-based rather than project-based approach was followed.

4: NBDC Program Design Issues

Several issues have emerged from the documentation and interviews on the origins of the NBDC. We briefly review four here:

1. The five-project structure;
2. Budget issues;
3. Changes in personnel;
4. The focus on the Ethiopian Highlands; and
5. The choice of field sites.

Project structure

The five-project structure was debated intensely, and the CPWF management team (MT) concluded that the logic of the project structure was easy, transparent, and would avoid silos. Having five projects was seen as a way to expand the number of partners, an explicit goal of CPWF, while also ensuring that no single institution would 'dominate' in a basin. Unfortunately, many of the researchers we interviewed perceive that the five-project structure has been an important impediment to integration. One senior researcher involved from the beginning suggested the lack of a coherent integrating framework, not necessarily the-five project structure is the real problem; others suggested that NBDC management could have overcome some of these problems. The "Outcome Logic Models" (OLMs) should have helped with this integration. However, there were separate OLMs for each project and for the NBDC program; while N3 appears to have made good use of its OLM to guide its work, others did so less effectively. OLMs were not used consistently by the NBDC as an integrating, monitoring and learning tool.

The now-completed N1 project was designed as a desk study to review past experiences and extract lessons to be used in planning the other research projects. It was contracted out to an individual with experience working in the CPWF[8]. However, delays in contracting led to a draft report being produced in August 2010, when the planning of the research projects (especially N2) was fairly advanced. The N1 report identifies RWM innovations and explains the institutional and political background and challenges (Merrey and Gebreselassie 2011). Unlike the others, N1 had no OLMs, as it was intended to produce a product to support the planning and implementation of the other projects. While it appears not to have had as much influence on planning the field research as had been expected, it has been used in the final year as a basis for research analysis, validation of NBDC results, and suggesting ways forward.

Although most acknowledge there has been fairly good internal communication and knowledge sharing (section 11), nevertheless, there was also a tendency to work in institutional and disciplinary silos. Many national and international researchers when interviewed commented they mainly knew about their own project and knew less about the others. It was noted that N4 was to take an overall (transnational) basin perspective in trying to identifying the likely consequences of scaling up improved RWM but this has not happened. N3 was to make use of results from N2 in order to identify scaling out strategies, but as a result of early delays in N2 implementation (because of changes in personnel) there was nothing to work with. N2 was to have gone beyond characterization to testing innovations that would be the basis for the N3 analysis, but such action research was slow in developing and quite minimal in extent. Some researchers suggested that N2 and N4 deviated from the original plans, causing friction and some disjointedness among the projects. On the other hand, a few interviewees suggested that working within project silos may have created a safe environment for productive and creative work, but the lack of an integrating framework was

[8] Disclosure: this was Douglas Merrey, one of the authors of this report.

the critical issue. Researchers also mentioned problems with sequencing: as noted above, N1 was completed too late to support early planning of the other projects; N3 started simultaneously with N2 and came to an end in late 2012, making it nearly impossible to identify opportunities for scaling up the findings of N2.

Overcoming the silos of the project structure was discussed in detail at a May 2011 NBDC workshop, but there was little immediate follow up. In the second half of 2012, with two new joint BLs replacing the first BL who moved on to another CGIAR center, a concerted attempt has been made to overcome the project silos and promote a culture and work process based on "One NBDC." This idea was endorsed at an internal meeting of the researchers in November 2012, and the entire team appears to have bought into it. An integration framework was developed by two NBDC scientists (from different NBDC projects), who have been working with the team to find ways to identify opportunities for greater cross-project and cross-disciplinary integration of the science. However, it is not yet clear to what extent this initiative will influence the NBDC trajectory and eventual contribution to development outcomes.

In early 2013, another initiative to achieve better integration was launched: an attempt to synthesize the main "messages" emerging from NBDC. Researchers were invited to submit their ideas of key messages on the wiki website; about 40 submissions were received. Although many were specific to a particular project or technology, overall they fit fairly well into an initially proposed set of six key messages. These were shared with the NBDC team and at several stakeholder consultations. This process resulted in considerable revision and expansion to eight messages but also the production of a stronger evidence base. The messages, summarized as a "new integrated watershed rainwater management paradigm", demonstrate that in spite of the problems implementing the five-project structure, the outputs are remarkably consistent[9]. Most important, they have been widely agreed to by stakeholders and are likely to be the basis for a proposal for a follow-on phase of work. These recent developments – One NBDC and messaging – are examples of learning from experience and adapting program management based on lessons learned. This capacity to learn and adapt is more critical than the initial project structuring in determining the outcomes of research for development programs.

Budget issues

The NBDC was overly ambitious given the limited time and resources that had been expected, and severe budget cuts forced on the CPWF and therefore on all the basin programs in 2012 compounded this problem. Identifying and credibly testing RWM technical and institutional innovations in a fully participatory manner with communities, modeling the potential for scaling up and out in diverse agro-ecological-social systems, modeling in a credible manner the likely outcomes (physical, economic, social, environmental) of interventions at a basin scale, all within four years (reduced later to three), with multiple partners sharing a total budget on the order of $1.3 million/year seems incredibly ambitious. Innovation Platforms (IPs) were the mechanism used to work with communities to identify and test interventions in a participatory manner. This is a new idea for most rural people and indeed for most scientists. Facilitating the formation and activities of the IPs requires time and patience, as both researchers and IP members learn by trying things. Expecting them to identify meaningful innovations, implement them, and measure outcomes in time for the scaling and outcome modelers to use the results within a 3-4 year program was overly optimistic[10]. The lack of resources to support full-time field-level coordinators also undoubtedly affected progress. Finally, the relatively small budgets imposed another constraint; most staff members of participating institutions, especially the CGIAR centers, are working only part time on NBDC; they have other projects as well as other demands on their time – often to an overwhelming extent in the case of some CGIAR scientists.

[9] Merrey, D.J. and T. Clayton. 2013. *A new integrated watershed rainwater management paradigm for Ethiopia: Key messages from the Nile Basin Development Challenge*. NBDC Brief 14. Addis Ababa: ILRI and IWMI: see box 2, section 13 for a summary.

[10] IPs were launched only in July 2011, well into the program time period.

Changes in personnel

Another issue mentioned by many interviewees has been the number of changes in key staff members: many interviewees suggested that turnover in personnel involved in the NBDC has been a serious problem. For example, several of the senior researchers who prepared the original proposals left for other institutions; and there have been changes in leadership of projects. While the first BL provided continuity from the early planning stage well into the implementation stage, several very senior people responsible for the design of the program including development of partnerships departed for other positions early on. Some people were brought in who had little familiarity with Ethiopia, the Nile Basin, or indeed the CPWF, though they had important skills to contribute. The changes in personnel, constant re-writing of work plans and other documentation in the early stages, and the development of mismatches between Outcome Logic Models (OLMs) and the partners chosen apparently had a significant impact on the project design and subsequent implementation of NBDC. In addition, national partners noted that there was no single institutional representative or focal person of the NBDC from their perspective; they dealt with a variety of scientists from different projects, who changed occasionally; and some international partners (for example the World Agroforestry Center [ICRAF], ODI) had no representative residing in Ethiopia during most of the NBDC period, making collaboration more complicated.

Protecting soil moisture monitoring sites in Jeldu district
Photo: ILRI/Birhanu Zemadim

Focus on the Ethiopian Highlands

Although possible alternatives to the Ethiopian Highlands focus for RWM as a basin challenge were discussed in the early stages, this focus is easily defensible given the necessity of choosing a limited geographical focus. However, the *de facto* focus entirely on the Highlands, rather than assessing the likely consequences and outcomes of interventions in a wider basin perspective, means that the program may have little to offer in terms of transboundary consequences. This was not necessarily the intention originally; for example N3 had been expected to examine the basin-wide consequences of scaling up RWM innovations. NBI and the Eastern Nile Technical Regional office (ENTRO, based in Addis Ababa) were intended to be partners (as stated in proposals), but the focus on one country with no attempt to take a clear transboundary basin perspective may be one reason why neither of these basin regional organizations has taken any interest in the NBDC (this is speculation). Indeed, one key interviewee stated that because of a perception that improved RWM could deprive downstream countries of water, NBI politically could not participate. This is extremely unfortunate as it may affect political support for future uptake[11].

Choice of field sites

We found no clear statement as to the basis for the choice of field sites (Jeldu, Diga, Fogera). The question of site selection was raised at the September 2010 reflection workshop, but the researchers were already committed to these sites. One criterion was apparently 'representativeness', and they do represent different agro-ecologies in the Abay Basin, though they do not represent the entire range. These are apparently sites where either ILRI or IWMI had existing links through other projects; and they are relatively accessible. In comments on an earlier draft of this paper the first BL noted that they were deliberately avoiding sites "overrun" by NGOs, as they distort incentives of farmers by paying per diems etc. The baseline survey carried out by IFPRI demonstrates that none of these three sites is within a planned SLM Program investment area (see Schmidt and Tadesse 2012: 4, Table 3.1). If the NBDC was planned as a "research for development" program, the question arises as to why it was not explicitly linked to existing development investment programs. Indeed, the N1 report discussed at the September 2010 planning workshop suggested we need a better understanding of the implementation process of these major programs. A response we received to this is that NBDC was deliberately avoiding such sites with their "top down" approach – a fair point given the desire to demonstrate a more farmer-driven participatory approach to improving RWM. It is important to add that GIZ, a major SLM Program player, has participated in at least one of the field site Innovation Platforms (Jeldu). It is not that there is no involvement with investment programs, only that this was not a major criterion for site selection; and this may have had a negative impact on the uptake of NBDC innovations.

Conclusion

While NBDC has important and impressive achievements, as documented below, it is also in part a "story of lost opportunities," for example not addressing RWM interventions in a wider basin perspective, not choosing to work more closely at field level with SLM implementation programs (though the Ministry SLM coordinator was a member of the NBDC Platform Steering Committee), and problems emerging from the five-project structure and their actual implementation. An initially over-ambitious program that suddenly faced serious budget cuts, combined with personnel turnover, also took their toll. Nevertheless, as the following sections will also show, the program has been characterized by effective learning and adaptive management, some promising innovations, good science, substantial capacity building, and strong linkages with policy makers. It is also a source of important lessons to design future R4D programs.

[11] In phase 1, PN 19 on 'upstream-downstream interactions' was based on the hypothesis that improved RWM upstream would have such large positive outcomes that they would far outweigh any small negative outcomes. See http://ongoing-research.cgiar.org/factsheets/cp19-improved-water-and-land-management-in-the-ethiopian-highlands-and-its-impact-on-downstream-stakeholders-dependent-on-the-blue-nile-upstream-downstream-impacts-in-nile/

5: NBDC Theory of Change

The Nile Basin Development Challenge is stated formally as follows:

> **We aim to improve the resilience of rural livelihoods in the Ethiopian highlands through a landscape approach to rainwater management.**

The question is, how did NBDC envision achieving this, and how can it know whether it is making progress to achieving it? Box 1 below reproduces the CPWF "theory of change" (ToC), meant to inform the overall structure of the program, and most important, provide opportunities for reflection and learning from experience. Are the program and individual projects achieving their overall development goal? If they are not, what changes are needed? The CPWF ToC was supported by a fairly elaborate set of tools for monitoring and evaluation (M&E) – again this was intended to be in learning mode, not only to satisfy contractual requirements. It was captured in the planning stage by the Outcome Logic Model (OLM), itself based on the premise that research (or other sources of learning) leads to changes in knowledge and therefore attitudes and skills, which will at some point lead to behavioral changes – the desired outcomes which cumulatively through time will lead to actual impacts – reduced poverty, sustainable eco-systems, etc.[12]

Box 1: CPWF Rationale for a "Theory of Change"

Why a Theory of Change? CPWF adopts a Theory of Change (ToC)-based approach to M&E, impact assessment and communications. A theory of change is the cause-and-effect logic that links research activities to the desired changes in the actors that a project or program wishes to influence. It describes the tactics and strategies, including working through partnerships and networks, thought necessary to achieve the changes. In other words a theory of change is a model of how project partners think their project will work. It provides a road map of where the project is trying to reach. Monitoring and evaluation of implementation can test and refine the road map, while communications helps in reaching the destination by helping to bring about change. The value of testing and refining the model/road map is that it challenges pre-conceptions, assists reflection and catalyzes staff to frequently ask themselves: 'Are we going in the right direction? Are we doing the right thing to achieve the changes we want to see?' Finding the responses to these questions is one of the ways that the CPWF puts its core principle of adaptive management into practice.

See more on the CPWF's use of theory of change. http://waterandfood.org/approach/knowledge-management/monitoring-and-evaluation/

Each project except N1 has its own OLM tied to its budget, milestones, planned outputs, etc. There is also an overall NBDC OLM linking these separate OLMs. These were intended to facilitate and guide the Each project except N1 has its own OLM tied to its budget, milestones, planned outputs, etc. There is also an overall NBDC OLM linking these separate OLMs. These were intended to facilitate and guide the program, and to be updated periodically based on implementation experience. However, with the exception of N3, interviewees expressed doubts as to whether they had much impact or were used in any

[12] See for more information on the theory and tools: http://waterandfood.org/approach/knowledge-management/monitoring-and-evaluation/ and http://monitoring.cpwf.info/home

systematic way. As one interviewee put it, "the theory of change or the M&E are not used so much as a learning tool; the framework was established, but it was not implemented due to its cost." As one senior interviewee stated, "the overall OLM framework was forgotten about; not used as it should have been." We also note that as new personnel arrived, they were not systematically introduced to the OLMs even if they were leading one of the projects.

While all interviewees appreciated the importance of learning by doing, few of the NBDC researchers we asked (a subset of the total number interviewed) were able to articulate the NBDC Theory of Change, and explain how it has evolved and how it has been used. Several less senior researchers professed to have little or no idea as to what it was, or claimed that it was not relevant to their project. Some senior interviewees attributed the Theory of Change and its accompanying M&E process entirely to the CPWF MT, praising them for having done so much work to develop the ToC. But the way this 'praise' was phrased implied the ToC belonged to the CPWF MT and not to the NBDC program. Two senior researchers were quite critical: they considered the program as developed at the inception workshop too complex and ambitious and the theory of change too elaborate to be of any use, developed by "arm chair thinkers" who did not understand realities on the ground.

In some cases, such as N2, projects claim to have adopted their own "Theory of Change," reflected, for example, in the Innovation Platforms (IPs). The latter are participatory and driven by internal demands (in principle), unlike demonstration sites which are driven by external actors. In a few cases, researchers expressed doubt about the applicability of any ToC to their project, as they see their mandate as producing results and tools which other projects and actors need in order for the program to achieve its objectives (this is a rudimentary ToC itself).

There is also full agreement that M&E has been a serious weakness. NBDC people attribute this largely to budget cuts: what had already been a modest budget was cut drastically in 2012 as part of the across-the-board cuts CPWF was required to implement. Before the cuts, limited resources had led to a decision to focus on Most Significant Change stories, to be complemented by a knowledge, attitudes and practice ("KAP") survey. According to an email from the person in charge of M&E at that time, "the main reasoning behind the development of this M&E framework was that while the outcome logic model was a good project management plan, [it] did not demonstrate how research outcomes of the project would be measured. This survey was conducted for some projects and a short presentation was prepared (posted on the wiki) and shared informally with those concerned. A very draft report is available but was not posted on the wiki" – it was not completed. Others have noted the KAP survey was controversial, seen as not relevant by some projects. In any case, with the 2012 cuts, the M&E budget was drastically reduced, and at the CPWF MT level, the lead staff members all departed the program. Indeed it may be that the failure to prioritize M&E at the CPWF MT level, reflected in an initially inadequate budget allocation that was further slashed in 2012, is the most important explanation for the weakness of M&E.

Other factors may also be at work. For example, as noted above, it appears that many researchers have not understood or been comfortable with the Theory of Change jargon, and did not see its relevance. In addition to the patchy support from the CPWF level, systematic M&E – which is critical for systematic lesson learning and assessment of outcomes – was not a high priority for the first BL. This position was apparently shared with other basin leaders, leading to some resistance at an early meeting of all BLs. The current Nile BLs inherited a seriously reduced M&E budget, and M&E staff at ILRI departed. However, the November 2012 reflection workshop was built around the NBDC OLMs; and the recent One NBDC initiative is based on the Program ToC. Further, the N3 project did use its OLM as a management tool, which transformed it over time from a "normal" science approach to one that was a more outcome-driven R4D project. Attempts have been made to document outcomes through the six-monthly and other reports.

Despite the low priority on systematic M&E, there is strong evidence that NBDC is achieving important outcomes. Examples include the capacity building that NBDC has supported, not only postgraduate students, but also a variety of training programs for partners and stakeholders, with additional training provided in response to demand from Ethiopian agencies. National interviewees expressed appreciation for this capacity building support. Finally, it is at least plausible that NBDC is influencing a trend away from top-down to more participatory implementation of SLM. The positive responses to the key messages at the February 2013 National Stakeholders Workshop, and the even more positive responses at the July 2013 Regional Stakeholders Workshop suggests important outcomes are becoming more visible. At the latter workshop, a task force was appointed, led by Ethiopians, who are leading the formulation of a proposal for further work (section 13).

Conclusion

The formal Theory of Change and its accompany tools (OLMs, M&E) have not been systematically internalized and used by NBDC. The reasons are both internal and external to NBDC: internal because not much effort was made to use these tools in program management; external because the CPWF initiated this work with little ownership in the basins and later did not provide long-term consistent support to facilitate their use. These reasons tend to be attributed entirely to budget issues, though it also seems to reflect priorities of NBDC and CPWF leadership as well. Nevertheless, through reflection workshops and other mechanisms, the program participants have worked in a learning mode. It may not have fully used these lessons in practice, but it has made changes in strategy based on experience. And there is growing evidence that NBDC is achieving some of its desired outcomes, and is positioned to continue to do so through a potential Ethiopian-led follow-on program.

6: The Research for Development (R4D) Concept—Evolving Understandings and Relevance

R4D is a defining characteristic of the CPWF program, especially in Phase 2. It is the foundation for its "theory of change" and the basis for identifying a large "basin development challenge" to focus the research in each basin.

R4D has multiple historical roots, beginning with "applied research" done by social scientists in the 1930s (all too often to support colonial governments). In the 1980s "participatory action research" (PAR) was proposed as a way to work with communities to support their own innovations, and to use social science to document, share and learn from the processes and outcomes (Whyte et al. 1989). CGIAR centers also adopted various versions of PAR from the 1980s and it continues to be an important approach to doing research for development (e.g. Mapfumo et al. 2012). By the early 21st century, PAR principles were being integrated with those of integrated natural resources management and integrated research for development (Sayer and Campbell 2004), and more recently with the concept of "innovation systems." This movement basically places PAR within a firm agro-ecology systems perspective, and in the case of innovation systems, a broader institutional framework. R4D is therefore an important development because of this broad ecosystems perspective, and because it escapes the confines of social science to become an integrating inter-disciplinary paradigm for doing research. R4D was pioneered by the Sub-Saharan Africa Challenge Program, and has now been carried to a more explicitly developed form in the current phase of CPWF (including NBDC specifically)[13].

CPWF defines R4D as "an engagement process for understanding and addressing development challenges defined with stakeholders. Stakeholders are champions and partners in the research process as well as the change it aims to bring about" (Hall 2013). Hall suggests adding one more element: "and continuously learning how to do this," as this is implicit in the efforts that CPWF has made to support learning[14]. A definition we obtained from an interview suggests the CPWF leadership holds a challenging understanding of R4D that goes beyond the definition provided by Hall, one that includes full participation of all stakeholders, integrating notions of power, more equitable relations between people, institutions, partners, and how those dynamics evolve; and making research relevant by transforming its focus to contributing to real development outcomes. R4D is therefore intended to achieve systemic innovations, not simply marginal increases in outputs of existing socio-technical systems.

This understanding of R4D emerged from just two of the interviews with NBDC team members, though many would agree with it. One of these team members offered a perspective that seems to go beyond R4D as articulated by the CPWF MT, emphasizing that research needs to be embedded in the development process; i.e. researchers should work directly with implementers in testing innovations as they are the ones who will have the resources and responsibility to scale up. Within the NBDC team, there is no common shared understanding or vision of R4D among the partner institutions and individual team members, though there is a shared value on contributing to development goals. It may be revealing that few of the team members responded with a full coherent definition to the question we asked regarding their understanding of R4D. Most did mention elements of R4D such as implementing physical interventions and measuring actual impacts compared to anticipated impacts, "research into action" that includes the element of "participation," working on challenges relevant to communities, research that is directly relevant to partners, and "beyond academic" research that bridges the gap between research and development. Many researchers (Ethiopian and international) hold a narrower view of R4D than the

[13] See Merrey 2013.

[14] We could not find any readily accessible CPWF definition of R4D and Hall (2013) does not mention his source. The CPWF MT has most likely been learning and adapting its ideas based on experience.

Extension worker from Chilanko adding description to a landscape drawing
Photo: ILRI/Apollo Habtamu

CPWF leadership: research that is somehow in the future likely to be relevant to development, or for the Ethiopians, research that is directly relevant to farmers. This is a traditional perspective of the CGIAR and national research institutions, and is appropriate in many circumstances.

Further, several senior (international) interviewees argued that NBDC has devalued and not given sufficient space to more "traditional" forms of science; in their view, science quality has been compromised by an over-emphasis on "process" and "soft" (i.e. social) science. Perhaps it is fair to say the NBDC has not provided adequate space to ensure productive contributions from the "hard" scientists and modelers in line with scientists' expectations. It has been partly but not fully successful in achieving full integration

among "hard" and "soft" sciences; for example there are only a few publications so far reflecting trans-disciplinary insights that go beyond single-discipline perspectives[15].

Clearly, some researchers do share the CPWF leadership's perspective, as evidenced by the experiments with Innovation Platforms (IPs) and participatory "games" for planning and capacity building ("Happy Strategies", "WAT-A-GAME"). There is also evidence that over time there has been growing convergence among researchers in their understanding and buy-in to R4D—perhaps as a result of the insights gained from the experiments in participation and the program learning process over time.

According to some interviewees, the differences in understanding of R4D have been compounded by conflicting personal and institutional agendas. Some researchers expressed concern that R4D may not be good for the career of scientists with academic ambitions, or that it might not be assessed positively in institutions that value "scientific" performance[16]. One person even suggested that as a result, some scientists did not wish to implement the program as planned. Bringing together institutions with different cultures and researchers who had not previously collaborated takes time and effort. Some researchers appear to find it difficult to adapt to the change in the researcher's role (and power relationships) that is necessary for R4D: it is no longer the researcher who sets the agenda, but the full set of stakeholders. Moreover, the CGIAR centers are traditionally schizophrenic in the balance between research, capacity building and development, with changing signals over the years from science councils and donors. In general, the incentive system for CGIAR scientists has emphasized science outputs (peer-reviewed journal articles) in recent years, not necessarily developmental outcomes. Finally, a few interviewees noted that the interests, incentives and historical priorities of the partner institutions and of individual researchers were not always aligned well with the NBDC[17]. Since the past and present BLs have been employees of the two key implementing institutions, they too can be affected and may sometimes need to compromise between NBDC goals and institutional imperatives.

There is strong agreement among researchers that planning and implementation in the NBDC has been a critical R4D problem. There are multiple dimensions to this observation. One is the resistance mentioned above—R4D is perceived by some scientists as not being "real science." Another, more important dimension relates to implementation problems. For example, N2 was expected to take the lead in working with communities to test actual RWM innovations and measure the results. However, delays in implementation, changes in personnel, and perhaps an under-estimation of the time needed for developing effective community partnerships all contributed to delays. We also heard, as a kind of complaint, the view that N2 went much further in its focus on community participatory processes than was originally anticipated (from other perspectives this has been one of its major contributions). As discussed in section 4, N3 had been expected to use the results of local level interventions as one important basis for analyzing the potential for scaling out; however, N3 came to an end as planned in December 2012 (some work extended into early 2013), before any such results were available. This has proven to be a serious flaw in the program design, one that should have been addressed if CPWF were really governed by "adaptive management." The over-ambitious nature of the original program design given the budget available, compounded by severe budget cuts in 2012 have been discussed above: these have had a serious impact on the implementation of NBDC as discussed above, and constrained the potential for extending N3.

[15] See for example the papers presented at the July 2013 Science Workshop (Mekuria, ed. 2013); a partial exception is "participatory hydrological monitoring" (Zemadim et al. 2013). Nevertheless, it may be too early to have high expectations regarding formal publications.

[16] We have no direct evidence to confirm this claim; but from the interview transcripts it seems credible that many CGIAR scientists perceive it to be true.

[17] The new CGIAR Research Programs are intended in part to overcome these vested interests and to provide incentives and space for scientists to focus on how their science contributes to achieving development outcomes; but Centers' performance evaluation criteria may not fully reflect this shift as yet.

There may sometimes have been a divergence in interest between the NBDC leadership and the national partners (see section 7, below); the national partners were expected to take the lead in implementing innovations, but perhaps did not always understand this, were not kept up-to-date or brought fully into decision-making processes, or did not have the resources or capacity for it. In the interviews, some partners raised the issue of ineffective internal communication. The monthly NBDC meetings are attended by representatives of the two main CGIAR centers, ODI, and a member of the CPWF MT; but not by representatives of the national partners; this suggests they are not fully engaged in program management. There were also some implementation problems affecting the national partners, which are discussed in section 7. A strength of the NBDC has been the process of reflection on lessons learned, often though not always leading to adjustments in implementation; but the limited time of the program means that it is only near the end that we have a more mature understanding of how the program should have been implemented.

Conclusion

R4D differs significantly from the "normal" understanding of applied research or research intended to support development as understood and practiced by most CGIAR centers and their national partners. It requires researchers to play new roles, cede considerable control of the research to the partners, and requires new skills. NBDC did not articulate a clear understanding of R4D, how it should be implemented, and the roles of partners at the start of the program; nor did it make any strong effort to ensure that all parties would have a shared understanding of R4D. Therefore it has had different meanings for different people, based on their own disciplines, experience, and institutional homes.

As a result, NBDC has been a learning experience for the participants; many have learned a great deal about R4D from this program, and are now far better-equipped to implement "real" R4D. Many though not all the scientists involved have gained a deeper understanding of the potential value of R4D and what is required to make it work. R4D has led to the identification and testing of several promising innovations (see section 9 below). NBDC has provided an effective learning platform for partners and stakeholders, and created a firm foundation for future R4D work to improve RWM in the Nile basin. This includes significant buy-in to this approach to research among the national partners and stakeholders. As discussed in sections 7 and 8, there is a strong interest among the partners and stakeholders in building on the NBDC foundation.

Nevertheless, many lessons are yet to be learned. There is no single formula for doing R4D; there is a spectrum of approaches and types and what is appropriate will vary based on the problem to be solved and the social, economic and agro-ecological context. PAR as conceived some decades ago remains a viable approach, especially when the problem is single-dimensional, for example testing a new crop variety or land management method. A more complex approach, involving many more stakeholders, is needed to address complex multi-dimensional problems, such as RWM in a landscape and value chain perspective. This requires a high level of communication, process facilitation and leadership. Another important unresolved set of issues is the role of the CGIAR centers themselves in the continuum of research and development. To what extent should CGIAR centers stray from retaining a central focus on quality research, versus taking more responsibility for the outcomes and ultimate impacts even if the quality of research is perceived to be compromised? What should the CGIAR role be in R4D programs that build on the NBDC? In NBDC, the CGIAR centers played dominant leadership roles, perhaps necessary given the lack of experience with this approach among national partners. However, in future, the CGIAR centers should shift to playing a more supportive role, with the national partners taking the lead. This is exactly what is planned for the next phase of NBDC and leads to the next section on partnerships.

7: Evolution and Effectiveness of Partnerships

Partners are those individuals and institutions directly involved in program implementation. They include but are not limited to formal research partners and implementation organizations. The first BL distinguished among: the partners receiving money for specific tasks (co-contractors and sub-contractors); those who were keen to work with NBDC because of mutual interests with no contractual expectations; and "peripheral partners," those who were "coming and going". Partners include national, regional and international organizations.

The main program implementation partners are two CGIAR centers, IWMI and ILRI. One or the other leads every project (N2-N5), with the other closely collaborating. This dominance of the CGIAR centers distinguishes the Nile from other CPWF basins and has had implications addressed further below. In addition, a very long list of national, regional, and international partners was included in each of the original proposals. Some of these have dropped out (e.g. NBI, ENTRO), but some new partners have become closely involved in the program, for example the recently-established Abay Basin Authority, the Tana and Beles river basin organizations, and the Ministry of Water and Energy. Clearly, the range and nature of partnerships has evolved over time. Interviewees also noted several institutions that in their view should have been included as partners, for example the Ethiopian Institute for Agricultural Research[18], and regional agencies. There is no formal published master list of "partners" involved in the NBDC[19].

Overall, interviewees feel that partnerships have gone well, though some partners were mentioned whose performance was considered disappointing or not meeting expectations. As noted elsewhere, NBI and ENTRO dropped out; we speculate that this is because they were not attracted to what became an entirely Ethiopia-focused program. One of the original NGOs expected to participate was a disappointment, but others have done well. The experience with national partners — regional research institutions and local universities – has been mixed. Some of these partnerships have been very strong (e.g. Amhara Regional Agricultural Research Institute [ARARI], Oromia Agricultural Research Institute [OARI], Universities of Bahir Dar, Ambo, Arba Minch) but some others less so, reflecting differences in capacity and readiness to participate. It was observed that some of these national partners were disappointed at the slow early pace of the program. The close links with these national partners have generally been through the Ethiopian scientists at the CGIAR centers—reflecting the importance of their close personal ties. Some national partners said they were involved in the initial design of the NBDC research program; others were brought in after the program was approved.

Based on our interviews of national partners, they seemed satisfied with the partnerships and the NBDC program. In some cases, the partners have very specific local roles, and seem less knowledgeable regarding the overall NBDC program. They expressed satisfaction at the support for postgraduate students and the training and capacity building opportunities. Indeed one senior partner, a professor, sees the support for students and especially the exposure to international scientists as extremely valuable. There were issues that affected the smooth running of the partnerships; some, such as lack of clarity on the focal person, have been mentioned above.

The most serious problem relates to finances. The national partners have contracts with either IWMI or ILRI, depending on the lead center of the project on which they work. Two issues were identified: very long delays in getting payments from the lead CGIAR centers, and the inadequacy of resources compared to their perceived needs and previous experiences with other CGIAR centers. Interviewees mentioned many months of delays in receiving substantial sums expected under their contracts, and expressed

[18] According to the first BL this institution was invited to be a major player at the proposal writing stage but declined.
[19] There is a an early network analysis of actors (stakeholders) and a January 2011 draft list of actors (stakeholders) but these were never published; see section 8 on stakeholders.

frustration that getting these issues resolved takes a long time. The national partners have been forced to pre-fund costs that should have been covered through advance payments. Although they seemed to consider the contracting center largely to blame, one interviewee noted there have also been delays in moving payments through the Ethiopian financial system. The other issue raised is the inadequacy of funding given their needs. Ethiopian research institutes suffer from shortages of computers and field vehicles, very poor internet connections, (and, we would add, low salaries). They perceive that the NBDC should have provided support for these kinds of items, and indeed they referred to past partnerships with other CGIAR centers in which these were included. As noted above, NBDC was under-funded given its ambitious goals and could not have provided these from its own resources; however that simply leaves this as an unresolved problem.

We heard some issues regarding the selection of partners. Examples include: selection of partners by the proposal writers who had been involved in CPWF Phase 1 projects, with whom others were not familiar; selection of some partners before the OLMs had been prepared who later proved to be inappropriate choices (but they were already part of the approved proposals); and selection of partners based on project rather than program considerations.

The IWMI-ILRI partnership is very close and effective at both institutional and personal levels. It may help that some scientists, including the first BL, have been joint appointees, reflecting a partnership with roots pre-dating NBDC (Appendix 1). It is also important to note that IWMI and ILRI partner on many other projects where there is a mutual interest. Although this has facilitated smoother management of the program, it has also led to their strong dominance. The other CGIAR partner, ICRAF, had no physical presence in Addis until recently. It was brought in as the proposals were being prepared, and asked to bring an agroforestry component into the program. Its share of the budget is quite small compared to the expectations and the transaction costs of collaborative research; and we understand more outputs were added during early planning workshops with no adjustment in the budget. ICRAF was subcontracted by IWMI for work included in N2 – it was not one of the original proponents. Some NBDC scientists have a perception that ICRAF has not produced as much as had been expected (ICRAF is well aware of this perception), and has not been as fully engaged as others had hoped. One interviewee described the relationship as "loose," though ICRAF is producing important outputs (as evidenced by the papers and posters presented at the July 2013 Science Workshop; see Mekuria, ed. 2013). In fact, ICRAF's contribution has been very important, and its potential for contributing to any future program is high.

In N2, ODI, though also not residential, has played a critically important role in project implementation and seems to have a strong relationship with IWMI and ILRI. ODI built on its recent experiences in RiPPLE (http://www.rippleethiopia.org/), a program aimed at providing high quality knowledge to inform water policy and practice in Ethiopia. RiPPLE is now an NGO. It was one of the pioneers of the use of "Learning and Practice Alliances," a version of IPs, building on earlier programs including the CPWF phase 1 project on multiple use water services.

Several international interviewees noted the dominance of international staff in program leadership. This also emerges by hints and implications from interviews with some Ethiopian scientists as well, and raises the question whether international staff leadership has created adequate space for their Ethiopian colleagues (both CGIAR scientists and national universities and research institutions) to work to their full potential. We do not have an answer to this question. It is important to note that the first IWMI regional office head, who played a critical role in developing the NBDC proposals, was a highly-respected Ethiopian, as was the first BL. Both had strong national and international networks. Therefore this observation needs to be read with some caution. The July 2013 Regional Stakeholders Workshop decided that the proposed follow-on proposal would be developed by a task force led by two Ethiopian institutions.

Finally, interviewees raised the issue of the impact of financial dependence through sub-contracting on partnerships: partnerships should not be one way, as in subcontracts; partnerships should be based on equality and need to be mutually beneficial. Sometimes, the partnerships have looked more like sub-contracting, while others were real partnerships. The dilemma of course is that finance is a necessary ingredient for participation in research — the trick is to structure the relationship so that there is mutual benefit beyond the purely financial transaction.

Conclusion

NBDC reflects strong partnerships among some individuals and key institutions, both national and international. In most cases the NBDC experience has strengthened these partnerships. The program has also adapted well in terms of incorporating new partners where relevant. National partners especially appreciate the support for postgraduate students. The NBDC experience offers lessons for achieving stronger partnerships in the future, for example involving national partners from the earliest stages of project or program design, sorting out financial issues in a timely manner, and providing space more effectively for national researchers and partner institutions to play leadership roles.

8: Stakeholder Engagement: Approaches and Lessons

Engaging with stakeholders, broadly defined, and especially with those whose actions we hope to influence, is critical if research is going to lead to the kinds of developmental outcomes envisioned by the CPWF. However, some responses to our interviews suggested that we have not been sufficiently precise in distinguishing "partners" and "stakeholders" in designing our interview guide. As explained in section 7, our distinction is that "partners" are those institutions and individuals who work actively in the planning and implementation of the program. This itself is a wide group, not only researchers, but community members, NGOs working directly with the program, government officials directly involved, and the CPWF itself. "Stakeholders" is an even broader group that includes all those with a potential interest in the products and outcomes of the work: the wider community of government officials and departments at all levels, donors, NGOs, other researchers not directly involved in the program, and farmers in local communities. The NBDC Outcome Logic Models (OLMs) and impact narratives specify a wide range of "actors who will change in some way" – these include both the "stakeholders" as defined here and the partners.

Most interviewees agreed that, broadly speaking, stakeholder engagement has been very successful. From the beginning of the NBDC program, the leadership reached out to a wide set of stakeholders. There was a strong concentration on involving local, regional state and national government officials (implementing agencies, policy makers, etc.), researchers, and to some degree NGOs. With hindsight, some interviewees suggested the program could have done more to engage with other donors (there are quite a few donors in the Ethiopian RWM arena[20]), and other NGOs working in the area. Very few interviewees mentioned reaching out more effectively to the private sector, though this sector is becoming important in Ethiopia. Several mentioned that the Ministry of Water and Energy (MWE) could have been involved more directly than it has been (it came into N4 later because of its interest in the modeling); a few mentioned

National platform group work. Photo: ILRI/Ewen Le Borgne

[20] Ethiopia is implementing a large long-term multi-billion dollar SLM program with the support of a number of development partners; see below, section 9.

other ministries or government agencies (for example in health, environment, meteorology, though some of the latter are involved as partners on specific activities). Some interviews noted that regional state and district level officials could have been more involved. Some new stakeholders emerged in the course of NBDC, for example the Abay Basin Authority – as noted in section 7, NBDC has engaged with this new organization as a partner.

At the federal level, the Ministry of Agriculture (MoA)'s Sustainable Land Management (SLM) Program was expected to be a major partner and stakeholder, though some suggested this was only partially achieved in practice. That program has also been one avenue for linkages with other stakeholders. A strategic decision made early by the first BL was to develop an engagement structure that was parallel to, but perhaps only tenuously linked with, existing structures in the MoA. The first BL noted that NBDC tried to go beyond the 'traditional' mode of working with the MoA through its committees to something more partner-driven, and there is growing evidence that this has been achieved. In the early stages there were internal science meetings and NBDC stakeholder meetings of various kinds. The NBDC then formalized interactions with stakeholders by initiating the National Platform on Land and Water Management, a wide set of stakeholders at national level dominated by government officials and researchers. Officially, the platform focused more generally on land and water management in Ethiopia, with NBDC being a member of its steering committee and providing the secretariat; in practice, many of the stakeholders engaged in the platform also operated in the Abay Basin. The platform has met regularly (bi-annually after the second meeting) in a workshop format to discuss planned research and increasingly, research outputs and their potential implications. Important events include the National Platform Orientation Workshop in April 2011, the second national platform workshop in December 2011, and the third national platform workshop in July 2012 with ICRAF.

In 2013, the pace of stakeholder engagement meetings has picked up: the fourth national platform workshop was held in February focusing specifically on the work of the NBDC, and several less formal stakeholder consultative meetings to discuss the future sustainability of NBDC activities have been held. A regional stakeholder engagement workshop was held in Bahir Dar in July 2013, and a final NBDC and national platform workshop is planned for 14-15 November. At the fourth national platform workshop, a set of "key messages" emerging from NBDC results and largely focused on policy were shared and discussed. While the first reaction was lukewarm, by the end of the second day, the participants had bought into these messages, became strongly engaged with them, and added considerable value to strengthening them. Following further reflection and using the outputs of a July 2013 NBDC Science Workshop, these key messages were revised further (NBDC 2013) and shared at the Bahir Dar Regional Stakeholder workshop. At this workshop, about 50 participants remained fully engaged for two days, produced important outputs that in effect endorsed the "key messages" of NBDC, and agreed to work together to develop a proposal for further work. Importantly, two Ethiopian institutions have agreed to lead a broad task force to develop the proposal; the task force includes national research institutions, MoA, universities, international donors, IWMI and ILRI, and others. There is now a strong potential that NBDC outputs and the relationships built and working processes set in place may influence future RWM investment policies and implementation strategies.

A Steering Committee (SC) was established in July 2011 to provide guidance and direction to the National Platform on Land and Water Management; its members included representatives from the MoA including the SLM program, CGIAR centers, research institutions, and NGOs[21]. In addition, "Thematic Working Groups" were established in July 2012. These are communities of practice around, respectively, technical innovation, institutional innovation, policy support, and ecosystem resilience and climate change. These groups and the SC have become more active and engaged in 2013, as NBDC seeks to share its results

[21] Universities, regions and the private sector are not represented, and there are no women. This has been recognized and will be addressed if the Platform and its SC continue.

and their policy implications, and to find ways to sustain activities that are seen as valuable. The SC has debated the issue of whether the National Platform on Land and Water Management and its subsidiary groups should be continued parallel to existing structures, or whether they should be fully integrated into the national SLM structures. At the most recent meeting (April 2013), most members favored a parallel structure with research and the CGIAR centers playing strong roles. This debate in itself as well as the emerging consensus suggests that many stakeholders now value the Platform established by NBDC, but its future role, if any, and relationships with government and other organizations remain to be decided.

Tilahun Amede and presidents of seven universities. Photo: ILRI

Conclusion

While it is clear that stakeholder engagement has gone well overall, several issues have been raised for consideration in future programs. One is the extent to which the NBDC over-promised in the beginning, and then lost some credibility as it failed to fulfill all those promises in the limited time period of the program. Several interviewees suggested that NBDC had raised high expectations that were not fulfilled. Some interviewees also suggested there has been a continuing mismatch between the schedules of stakeholder engagements and the availability of research results ready to share (this applies especially to N4, whose modeling work on likely consequences of RWM interventions is somewhat behind the other project schedules, and to N2 whose implementation was delayed at the early stages). Some have also suggested that N5 has not played as strong a leadership role as it might have with regard to communication, M&E, and fostering innovation and integration. Another issue raised is the extent to which NBDC engaged with the right set of stakeholders: perhaps engaging with the wider community of donors investing in SLM, regional level governmental agencies, civil society organizations, private sector firms, and NGOs working on these issues, could have enhanced the potential outcomes of the program[22]. A final issue is the effectiveness of stakeholder involvement in the early planning stage of NBDC: were they part of the program design process, or were they consulted only after many strategic decisions had already been made? Has the process of stakeholder engagement been sufficiently transparent? Whatever the answer is, the national institutions are playing a leading role in preparing the next phase of work. We consider this further in section 13.

[22] At the July 2013 Regional Stakeholders Workshop, these stakeholders were better represented.

9: Innovations and Innovation Processes: Perceptions and Outcomes

Research for development is about catalyzing innovations, which may be technical, institutional, or organizational, or some combination thereof. In section 2 we defined "innovation" as some combination of technological and institutional change that lead to changes in the behavior and relationships of the actors involved; change is systemic with the potential for new outcomes. Innovations are distinguished from "new knowledge". Producing new knowledge is the major goal of science, and R4D programs are likely to produce both innovations and new knowledge, i.e. new data, insights into how things work or why things are the way they are, as well as innovations. New knowledge is a foundation for science-based innovations. NBDC has clearly produced both new knowledge and innovations.

We asked many interviewees to identify what innovations have been produced, whether they originated from the research or other sources such as stakeholders' practices, and how they developed. We did not clearly distinguish innovations and new knowledge; therefore responses included both. There is a strong consensus among the researchers that NBDC has produced important new knowledge and innovations, and their lists showed considerable agreement on what they are. However, most were not very specific or focused only on their own work. We therefore prepared an indicative list from multiple sources which is provided in Table 1. The table indicates whether we regard the item as an innovation (including potential though not fully realized) or new knowledge (which in some cases may well lead to future innovations). The table is indicative and is not complete. It reflects the authors' views, not necessarily only those interviewed.

Table 1: Indicative List of New Knowledge and Innovations Attributed to NBDC

Innovation/New Knowledge	Reference	Comments
1. CPWF application of R4D as a learning and change approach, as reflected in the overall NBDC institutional history [*innovation*]	One interview with a person not directly part of NBDC; Hall 2013; Merrey 2013	As Hall notes and the CPWF is seeking to demonstrate, this may prove to be an extremely important innovation if it leads to changes in how the CGIAR does its research business. There is evidence it is leading to changes in how research on RWM will be done in future in Ethiopia by national institutions as well as the participating CGIAR centers
2. A new integrated watershed rainwater management paradigm [*innovation*]	Key messages document (NBDC 2013); box 2 below	This has 8 core elements. Integration of these into a stronger implementation package supported by continuing R4D has promise to improve the outcomes of SLM interventions; the outcome of the July 2013 workshop suggests there is strong buy-in to the messages which, if fully implemented, will lead to major changes in SLM-RWM implementation programs
3. Innovation Platforms (IPs) [*innovation*][23]	http://nilebdc.org/?s=innovation+platforms ; interviews; Clayton 2013	Frequently mentioned in interviews
4. Use of innovation funds linked to IPs [*innovation*]	http://nilebdc.org/?s=innovation+platforms	Both this and IPs need better documentation and evaluation but appear to be potentially important

[23] One interviewee suggested "nested" IPs is the real (potential) innovation, but this was not fully achieved and there is not yet much documentation on this. Use of baseline livelihood analysis and information from engaging with stakeholders in the early stage were also important.

Innovation/New Knowledge	Reference	Comments
5. Happy Strategies Game [*innovation*]	Interviews, Pfeifer et al. 2012a	Happy Strategies is a tool to facilitate discussion among stakeholders to develop an intervention strategy on a watershed. It facilitates the participation of multiple stakeholders in developing watershed intervention strategies
6. WAT-A-GAME [*innovation*]	Interviews, http://nilebdc.org/outputs/, http://www.watagame.info/ [collaboration with Afromaison project]; Lema et al. 2013	WAT-A-GAME is an open toolkit developed by IRSTEA and CIRAD which enables participants to design and run simulations for water management, policy design and education. The NBDC innovation was its application.
7. Participatory videos ("digital stories") [*innovation*]	Interviews, http://nilebdc.org/?s=participatory+videos	Needs an evaluation for confirmation, but this demonstrated a potential communication tool to enable farmers (for example) to communicate results of experiments
8. National Platform for Water and Land Management to help set research agenda and communicate results [*innovation*]	Interviews, http://nilebdc.org/?s=national+platform for 3rd meeting in 2012	Should ideally be linked to IPs at regional & local level; but it seems to have been effective in supporting changes in knowledge and attitudes of stakeholders
9. Nile Goblet; RWM intervention suitability mapping [*innovation*]	Interviews, http://nilebdc.org/?s=nile+goblet+tool ; Pfeifer et al. 2012b, Notenbaert 2013	There has been considerable demand for training in its use. It seems to be an important NBDC innovation. It integrates of bio-physical and social data
10. Application of free global data sets in modeling [*innovation*]	Exit interview-Charlotte Macalister	Needs more support—this is from one interview
11. Participatory hydrological data gathering [*innovation*]	Zemadim et al. 2013	Potentially important innovation involving engagement of community in collecting and analyzing data on their watersheds
12. Integrated management of termites [*innovation*]	Swaans & Peden 2013; Legesse et al. 2013, Peden et al. 2013	This is emerging from research (new knowledge) as a potentially important innovation based on new knowledge contributed by a CPWF phase 1 project and NBDC
13. Modifications of SWAT model [*new knowledge*]	Interviews	Needs more support—this is from 2 interviews; publications so far have used SWAT but modifications are not clear
14. Hydrological insights to enable better targeting of interventions [*new knowledge*]	One interview; Steenhuis et al. 2013	Not clear whether this is leading to changes in targeting as yet
15. Techniques to raise productivity in vertisol areas [*new knowledge*]	Erkossa et al 2013	Not mentioned in interviews, but it is a potential innovation;
16. Use of multi-purpose fodder crops, e.g. desho grass [*new knowledge*]	Leta et al. 2013	Not mentioned in interviews; new knowledge which may lead to change
17. Rainwater-livelihoods-poverty index (*RLPI*)	Getnet and Kefyalew 2013	A participatory impact pathway assessment technique with measurable indicators; potential tool. Not mentioned in interviews

Participants at a workshop to design strategies at landscape level
Photo: ILRI/Apollo Habtamu

Some innovations were planned, such as the IPs and National Platform; but others have been serendipitous, emerging from the field work and actions on the ground, or from communities themselves. Examples of the latter include the Happy Strategies Game to facilitate community planning of RWM interventions on watersheds, and participatory hydrological modeling. The latter was resorted to as a way to solve the problem of destruction of measuring equipment: giving the community a stake in the process has made the process more sustainable and is raising their awareness and interest. Nile Goblet appears to be another example of serendipity: it is a way to facilitate the use of GIS data without expensive software and by people with little technical background. Using a combination of Nile Goblet, Happy Strategies and WAT-A-GAME, as well as other tools being developed, could lead to better planning of RWM interventions that are more demand-driven in future – a major goal of the NBDC. These innovations have attracted the interest of MoA and regional universities, among others, and there is some evidence of other national institutions adopting and further developing some of the planning tools. There has been strong demand for training in the use of GIS tools, especially Nile Goblet. NBDC has tried to respond to this demand, which has also resulted in improved relationships among partners and expressions of interest in future collaboration.

A review of the Ethiopian SLM Program is underway during 2013[24]. The potential for facilitating the next phase of SLM-RWM implementation programs to be more participatory and demand-driven has been demonstrated to some extent. The minister in charge of SLM in the MoA has expressed strong interest in the key messages constituting the main NBDC output, and the partners have agreed these will be central to the proposed next phase of NBDC.

Some researchers also cautioned that there are limitations to some innovations such as the IPs and National Platform, a caution also expressed in a recent blog on Future Agricultures[25]. The outcomes of the 22-24 July 2013 Regional Stakeholders Consultation suggest that a regional platform is emerging. However, there is currently no effective link between the local IPs and Regional or National Platforms. With experience, the researchers have realized the local IPs were not as broadly representative as had been hoped; they are dominated by local government officials, which is not surprising in the Ethiopian context. There is also some doubt as to whether the stakeholder analysis was adequate at the beginning, the extent to which NBDC will be able to document outcomes, and the future sustainability of these innovations.

Interviewees identified some issues that have affected the innovation process. One disputed the notion that any innovations have been produced, noting as an example that "IPs are not new." This is true in principle, but they are relatively new in the Ethiopian context. A major issue emerging from several interviews is that innovations tended to be produced within projects ("in isolation"), which has minimized the opportunity to explore synergies among innovations. Another impediment mentioned frequently is the limited time and resources that NBDC could devote to developing and nurturing the innovations and facilitating uptake. A third reflects both of these issues: to date NBDC has not yet integrated these innovations into a package of policy, implementation and capacity building tools that Ethiopia can use on a wide scale. This is one of the challenges for the remaining period and perhaps a follow-up program[26].

Conclusion

NBDC has clearly produced some promising innovations and useful knowledge with future innovation potential, despite the impediments that interviewees noted. The potential impacts of integrating R4D with implementation processes is one of the most promising, as are the participatory planning tools, user-friendly GIS tools, and integrated modeling. Implementing the R4D process itself in a context characterized largely by traditional research for development has been an innovation in the sense that it has changed knowledge and attitudes and may be leading to new behaviors. The key messages forming the basis for the "new integrated watershed rainwater management paradigm" appear to be gaining traction. Integrating them into a package whose use could significantly improve the outcomes of the current SLM Program, and facilitating their wider uptake remain important challenges.

[24] This is the Ethiopian Strategic Investment Framework (ESIF) for Sustainable Land Management (SLM) referred to as the "National SLM Framework" (MoARD-SLM Secretariat 2008). A framework to guide SLM planning and investments to address the linkages of poverty and land degradation, ESIF is to be implemented in three phases from 2009 to 2023. It is being implemented by MoA and the National SLM Platform supported by multiple donors; there is a National SLM Steering Committee and a National SLM Technical Committee. The national structure is replicated at regional levels. It is budgeted at $6.7 billion over 15 years through a variety of ongoing and planned projects.

[25] See "Can 'value chains' and 'innovation platforms' boost African agriculture? 11 reasons to be sceptical". http://www.future-agricultures.org/blog/entry/can-value-chains-and-innovation-platforms-boost-african-agriculture-11-reasons-to-be-sceptical#.UjNVI7fD_IU

[26] One senior interviewee suggested NBDC should have had a "demonstration site" to showcase its recommendations, as policy makers respond best to concrete evidence. This would have been difficult given the limited time and resources, and is not entirely consistent with an R4D program.

10: Knowledge Integration: Working Across Disciplines and Scales

R4D involves people with diverse expertise, skills, and capacities working together. Successful integration across disciplines, cultures and institutions, and among the variety of stakeholders, is a critical ingredient to achieve new insights and develop innovations that go beyond single-disciplinary outputs. Put differently, since agro-ecological and rainwater management systems are complex and multi-dimensional, no single discipline is adequate to characterize the system and identify systemic game-changing innovations. We used the term "knowledge integration" to describe this process; but as one interviewee emphasized, rather than "knowledge," we should talk about learning, analysis, and sharing what works and what does not work. It is about learning how we learn and with whom we learn. "Multiple narratives make R4D and give it credibility; it needs both process and results." We believe that is the spirit in which most interviewees see this topic.

The CPWF has from the beginning strongly emphasized the creation of a positive learning environment. This is its rationale for the use of "Most Significant Change" stories emphasizing participation and empowerment of participants, the design of its reporting formats to emphasize learning, and provision of opportunities for reflection and sharing of lessons. Nevertheless, all of those interviewed expressed doubts about NBDC's achievements in integrating knowledge, or achieving shared learning among different disciplines and between researchers and implementers. For example, one interviewee observed succinctly that "we are not that much closer to appreciating and valuing each others' perspective between social scientists and biophysical scientists." This reflects the views of all or nearly all of those interviewed.

Developing GIS maps using Nile goblet tool
Photo: C.Pfeifer

There are notable exceptions which it is important to recognize. For example, the Innovation Platforms have enabled sharing and mutual learning among a diverse set of participants. Development of some of the tools, for example Nile Goblet, Happy Strategies and WAT-A-GAME, have required collaboration of scientists from diverse disciplines and between scientists and others. The frequent reflection workshops and other kinds of meetings have undoubtedly fostered mutual learning – perhaps more than is obvious from the outputs to date. The "key messages" developed in 2013 are an example of knowledge integration, as is the "One NBDC" initiative. However, the process of creating these, in which NBDC scientists contributed their ideas for key messages on the wiki, revealed that most formulated fairly narrow — though useful — ideas, which were important ingredients in the more integrated messages but did not demonstrate much integration among individual team members. This narrow disciplinary focus is also reflected in the majority of papers presented at the 9-10 July 2013 Science Workshop: there were about 30 papers and posters, with no more than two or three attempting any kind of cross-disciplinary synthesis (Mekuria, ed. 2013)[27].

Bringing different disciplines, cultures and values together is difficult, and as one interviewee noted, requires a common vision and goal. The absence of a clear vision and analytical framework articulated by the NBDC leadership and shared among the team members and partners was mentioned by a number of those interviewed. This gap was also exhibited in the process of developing the key messages. Interviewees offered a number of possible reasons for this problem: failure to align different institutional and disciplinary approaches; institutional borders and blind spots; individualism on the part of some participants who wished to remain within their own domains; lack of sufficient communication and sharing across projects; and the lack of a common analytical framework (as well as the time it takes to integrate these disciplines). The OLMs were perhaps intended to play this integrative framework role (though OLMs do not offer a model of how complex landscape systems are hypothesized to work). But there were too many OLMs – one for each project – and these were not used effectively as an integrating management tool. Changing personnel over time was also identified as a factor, as discussed above. As one interviewee noted, teams worked across disciplines within projects, but were often not able to do so across projects. This reflects the impact of the original five-project structure discussed in section 4 – though a shared vision and framework perhaps could have helped overcome this impediment.

Finally, it is interesting to note that only two interviewees specifically mentioned the problem of working across scales (only one developed the idea). N2 was designed as very locally focused, with N3 examining the potential to scale out from local levels, and N4 examining the basin-level consequences of doing so. One interviewee thought this scale-based structure actually made knowledge sharing more difficult than a more disciplinary-based structure would have done. We have no basis to comment on this observation. The problems encountered in working across scales were also a product of the five-project structure compounded by poor sequencing of outputs from projects that were intended as inputs to others.

Conclusion

There seems to be agreement that NBDC has not done as well on knowledge integration – working across disciplines and scales – as on other dimensions analyzed. We have identified a number of likely reasons which worked together to impede integrating knowledge, or learning and sharing lessons, in the program. These include the need for a shared analytical framework in the form of a working hypothesis stating relationships among the components of the landscape system, the multiple OLMs which in any case were not systematically used as an integrative management tool, and disciplinary and institutional boundaries that were not fully overcome. All of these issues can be addressed in future programs. The knowledge integration issues are closely related to the knowledge management and communication component, and also had an effect on the innovativeness of the NBDC.

[27] To be fair, the call for papers may have been interpreted as seeking focused scientific papers, and indeed many of those presented were from postgraduate student research. The BLs are commissioning some of these kinds of papers; therefore the final list is likely to reflect more integration.

11: Knowledge Management and Communication

A requirement for R4D to achieve its potential is good communication and knowledge-information sharing, both internally and externally. As a senior knowledge management specialist noted, R4D is about sharing knowledge and explicitly tapping and using the knowledge of scientists, non-scientists and community members. This is a high priority for the CPWF, which has invested considerable resources in communication and knowledge management. An indicator of the importance of knowledge management to support research and innovation processes by CPWF globally is demonstrated by its creation of a "Learning to Innovate" ("L2i") thematic working group in 2011 (http://learning2innovate.cpwf.info/). This was a potentially important and promising initiative, unfortunately dropped as a result of the 2012 budget emergency[28]. It has also been a high priority for NBDC.

In the Nile, the stakeholder workshops have been one important means of communication. NBDC uses multiple media to package and communicate results externally as well as internally[29]. This is managed by ILRI's Knowledge Management and Information Services (KMIS) unit, as part of its normal mandate. There is no full-time person assigned; the person with NBDC responsibilities also has other responsibilities[30]. Overall, all interviewees thought that NBDC had done a good job in communication, but they differed in their assessments of to what extent internal or external communication had been as effective as it might have been.

Internal program communication

Senior international NBDC participants generally perceive internal communication as having been good. NBDC uses a number of mechanisms for this: monthly meetings, annual reflection workshops, periodic meetings on issues that needed to be addressed, electronic media (e.g. wiki, yammer, blogs, and Skype and email to involve those not physically present at the Addis campus). The wiki (http://nilebdc.wikispaces.com/), for example, contains a repository of many documents that have been enormously useful in preparing this institutional history. The wiki is not always updated in a timely manner, but this is a shared responsibility with team members. On the other hand, some noted that in the early phases of the program monthly meetings were not held regularly, and it is clear from the wiki that there was a six-month gap during the transition from one BL to the next set in 2012. Another issue raised but not definitively resolved is the extent to which the outcomes of reflection workshops have been followed up and implemented – but this is a management not communication issue.

Less senior researchers and national partner researchers had more mixed views on actual internal communication. Some felt that communication among projects was weak; some expressed skepticism about the effectiveness of communication among those from different disciplines and/or institutions; and it was also noted that while the infrastructure is there, the actual use of the wiki and yammer is confined to a few team members who use the wiki and yammer occasionally. For example, we confirmed that a number of wiki pages were established to track such things as the publication pipeline, but this is not updated periodically by team members. The wiki has clearly not been used effectively as a management tool despite strong efforts by the knowledge management professionals. Nevertheless, the wiki is a useful depository of information and even if not always up-to-date; it contains quite a bit of information. Yammer however seems not to have played as significant communication role as had been hoped. Even researchers find it difficult to change their behavior patterns.

[28] However, none of the NBDC interviewees mentioned L2i.
[29] See http://nilebdc.org/comms-tools/ for a list of communication tools and links to them.
[30] Disclosure: the current person is a co-author of this report, Ewen Le Borgne.

A senior knowledge management professional correctly noted that this kind of sharing requires a change in culture and behavior to work well; this was clearly not fully achieved by NBDC. On the other hand, he claimed that NBDC has been a leader in communication among the BDCs, and also pointed at examples where NBDC scientists have begun using wikis in other projects.

External communication

Most senior participants felt that external communication has been less effective than had been expected, but differed in their diagnosis of the issues. In fact, there are many policy briefs and other reports, blogs, email newsletters, etc. being produced regularly by NBDC. There is also an active website (http://nilebdc.org/) with links to a CG space site where all publications from NBDC and other CGIAR programs are available (http://cgspace.cgiar.org/). There is a link to a site containing program photographs (http://www.flickr.com/photos/nilebdc/), and a link to program presentations and posters (http://www.slideshare.net/search/slideshow?searchfrom=header&q=nbdc). The overall quality of these sites and the published material is very good. These sites have been important sources used in preparing this Institutional History. KMIS does monitor the use of these sites, but this information is not shared (or requested) on a regular basis. Therefore it is difficult to say how effective they have been in communicating NBDC outputs and lessons.

One major issue raised is the over-reliance on web-based media in a country where many stakeholders, especially those outside Addis Ababa, have poor or no access to the internet[31]. Agricultural research institutions, universities, and regional and local officials often have little or no internet service; therefore they cannot access NBDC results easily. NBDC could have done a better job of analyzing the potential communication channels in Ethiopia as a way of improved targeting of messages at the onset of the program. Relatively few NBDC products are printed, most likely because of costs and uncertainty as to their actual use; and of those printed, even fewer are in the national language. Another issue raised by a few interviewees is the extent to which NBDC scientists perceive themselves as communicators and take responsibility themselves for communicating results. For example, some researchers have admitted they have not strongly engaged in the consultation platforms; put differently, research may not have been sufficiently integrated into these platforms.

Finally, publication of scientific research results remains a very important means of communication with the larger science community. Refereed publications are emphasized in the performance evaluation of researchers done by most CGIAR scientists. To date, few refereed publications have been produced by NBDC. Indeed, a perception sometimes expressed on the CPWF program is that while its communications with other stakeholders is exceptional, even pioneering, its scientific productivity is weak so far. It is difficult to measure this: the wiki page on NBDC publications is quite out of date, reflecting the absence of an NBDC scientific publication plan. There are a few refereed published journal articles, but not many as yet. Nevertheless, the proceedings of the 9-10 July 2013 NBDC Science Workshop demonstrate that there is quite an impressive range of scientific work; and a plan is in place to work with some of the authors (particularly from national partners) to assist them to turn their work into publishable journal articles. There is always a lag between the time research is carried out and publication of the results. We therefore expect that the scientific publications will catch up over the next year or so[32].

[31] This issue was raised at the 20-22 February 2013 stakeholder consultation platform meeting as well, and it was recommended that NBDC produce CDs and DVDs periodically with both NBDC material and publicly available relevant material from other sources such as FAO. There is as yet no follow-up to this proposal, but we expect there will be by the end of the program.

[32] One senior interviewee expressed concern that scientific publication is being over-emphasized during the last nine months of NBDC, possibly at the expense of other forms of communication. We doubt this is the case, but there is no doubt many scientists are more comfortable with publishing scientific outputs than communication their results through other media.

NBDC briefs on display
Photo: ILRI

Conclusion

We currently have no way to make definitive statements on outcomes and impacts, though the responses at recent stakeholder workshops suggest the high potential for substantial positive outcomes in the long run. It may be useful for the ILRI KMIS unit to carry out a survey of external consumers' views of the effectiveness of external communications including an attempt to measure outcomes and impact (ideally this would be done as part of the program M&E). This section has shown that while the overall quality of communication and knowledge management has been good, there are also important lessons for the future. These include: strengthening internal program communication and the knowledge sharing culture that supports effective communication (this requires strong leadership); using other media to communicate results to people without good internet access; preparing a program publication plan with timelines while encouraging timely scientific publication, and encouraging scientists to play a more active role in communication.

12: Retrospective Assessment: Key Gaps and Limitations

This section does not repeat the many lessons learned that have been identified in the previous sections. It briefly addresses a few selected issues that in our view, did not receive sufficient attention, either in the interviews or in the program itself. These are gender and program design.

Gender

Differences in power are universal in human societies, but the degree varies widely. Gender is only one dimension, aside from age, social rank, wealth, and others; but gender is an extremely salient dimension of power relationships in Ethiopian society. Achieving greater gender equity is an important formal Ethiopian policy goal, and considerable investment is aimed at achieving this. In NBDC, gender dimensions have been taken seriously in some participatory activities at the three field sites, but it has not been central or even visible in the overall program implementation. The current BLs recognized this is a serious gap in the design and implementation of the NBDC. They therefore commissioned an external consultant to assess what had been done, and to recommend what could be done in future (Farnworth 2013). The report offers excellent ideas for strengthening how gender issues are addressed in future, but at this stage, given the short time remaining in the program, heavy demands on participants' time, and the level of work remaining to be done to complete the program, little more is likely to be done. This is unfortunate as Farnworth offered a number of practical suggestions for the remainder of the program. These include CPWF organizing a cross-basin workshop to share lessons learned (and opportunities missed) on gender; capturing gender lessons through a gender write-shop to produce briefs, papers and other products communicating gender lessons; engaging a senior gender specialist (difficult to do given budget constraints); and building gender into the next proposal.

Given the critical roles of women in rural communities, it is surprising that so little of the actual research, implementation, and stakeholder interactions take their roles as central. This is a real "lost opportunity." It reflects deeper subconscious more than conscious biases among the implementing agencies (including researchers) as well as the stakeholders and partners. Future programs, as Farnworth (2013) recommends, need to have gender specialists in senior positions in the team; explicitly addressing the complementary roles of women and men and ensuring women as well as men are fully engaged; and using the R4D as a transformative learning process for all participants.

Realistic program design

Related to the need to show progress fairly early, it is very clear that the NBDC was too ambitious and too complex, with too many partners, to implement effectively and fully given the limited time and financial resources. This would have been true even if the CPWF did not see its time frame and resources reduced significantly. R4D requires considerable time to produce results – it is not amenable to being completed effectively in a 3-4 year timespan. Given limited time and resources, it is important to keep the program design simple and also to produce some "quick win" results as well as plan for useful results to be produced and shared periodically throughout the program. Limiting the number of partners would contradict a stated goal of the CPWF – promoting more partnerships—but having multiple partners increases the management and transaction costs. Management of partners would have been more efficient if there had been clearer lines of accountability for overseeing and supporting field level work by national partners. Ideally, NBDC should have been a 10-year program, with clearer milestones along the way, and somewhat more funding on an annual basis to achieve its promises. This is an issue research institutions

cannot solve alone: effective landscape or agro-ecological research based on R4D principles requires a long-term commitment by all parties: financing agencies, researchers and implementing agencies (Sayer et al. 2013). The new programmatic structure of the CGIAR, reflected for example in the Water Land and Environment (WLE) program (http://wle.cgiar.org/), offers an opportunity to address this issue.

Participatory program design

The overall NBDC program was largely designed initially by the CPWF MT, based on discussions with a small select group of stakeholders and emerging results from Phase I research. Real engagement with the stakeholders and partners – the target audience for R4D – began only after the program structure and goal had been designed, calls for proposals issued, and partners chosen. Active participation processes began largely once the proposals had been reviewed and partners selected. A more inclusive and effective participatory process from the earliest stages might have led to a very different program focus and design, including institutional leadership. More important, it might have been more demand-driven from the beginning. Related to this, the program was not designed in partnership with existing SLM-RWM investment programs. This is unfortunate; as noted in section 9, Ethiopia is implementing a multi-billion dollar long term SLM program with the assistance of many donors. Engaging with the leaders of this program from the earliest stages, and implementing R4D in partnership with implementers of these programs, might have enhanced the opportunities for achieving more substantial outcomes in terms of shaping the trajectory of the SLM Program.

One other issue relates to this design process: the role of national organizations in program design – or if the future program is to include other basin countries, regional basin institutions. It is clear to all participants that the NBDC is a CGIAR-led and even dominated program, which has reached out to include national organizations in its implementation. While this has worked reasonably well, future programs might be more pro-active and responsive to demand and have more impact if they are designed with the full participation, indeed leadership, of national and basin-level research, policy, civil society and other stakeholders from the inception. The ideal outcome would be a program led by national and/or regional organizations and supported by the CGIAR and other international partners. Given capacity constraints, it is important to get the right balance, but the program should be structured in a way that facilitates strengthening national (regional) organizations' capacities to lead and manage major programs with international partners. A future program design could also consider a national or regional institution as the home for the program leader, rather than using one of the international organizations. This might overcome some of the constraints experienced in NBDC and strengthen the national ownership, though the experience of CPWF Phase 1 also highlights the limitations. It is therefore gratifying that at the July 2013 regional stakeholders' consultation, a task force led by two Ethiopian institutions was formed to develop a proposal for the next phase of NBDC.

H.E. Sileshi Getahun, State Minister for Natural Resources (right) and Simon Langan, Nile Basin co-leader (left) at NBDC / Land and Water Management National Platform Meeting 4.
Photo: ILRI

13: Looking Forward: Building on the NBDC Legacy

This Institutional History is intended to contribute both to setting a new rainwater management R4D agenda in the Nile Basin and to the approach taken in future R4D programs such as the CGIAR Research Program on Water, Land and Ecosystems (WLE) and the CGIAR research program on integrated systems for the Humid Tropics. We have documented what we believe to be the most important lessons – positive and negative – emerging from the experience of NBDC. The program has not achieved all of its ambitious goals, and with hindsight there are things it could have done better. Nevertheless, the program has also achieved quite a lot in terms of better understanding of the potential contribution of improved RWM in the Ethiopian Highlands; new policies, strategies and tools that could lead to dramatic improvements in the outcomes of future investments; and a fairly high degree of interest, buy-in, and enhanced capacity among all of the partners and stakeholders. If NBDC has not yet bent the SLWM trajectory in the Abay Basin, it has at least identified the critical elements of an approach to do this. NBDC refers to this as a "***new integrated watershed rainwater management paradigm***." Box 2 overleaf summarizes the key elements of this paradigm.

During the last months of 2013, NBDC will focus on finalizing and sharing widely its results and recommendations, engaging with key policy makers, donors and scientists to communicate the potential value of using the lessons NBDC has learned, and polishing scientific outputs that are critical for the credibility of the work. We are confident that the key Ethiopian stakeholders are interested in building on and scaling up the NBDC lessons. NBDC leadership is engaging with key national and Nile Basin stakeholders to explore how a future NBDC program, involving a close partnership driven by national and basin stakeholders, could contribute to the process of consolidation and scaling up and out the use of new tools and implementation strategies.

The proposed program will build on the strong partnerships that have emerged from NBDC. It will draw on many important lessons learned and the foundation built by NBDC. It will combine good science with achieving real outcomes. It will be led by the national and/or basin partners, with strong support from international organizations for research, capacity building, communication, and knowledge management. It will be driven by a shared vision captured in the new integrated watershed management paradigm. And we trust it will attract sufficient long-term support.

Box 2. "An Overarching Vision of RWM in the Blue Nile Basin"

Ethiopia's policies and programs on sustainable land and water management have evolved over several decades and have had substantial positive impacts on land management and livelihoods. We believe they are on the cusp of being transformed and integrated into a new paradigm. However, further strengthening of these programs is urgently needed to achieve their full promise and to maximize the benefits from the very large investments currently being implemented or planned. We are not proposing radical changes in policy or implementation; rather, our proposal is to integrate and strengthen a set of eight core elements already present.

The core elements of this emerging New Integrated Watershed Rainwater Management Paradigm are:

1. Local community empowerment and leadership is critically important to achieve long-term benefits and sustainable outcomes of rainwater management programs.
2. Partnerships should integrate and share both scientific and local knowledge and encourage innovation through "learning by doing" based on scientific principles.
3. Strengthening and transforming institutional and human capacities among all stakeholders is a critical requirement to achieve the potential benefits of the Sustainable Land Management Program.
4. A necessary condition for successfully implementing sustainable innovative programs at scale is creating, aligning and implementing incentives for all parties with due consideration for risk management.
5. Adapt the growing number of new models and learning and planning tools along with improved learning processes to increase the effectiveness of planning, implementation, and capacity building.
6. Strengthen the integration among multiple rainwater management interventions at watershed and basin scales.
7. Pay more attention to the downstream and off-site benefits of rainwater management in addition to upstream or on-farm benefits and costs.
8. Pay more attention to improving markets, value chains and multi-stakeholder institutions to enhance the benefits and sustainability of rainwater management investments.

These elements are highly integrated – success is more likely if all the elements in policies and implementation strategies are included. A landscape or watershed perspective is central to the new RWM paradigm.

We believe that the critical innovations justifying our use of the term "new" emerging from NBDC are:

1. The shape and integration of the core elements of a new integrated RWM paradigm at watershed level, and
2. The tools and methodologies for effective planning, learning and implementation emerging from NBDC.

Therefore, the proposed new paradigm does not replace the existing programs and strategies. Rather, it offers a clear pathway to achieving the ambitious conservation, livelihood and production outcomes that Ethiopia may otherwise not achieve.

Source: Merrey and Clayton 2013

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Appendix 1: Rainwater Management in the Abay River Basin: A Brief History[33]

Farmers in the Highlands of Ethiopia have been using indigenous practices for managing their land and rainfall for many centuries. During the twentieth century, population grew rapidly, and farmers were forced to extend cultivation into less favorable and more vulnerable land. This expansion was not accompanied by adequate public or private investments to increase productivity of land and water; and the feudal and subsequent state-based collective ownership of land did not encourage innovation and investment. Per capita food production declined continuously during the 1960s-1980s. Famines had occurred throughout Ethiopian history, but in the 1970s and 1980s, drought and crop failures became so severe they made international headlines. Millions of people suffered and many died. Land degradation was diagnosed as the major reason for crop failures, and therefore the 1970s saw the launch of food for work programs linked to labor-intensive public works — including construction of bunds and other land management structures. In the 1980s, major research programs were initiated aimed at achieving a better understanding of the dynamics of land degradation and identifying technological solutions. All of these programs were driven from the top of an authoritarian government structure, with little or no consultation with farmers.

By the 1990s, there was an expanding research base to support a programmatic approach to "sustainable land management" tenuously linked to ever-expanding implementation programs. These programs, supported by the government and various donors over the last couple decades, have been evolving from strictly top-down programs aimed at reversing land degradation in the most vulnerable areas, to programs that offer a broader set of options, including more attention to improving livelihoods, and at least in principle, emphasizing community consultation and participation in local planning and decision-making. The rising level of investments in SLM accompanied by growing investments to make agriculture more productive and market driven and by investments in capacity development, including a cadre of locally-based agricultural extension staff ("development agents" [DAs]), have achieved demonstrable progress during the past decade. Most important, much has been learned, and the lessons from past experiences and research have been used to adapt investments in SLM over time. Development partners continue to provide substantial support, complementing the government's own investments – since 2009 these have been consolidated into a large program overseen by the SLM Secretariat in the Ministry of Agriculture and Rural Development. Nevertheless, there are still problems; for example the government still uses quota systems imposed from the top to drive these programs, which have undermined the official goal of greater community empowerment. Interventions are rarely designed holistically, and rarely take an integrated watershed or landscape perspective in practice[34]. Returning to SLM research, until very recently much of the research was carried out within disciplinary silos, with inadequate sharing of knowledge and lessons. At the dawn of the first phase of the CPWF in Ethiopia, this research, while valuable, was perhaps not sufficiently innovative and was not achieving its full potential in terms of wide-scale outcomes. This sets the scene for CPWF in the Nile Basin.

[33] This section is based on findings reported in the first NBDC product, a review and synthesis of lessons learned from over 30 years of SLM research and development programs in Ethiopia. See Merrey & Gebreselassie 2011.

[34] Ludi et al. 2013 provide a detailed analysis of the dynamics of these processes based on detailed research in three woredas.

Appendix 2: NBDC; Summary of Events and Outputs for the Institutional History

Date	Events	Outputs	Comments/observations
2001-2009	1. 2003: IWMI Nile Basin & Eastern Africa sub-regional office opens in Addis, initial collaboration with ILRI & MWR, national workshop on AWM research 2. Nile added to CPWF list of basins (2001) 3. Baseline Conference: CPWF [4 Nov 2003, Nairobi] 4. First joint ILRI-IWMI appointment for livestock-water productivity (2004) 5. Egyptian National Water Research Center and CPWF, The Second Kick-off Workshop for the Nile River Basin, August 5-6, 2003 – Entebbe Uganda 6. IWMI-NBI Workshop, Entebbe [27-28 September 2004] 7. CPWF funded Nile Phase 1 (2005-2009) included projects on: livestock-water productivity (PN 37); downstream-upstream interactions in watersheds (PN 19); improved planning of large dams (PN 36); water productivity improvement in cereals & legumes on the Atbara River Eritrea (PN 02); and others that were cross basin with apparently less emphasis in the Nile. For example: Sustaining inclusive Collective Action that Links across Economic and Ecological Scales in upper watersheds (SCALES) (PN20). 8. CPWF Basin Focal Project led by IWMI 9. IFWF2, Addis Ababa, [Nov. 2008]	1. IWMI MoU with MWR; edited proceedings of December 2002 workshop organized jointly by MWR, EARO, ILRI, IWMI [McCornick et al., eds. 2003] 2. The Comprehensive Assessment of Water Management in Agriculture book (Molden, ed. 2007) was a critical milestone in the intellectual development of CPWF 3. NWRC was the coordinating institution for phase 1; Dr. Mahmoud Moustafa was the first basin coordinator, followed by Dr. Mohamed Abdel Salam Abdel Meguid 4. CPWF and IWMI developed linkages with NBI and ASARECA; IWMI led a project intended to develop a formal CGIAR-NBI partnership but this never happened as envisioned 5. Basin Focal Project for the Nile: Awulachew et al., eds. 2012 6. CPWF Medium Term Plan (2010-12) published in 2009.	1. ILRI through Don Peden facilitated IWMI's entry into Ethiopia from the beginning 2. At the first planning meeting in Colombo in 2001, Nile was added as a CPWF basin (but the results of this meeting emerged only when the proposal for CPWF was circulated in 2002) 3. Focus of joint IWMI-ILRI apt. was on LWP. This emerged from a project IWMI had "commissioned" from ILRI on a larger AWM investment analysis program. This work and IWMI becoming established at the ILRI campus in Addis initiated what has become an effective partnership between the two centers. 4. Of the Phase1 projects, 2 seem to have been most influential on NBDC planning. The LWP one attracted most attention, but the one on downstream-upstream watershed interactions also influenced the design of NBDC. SCALES focused more on the Andes than the Nile, apparently, but its outputs should have been very useful for NBDC – there is no evidence this is the case. 5. Although the formal BFP outputs came after phase II began, much of the material existed in draft form; RWM was highlighted at IFWF2 in Addis (2008) and in a 2008 workshop in Ghana devoted to RWM whose proceedings were published (Humphries & Bayot 2009) 6. CPWF Medium Term Plan (2010-12) has a chapter on each basin; the Nile basin chapter explains the rationale for the development challenge, lists a lot of stakeholders and their roles, and sets out an initial description of six

Note: This has been developed over time based on many inputs. Doug Merrey is responsible for most of the comments and observations.

Date	Events	Outputs	Comments/observations
2001–2009 cont.	10. German-funded project with Tilahun as manager (Improving water productivity of crop-livestock systems of sub-Saharan Africa) 11. Consultation workshop to validate basin challenge & choice of Blue Nile [2009?] 12. Partners invited to submit proposals; review and contracting [2009] 13. MoU between the ILRI (CPWF) and the Ethiopian Institute of Agricultural Research (EIAR) and also with ASARECA 14. Agreement between ILRI and IWMI for the CPWF project on livestock and water 15. Special session organized at the NBI's Tenth Anniversary by Basin Focal Project and PN37, held in Dar es Salaam on 9 December 2009		proposed projects. Later the proposed separate project on institutions was integrated with technologies and strategies (N2) 7. We should evaluate the legacy of the phase 2 design process – pre-selection of partners, design as separate projects, focus on Blue Nile. There are clearly implications, for example the initial difficulties to achieve good integration and cooperation 8. What has happened vis-à-vis the partnership with NBI? I have found no evidence of any involvement in NBDC 9. The activity was critical to encouraging development of LWP concepts that were first published in Water for Food; Water for life. This relationship also was instrumental facilitating ILRI's involvement with the BFP synthesis. 10. This was intended to provide substantive feedback to the NBI and set the stage for follow up in Phase 2. David Molden (DDG of IWMI) led the delegation
2010	16. Inception workshop (Jan '10) 17. Site selection – Jeldu, Diga, and Fogera (Jan '10) 18. N1 Project implemented (March-September 2010) 19. NBDC Field trip NBDC to Jeldu (June '10) 20. Site specific survey and rapid diagnosis in three action sites (July, Aug '10)	7. Phase 1 project reports ('10) 8. Challenge Program on Water and Food: innovation for action (policy brief) (Sept '10) 9. Merrey & Gebreselassie report-draft in September, Presentation at Sept planning workshop, published online in 2011 [see below] 10. Site specific rapid survey and diagnosis—Alan D. says some results reported on wiki http://nilebdc.	11. BL (Tilahun) selected in 2009 12. Was site selection premature? 13. The N1 report took an historical perspective in RWM in the basin; 2 volumes including annotated bibliography, and a separate data base of sources was transferred to the BL. Was this data base used? I see evidence now of researchers referring to the N1 report, but to some extent its timing was a bit late to influence the early planning of the other Ns.

Date	Events	Outputs	Comments/observations
2010 cont.	21. Planning and launch workshop (Sept '10) 22. Workshop with national partners to develop baseline survey tool on planning, implementation and innovation in RWM (Nov '10)	wikispaces.com/ Baseline+survey+narrative+of+project+sites+%28Jeldu%2C+Fogera+and+Diga+Woredas%29 11. Planning and launch workshop report 12. Rain water management in the Ethiopian highlands: the NBDC (policy brief) (Sept, 10) 13. Workshop with national partners to develop baseline survey tool (video blog and conventional blog) 14. Rain water management strategies in the Ethiopian highlands: mapping, targeting and scaling out (policy brief, Sept '10) 15. Rain water management in the Ethiopian highlands: assessing and anticipating consequences of innovation (policy brief) (Sept ' 10) 16. Several presentations (throughout '10) are said to be available on baseline survey tool	14. Reading minutes of June 2010 NBDC team meeting (and others) the issue of ensuring close collaboration, communication, etc. among N projects and partners was an important issue, with lots of positive intentions expressed. The BL undertook to develop a "partner matrix" of all NBDC partners, an undertaking reiterated at the Sept 2010 meeting and again in December 2010 (we never found this).
2011	23. Agri-Water Share Fair on agricultural water management (Feb '11) 24. International conference on 'Ecosystem Conservation and Sustainable Development' in Ambo, Ethiopia (Feb '11) 25. Technical partner meeting on targeting and scaling out (March '11) 26. National Platform orientation workshop (April '11)	17. Rain water management for resilient livelihoods (poster) (Jan '11) 18. Special issue of Experimental Agriculture on strategies to improve water productivity in drought prone crop-livestock systems (special issue journal) (Jan '11) 19. Web-site (www.nilebdc.org) and other communication tools launched (wiki, yammer, document repository) (early '11)	15. In March 2011, a wiki page on "partners" was created (http://nilebdc.wikispaces.com/Partners) but it is empty. 16. N1 report already presented previous September at national consultation 17. The early 6-monthly and annual reports tend to suggest issues in coordination, collaboration, data sharing among the Ns., except the N5 reports, which emphasize positive developments.

Date	Events	Outputs	Comments/observations
2011 cont.	27. Baseline survey analysis workshop (May '11) 28. Modeling workshop (May '11) 29. NBDC Science and reflection workshop (May '11) 30. NP Steering Committee established (July '11) 31. Local innovation platforms established (July-Sept '11) 32. GIS training in Bahir Dar (Aug '11) 33. Water 2011: Integrated water resources management in tropical and subtropical drylands, Mekelle, Ethiopia (Sept '11) 34. NBDC stakeholder forum in Bahir Dar (Oct '11) 35. 3rd International Forum on Water and Food (IFWF3) in South Africa (Nov '11) 36. Launch UNEP funded project in Wollo to enhance adaptive capacities to climate change (Nov '11) 37. 2nd National Platform meeting (Dec '11)	20. Review on past experiences with RWM systems in Ethiopian Highlands (N1 project report) published online March '11 21. NBDC technical partner meeting on targeting and scaling out (project report)(March '11) 22. 30 years to improve rainwater and land water management in the Blue Nile basin in Ethiopia (Policy brief 6) (May '11) [Based on N1 report] 23. Report on National platform planning workshop 8 April (technical report) (May '11) 24. Communication tools in the NBDC (poster) (May '11) 25. Bio-physical data sets (site/basin) (June '11) 26. What is a local innovation platform? (Policy brief) (June '11) 27. Development of key national policies with respect to rain water management in Ethiopia: a review (project report) (July 11) 28. Soil fertility effect on water productivity of maize and potato in Abay basin (poster) (Sept '11) 29. Poverty impacts of agricultural water management technologies in Ethiopia (poster) (Sept '11) 30. Determinant of adaption and successful use of agricultural water management technologies: the case of Ethiopia (poster) (Sept '11) 31. Most Significant Change Stories (Oct '11) 32. Happy Strategies game (pilot Oct '11)	18. In column 1, I do not see much evidence of interactions with CPWF's MT, except responses to comments in annual & 6 month reports (responses are mixed). 19. Reports for workshops listed in column 1 are on wiki—good detailed stuff. 20. May 2011 Science & reflection workshop—rich proceedings on wiki. But annexes [presentations] do not seem to be there. Follow-up not clear. 21. I did not find any info on the "NP Steering Committee" established July 2011 until May 2012 [2nd meeting]. At that meeting, 4 thematic working groups were established. 3rd meeting in Jan 2013 seemed to show this forum had become fairly lively and useful, and indicates working groups had been of some use in identifying learning events etc. 22. Was the Pretoria IFWF in November important in terms of either products shared or insights gained? There is a record on the wiki of a NBDC meeting after IFWF on positives and negatives, and a list of 'new initiatives and way forward'. These included several African basin initiatives—but my impression is this never happened; I suppose because of budget and over-stretched time. 23. UNEP project in Wollo piloted land use interventions as demonstrations in partnership with local woreda office and Wollo University.

Date	Events	Outputs	Comments/observations
2011 cont.		33. Mapping rainwater management strategies at landscape scale (Oct '11) 34. Looking at land and water management issues through a livelihoods lens (Poster) (Nov '11) 35. Report on livelihoods in three sites (Nov '11; not found) 36. Innovation Platforms explained (Poster) (Nov '11) 37. WAT-A-GAME (pilot Dec '11) 38. Several theses (throughout '11) 39. Several presentation and short audio/videos (throughout '11)	
2012	38. AfricaRising project begins early 2012 but is not specifically linked to NBDC 39. Informal 'communications' meeting (Feb '12) 40. Inception workshop "Integrated Termite Management in the Nile Basin" (March '12) 41. Second NBDC reflection and roadmap meeting (May '12) 42. Meeting on integration of targeting, impact assessment and priority setting (May '12) 43. Local innovation fund launched (June '12) 44. Launch NP Thematic Working Groups (TWGs) (July '12)	40. A rope to tie a lion (Participatory Video Fogera) (Feb' 12) 41. Evolving Nile Basin Research: from livestock-water to rain management solutions (policy brief) (Feb '12) 42. Communicating inside out: the NBDC first year (policy brief (Feb '12) 43. Similarity analysis for the Blue Nile Basin in the Ethiopian highlands (project report) (March '12) 44. Participatory hydrological monitoring (Policy brief) (March '12) 45. Communication priorities for the NBDC 2012-2013 (June '12) 46. Report on the 2nd National Platform Meeting 19 Dec 2011 (June '12)	24. Quote from minutes of Jan 2012 monthly team meeting: "It was insisted that cooperation among colleagues is necessary to team up together on publications for better output." This suggests that producing outputs and collaborating on these was seen as an issue. 25. In the next monthly meeting (March 2012) the issue of production of science and the need to partner across research projects was again discussed. 26. A quote from March 2012 monthly meeting: "We are still lagging behind on our internal communication but our external communication is even worse." It seems issues are being aired. 27. NOTE: March was the last 'monthly' meeting until October when Simon and Alan had taken over – quite a gap!

Date	Events	Outputs	Comments/observations
2012 cont.	45. 3rd National Platform meeting with ICRAF (July '12) 46. World Water Week Stockholm (Aug '12) 47. First BL departed and new ones came on board 48. Study on political economy (Sept-Dec '12)-Josie Tucker 49. Modeling symposium (Nov '12) 50. Targeting and scaling out domains workshop (Nov '12) 51. NBDC planning workshop (Nov '12) 52. GIS training in Bahir Dar and Addis Ababa (Dec '12) 53. TWG learning event on Nile Goblet Tool (Dec ' 12)	47. Most Significant Change Stories (II) (Oct'12) 48. Launch Nile book (BFP) (Nov '12) 49. Digital stories (November '12) 50. Modeling symposium: presentations on slideshare; most do not have results, only plans. 51. Matching land and water interventions with community needs (project report) (Dec '12) 52. The Happy strategies game: matching land and water interventions with community and landscape needs (technical report) (Dec '12) 53. Drivers behind Ethiopian soil and water conservation practices (2012) 54. Several theses (throughout '12) 55. Several presentations and short audio/videos (throughout '12)	28. DM-2nd reflection & roadmap workshop May 2012 ("draft summary report"): This was an internal self-critical meeting with CPMT members ("dragons"). End of day 1-strengths identified –integrated approach, multiple scales, trusted knowledge broker, BUT 3 serious gaps: integration among Ns ("different visions among Ns"), research-development integration, & thematic-science gaps not addressed. Report on day 2 mentions 'Sunrise strategy' but otherwise is not clear on ways forward. Some action points mentioned—no specific follow up until later. 29. It appears that after Alan & Simon were selected, there was a rapid evolution in how the program engages with policy makers; and the effort to move to "One NBDC" was initiated – we should capture this. It is also the context for engaging Belay and Doug to assist in consolidating, coordinating science, messaging, and engaging with policy makers. 30. "Uptake of integrated termite management for rehabilitation of degraded rangeland in Eastern Africa" – A RIU project led by ILRI building on PN 37 work, focused on developing solutions to termite problem in Uganda & Ethiopia (Diga) 31. On the Wiki, as mentioned above, the 'partner' page is empty. The page of partner MoUs has only one listed 32. More on partners: ENTRO was invited to platform meeting on Feb 2013), but did not show;

Date	Events	Outputs	Comments/observations
2012 cont.			33. In the list of events it appears we can detect an evolution in terms of more stakeholder engagement type meetings, more emphasis on platforms compared to the early days etc. Perhaps this is partly because NBDC has more to share now. 34. From the list of events we can see various initiatives which generated much initial enthusiasm and then faltered due to funding uncertainty. This seems to have generated quite some cynicism among the NBDC team and may have led to people retreating to silos. These may have overloaded time of researchers and managers 35. Late 2012: recruitment of two consultants to assist the BLs, one focused more on science products & communication (Doug), the other focused more on facilitating integration of key messages and recommendations into policy processes (Belay)
2013	54. TWG learning event on WAT-A-GAME with AFROMASON (Feb '13) 55. 4th National Platform meeting with NBDC stakeholder forum(Feb 20-22 2013) 56. A number of consultative meeting conducted with different stakeholders as to the sustainability and ownership of national platform after NBDC 57. Draft Extension strategy of the government of Ethiopia reviewed and commented as NBDC team	56. Tree growing in the highlands of Ethiopia: key issues to consider for its development (AfricaRising Brief, Feb '13) 57. Rhetoric and Realities working paper [Feb 2013] 58. Participatory hydro-meteorology monitoring-submitted to IWMI as RR (March or April 2013) 59. Entry Points to Improve Livestock Water Productivity in Selected Forage Based Livestock Systems-draft paper submitted to a journal (status not clear)	36. We should capture here the attempts to engage more strongly with policy makers, use existing national forums, develop messages, consolidate science and synthesis findings, plan for post-NBDC: Examples are recruitment of Doug & Belay; preparation of "key messages" from NBDC and workshop to validate-improve them. Also include example of comments on draft Ag Extension strategy as this draws from NBDC findings 37. Wiki event list page mentions July 2013 science meeting but clicking on this does goes to an empty page (no call for abstracts)

Date	Events	Outputs	Comments/observations
2013 cont.	58. Science Workshop [9-10 July 2013] 59. Amhara Regional Platform meeting [22-24 July 2013] 60. WLE planning workshop for eastern Africa and Nile Basin [14-18 October 2013] 61. Final NBDC Stakeholders Platform [14-15 November 2013]	60. Participation and performance: decentralized planning and implementation of soil and water management in Ethiopia –paper submitted (status not clear) 61. Development of key messages—presented at national platform, then revised substantially & shared widely 62. RIU brief on Integrated termite management to restore degraded rangeland (brief) (April 2013) 63. Comments on draft Agricultural Extension Strategy forwarded for the state minister for natural resources H. E Seleshi Getahun and Agricultural Transformation Agency (ATA) 64. M.Sc. theses	38. M&E page of wiki (http://nilebdc.wikispaces.com/mon-eval): This has not been updated since Nov 2010! It shows at that time that some Ns had not submitted an M&E framework. MSCs are not sufficient by themselves sufficient for M&E and documenting outcomes. 39. Subsequent exchanges emails—M&E seems to have been under-budgeted and is not being systematically carried out by Ns, BL management, or CPMT level. Will there be any way to assess outcomes systematically and credibly in late 2013? 40. Other draft papers in various stages—publications pipeline is not systematically updated 41. How does NBDC seek to create synergies (or find opportunities for these) by collaboration with AFTA, and various other projects, especially those supporting agricultural policy such as the recent IFPRI project, "REAP"? This is in addition to those that are linked because of institutional linkages, e.g. AfricaRising.

Appendix 3: List of People Interviewed

	Name	Position/expertise	Category	Status
1	Tilahun Amede	First BL+N5 PL	BL-CGIAR	Skype
2	Doug Merrey	N1+science L	Consultant to NBDC	IH author
3	Kees Swaans	N5 (National Platform)	CGIAR	IH author
4	Simon Langan	BL+N2 PL	BL-CGIAR	Face to face
5	Alan Duncan	BL+N5 PL	BL-CGIAR	Detailed comments on draft final version
6	An Notenbaert	N3 PL	CGIAR	Face to face
7	Charlotte McAllister	N4 PL	CGIAR	Public exit interview
8	Peter Ballantyne	KM+C	CGIAR	Face to face
9	Ewen Le Borgne	KM+C	CGIAR	IH author
10	Don Peden	General	Consultant to NBDC	Skype
11	Pamela Pali	M&E	CGIAR	Email on M&E
12	Beth Cullen	YP.-N2 (IP + Community)	CGIAR	Face to face
13	Catherine Pfeifer	YP.-N3 (GIS)	CGIAR	Skype; also public exit interview
14	Randall Ritzema	YP.-N4 (modeling)	CGIAR	Face to face
15	Teklu Erkossa	N2-soil/water?	CGIAR	Face to face
16	Zelalem Lema	N2-community	CGIAR	Face to face
17	Birhanu Zemadim	N2-hydrology	CGIAR	Face to face
18	Eva Ludi	ODI (N2)	International partner	Face to face
19	Fergus Sinclair	ICRAF (N2?)	CGIAR	Skype
20	Fentahun Mengistu	ARARI (N5)	National partner	Telephone
21	Asefa Taa	OARI	National partner	Telephone
22	Dejene Abesha	Ministry reps	National Policymaker	Telephone
23	Amanda Harding	CPWF MT Nile (later)	CPWF MT	Skype
24	Larry Harrington	CPWF	CPWF MT	Skype
25	Tonya Schuetz	CPWF	CPWF MT (consultant)	Skype
26	Natarajan Pavanasam, Dr.Mulugeta Negeri and Ato Negussie Bekele	Ambo University	National partner	Face to face
27	Mussie Hailemelekot	Bahir Dar University	National partner	Face to face
28	Tammo Steenhuis	Cornell University & Bahir Dar University (mostly N4)	International partner	Skype

Appendix 4: Interview Protocol – Institutional History of the NBDC

Note: this is the revised final version used; an earlier version was found to be too long.

Introduction/purpose: The NBDC focused on reaching development outcomes through research (R4D). The CPWF and NBDC would like to gain insight into how the R4D approach was implemented in the NBDC. To this end the following interview guide is designed to gather experiences from those who worked in the program as a basis for synthesizing lessons. Lessons learned will be relevant for others working in R4D, and especially for the CGIAR Research Programs.

The interview questions will be used as guide. A draft report of the interview will be shared with the interviewee for correction/addition, before it is finalized.

The content of this interview report will remain confidential and only be shared with the core team: Doug Merrey, Kees Swaans and Ewen Le Borgne. Analysis and (anonymous) quotes may be used in final report/article.

Name:

Interviewer:

Date:

Role in NBDC:

Period active in NBDC:

1. **Understanding R4D**
   How would you describe R4D? And what was the initial idea of R4D in the NBDC?

   To what extent did partners and NBDC staff have a good understanding of R4D according to you?

   In retrospect, how well was R4D implemented, and did it add any real value?

   According to you, were there key moments/breakthroughs in terms of the way of thinking on R4D in the NBDC? If so, please explain what changes and how his affected the project/program? (Did your perception of R4D change over time, and if so, how and why?)

2. **Partnerships/networks**
   Who were the actors you (or NBDC) worked directly with in your project? What was the reason for working with them (what was the expected added value)?

   How close/loose were these partnerships and how did they evolve over time and why? (did some dominate and if so why?)

   To what extent were the partnerships successful and useful, and why?

   In retrospect, do you think you (or NBDC) chose for the right partners for your project or the NBDC? If not, which partners would you have chosen in hindsight and why?

3. **Knowledge integration**
   If we talk about knowledge integration, what does that actually mean according to you?

   In your view, was NBDC successful in achieving knowledge integration?

   What went well and what did not go well, and why? And to what extent was this affected by the structure of the program?

   What were the main challenges and how were these addressed?

4. **Innovation**
   What do you understand by 'innovation'?

   In your view, to what innovations has NBDC contributed? Which ones are most significant and why? If there are none, please explain why.

   To what extent did these innovations emerge from research [i.e., science-based] versus being an idea(s) that emerged from stakeholders' observations or other sources? And to what extent was the development of innovations an interactive process?

   What challenges did you face during the innovation process? And what (factors) helped to overcome these (or prevented completion if applicable)?

   (What has been the impact of the innovation so far, and/or what is according to you the potential?)

5. **Engagement with development practice and policy**
   What were the different target groups for your project specifically, and for the NBDC more broadly? What was the intention in terms of engagement with these groups?

How did we engage with these different groups in practice and did we engage with the right people? Were groups or people excluded who should have been involved? Did we engage at the right stages in the program, with the right levels (woreda, provincial, national)? Please explain.

In terms of engagement, did we make use of existing structures/forums or try to create new ones; and why? Did we make the right choice, in retrospect?

What went well and less well in terms of the engagement process, what did we learn from that, and did that affect our work?

6. **Knowledge management and communication**

What do you perceive as knowledge management and communication in the NBDC?

Was there an initial strategy for knowledge management and communication? If yes, what were the main characteristics and principles or assumptions? If not, why not?

How effective was the program in terms of internal communication and knowledge management?

Please explain (e.g. information sharing and communication/learning between researchers and partners).

How effective was the program in terms of external communication and knowledge management?

Please explain (e.g. contributing to engaging interactive events; use of media to package and communicate results, outcomes and recommendations to different audiences?).

(Overall, what went well and not well in terms of KM and communication according to you and why?)

7. **Theory of change**

What was the theory of change (on how to reach impact) and what were the planning/monitoring tools and approaches used in1) your project, and 2) the NBDC? Please explain.

To what extent did it guide 1) your work, and 2) more broadly, NBDC? And if not, what did?

(Did the theory of change evolve with experience? How, why and how conscious was this? If not, how come?)

To what extent have we achieved the identified outcomes? Please explain? Were there any unintended effects/outcomes?

Did we adapt our decisions/strategies based on the progress made? Please explain (adaptive management)

8. **General (keep short)**

What are the main lessons you have learned in terms of the R4D process in the NBDC?

(What were the strengths and weaknesses of the NBDC?)

If you could do it all over again, what would you do differently and why?

In your view, what were the main gaps in the program?

R4D 1: Mitigating the effects of hydrologic variability in Ethiopia: an assessment of investments in agricultural and transportation infrastructure, energy and hydroclimatic forecasting.
Paul J. Block, 2008

R4D 2: Use of decision support systems to improve dam planning and dam operation in Africa.
Matthew McCartney and Jackie King, 2011

R4D 3: Fishery productivity and its contribution to overall agricultural production in the Lower Mekong River Basin.
Mohammed Mainuddin, Mac Kirby and Yun Chen, 2011

R4D 4: Evolution of Agricultural Water Management in Rainfed Crop-Livestock Systems of the Volta Basin.
S. Douxchamps, A. Ayantunde and J. Barron, 2012

R4D 5: Rhetoric versus Realities: A diagnosis of rainwater management development processes in the Blue Nile Basin of Ethiopia
Eva Ludi, Alemayehu Belay, Alan Duncan, Katherine Snyder, Josephine Tucker, Beth Cullen, Mathewos Belissa, Temesgen Oljira, Asefa Teferi, Zerihun Nigussie, Andenet Deresse, Mulu Debela, Yazie Chanie, Dagnachew Lule, Dawit Samuel, Zelalem Lema, Abeje Berhanu and Douglas J. Merrey, 2013

R4D 6: Rural poverty and Food insecurity mapping at district level for improved agricultural water management in the Limpopo River Basin
Dr. Manuel S. Magombeyi, Prof. Akpofure E. Taigbenu and Dr. Jennie Barron, 2013

R4D 7: Lessons from the Nile Basin Development Challenge Program: An Institutional History
Douglas J. Merrey, Kees Swaans and Ewen Le Borgne, 2013.

About CPWF

The CGIAR Challenge Program on Water and Food was launched in 2002. CPWF aims to increase the resilience of social and ecological systems through better water management for food production (crops, fisheries and livestock). We do this through an innovative research and development approach that brings together a broad range of scientists, development specialists, policy makers and communities, in six river basins, to address the challenges of food security, poverty and water scarcity.

The CPWF is part of the CGIAR Research Program on Water, Land and Ecosystems. WLE combines the resources of 11 CGIAR centers and numerous international, regional and national partners to provide an integrated approach to natural resource management research. The program goal is to reduce poverty and improve food security through the development of agriculture within nature. This program is led by the International Water Management Institute (IWMI).

About this R4D Paper

The Nile Basin Development Challenge (NBDC) program is a multi-disciplinary, multi-institutional participatory "Research for Development" (R4D) partnership. It is aimed at improving the resilience of rural livelihoods in the Ethiopian highlands through a landscape approach to rainwater management (RWM), with a special focus on the Blue Nile (Abay) River Basin. The R4D paradigm has several elements, including: using scientific research as a means to achieve specific development goals rather than as an end in itself; a focus on achieving tangible systemic changes over the long run; the use of a transparent model or "theory of change" to guide the program; inclusive partnerships among all participants based on mutual respect; and, a strong emphasis on collectively learning from experience and sharing that experience more widely. The NBDC uses multiple means to learn lessons from its experience as a basis for adapting its activities. This Institutional History consolidates and communicates some of those lessons.

This Institutional History is intended to contribute both to setting a new rainwater management R4D agenda in the Nile Basin and to influence the approach taken in future R4D programs such as the CGIAR Research Program on Water, Land and Ecosystems (WLE).

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