

Getting beneath the surface in program planning, monitoring and evaluation: Learning from use of Participatory Action Research and Theory of Change in the CGIAR Research Program on Aquatic Agricultural Systems

J. Marina Apgar
World Fish
Jalan Batu Maung, Batu Maung
19960, Bayan Lepas
Penang
Malaysia

Boru Douthwaite
World Fish
Jalan Batu Maung, Batu Maung
19960, Bayan Lepas
Penang
Malaysia

Will Allen
Learning for Sustainability
Christchurch
New Zealand

Rodrigo Paz Ybarnegaray
World Fish
Jalan Batu Maung, Batu Maung
19960, Bayan Lepas
Penang
Malaysia

Joelle Albert
WorldFish
Unit B, Tongs Building
Maromaro
Honiara
Solomon Islands

Jeston Lunda
WorldFish
Mongu
Western Province
Zambia

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Abstract

Many rural poor and marginalized people strive to make a living in social-ecological systems that are characterized by multiple and often inequitable interactions across agents, scale and space. Uncertainty and inequality in such systems requires research and development interventions to be adaptive, support learning, and to engage with underlying drivers of poverty. Such complexity-aware approaches to planning, monitoring and evaluating development interventions are gaining strength, yet, there is still little empirical evidence of what it takes to implement them in practice. In this paper, we share learning from an agricultural research program that used participatory action research and theory of change to foster learning and support transformative change in aquatic agricultural systems. We reflect on our use of critical reflection within participatory agricultural research interventions, and our use of theory of change to collectively surface and revisit assumptions about how change happens. We share learning on the importance of being strengths-based in engaging stakeholders across scales and building a common goal as a starting point, and then staging a more critical practice as capacity is built and opportunities for digging deeper emerge.

Keywords: Learning; theory of change; participatory action research; facilitation; critical reflection; aquatic agricultural systems; transformative change

Introduction

Approximately 500 million people in Africa, Asia and the Pacific depend on aquatic agricultural systems for their livelihoods; 138 million of these people live in poverty (Béné & Toah, 2014). Occurring along the world's floodplains, deltas and coasts, these systems are rich in agrobiodiversity and provide multiple opportunities to harness seasonal flooding and biodiversity to improve productivity, income generation and nutrition. However, factors like population growth, environmental degradation and climate change affect their resilience, threatening the livelihoods and well-being of millions of people.

Aquatic agricultural systems are complex and evolving social-ecological systems characterised by ongoing change and unpredictability (Levin, 2003; Levin et al., 2013). In such conditions of uncertainty, supporting adaptation and learning is an important strategy for improving livelihoods, particularly of the poor. These insights from systems dynamics and complexity are now influencing a trend within development practice towards complexity-aware approaches that facilitate learning in conditions of uncertainty (e.g. Ramalingan, 2013; Burns & Worsley 2015). Further, they support participation of stakeholders in building real-time understanding of how change happens within complex systems. Their intent is not to control how outcomes (improved livelihoods) are achieved, but rather, to collectively learn how to enact change in the interest of the poor under conditions of uncertainty. Methods that uncover the underlying social processes that influence outcomes for different groups are, therefore, becoming increasingly important for development practice.

Planning, monitoring and evaluation (PM&E) approaches are also evolving towards supporting more purposeful reflection by stakeholders themselves on the change process as it unfolds (James, 2013; van Mierlo et al., 2010; Patton, 2011). Such 'intelligent' PM&E systems (Arkesteijn, van Mierlo & Leeuwis 2015) tend to use theory of change, explicitly acknowledge underlying assumptions, and are more outcomes and less outputs-driven. Yet in spite of this evolution theoretically, there is surprisingly little documented empirical evidence about how to practically implement PM&E systems that enable stakeholders to reflect on the change processes they are contributing to and simultaneously inform program planning and implementation to support more effective intervention strategies.

In this paper we share our learning from implementing a large multi-partner agricultural research program that aimed to build and use such an intelligent PM&E system to be more effective in achieving outcomes in complex systems – the CGIAR Research Program on Aquatic Agricultural Systems (AAS). We share our collective experience of designing and implementing participatory action research (PAR) to put agricultural research to use in responding to development challenges in aquatic agricultural systems and in particular to focus on the interests of the poor and marginalized. Further, we reflect on how theory of change (TOC) embedded within PAR facilitates engagement with and reflection on the development processes that interventions aim to contribute to. First we present the program context and the design of its PM&E system. We then describe the implementation process and learning in context through an in depth exploration of an initiative on sustainable farming with communities and stakeholders in the Solomon Islands. Through adding learning from across implementation in five different sites we highlight challenges and successes that can inform future complexity-aware programming.

Program design to facilitate learning in aquatic agricultural systems

AAS initiated implementation in five locations, known as hubs¹, in 2011, in priority areas in African inland water systems (Barotse Floodplain in Zambia), Asian mega-deltas (Southern Polder Zone of Bangladesh and the Tonle Sap Floodplain in Cambodia) and marine and coastal systems of the Coral Triangle (Visayas-Mindanao region in the Philippines and Malaita and Western Provinces in the Solomon Islands). In these sites, the program made a commitment to foster positive outcomes in the interest of the poor and marginalized and embraced the need to seek transformative change to achieve this (Kantor & Apgar, 2013). It emphasized embedding agricultural research in development processes, and it took a systems approach extending previous experience in agricultural research using learning based approaches (e.g. Hawkins et al., 2009). A central feature of the program was its use of PAR to engage with stakeholders to plan and implement research in a way that fosters empowerment and collective learning (Apgar & Douthwaite, 2013).

PAR is a broad field of practice, and within it there are many specific uses and approaches (e.g. Reason & Bradbury, 2008). Typically, these approaches are characterized as values-based, action-oriented, and participatory (Poppelwell & Hayman, 2012). They share the use of a basic cycle of 'define the issue – plan - act - observe – reflect'. The iterative facilitated cycles of action and reflection ensure that learning and sharing takes place on a regular basis by supporting those involved to learn and adapt. In each hub, the program employed PAR with 'system level' stakeholders (NGOs, research institutions, government agencies etc.) as well as directly with men, women and children in a number of selected communities (see CRP AAS, 2013 for details), to focus program efforts on the real life challenges that agricultural research could support, and ensure that stakeholders were driving their own process of development. In line with the transformative intent of the program, the PAR design articulated an equity principle to focus on the poor and marginalized. It did this by first building understanding of the social norms and power dynamics at play in the context of the interventions and paying attention to who was and was not participating. Further, with particular emphasis on gender norms, critical reflection was embedded within PAR practice to engage with social norms and open up opportunities for changing regressive norms (Cole et al., 2014).

Another central component underpinning the design of participation and learning in AAS was use of TOC (Douthwaite et al., 2013). TOC is a methodology for planning, participation and evaluation that is used in the development and government sectors to promote social change (Rogers 2008, Breuer et al. 2015). It encourages project planners to work with project stakeholders to define long-term outcomes and their necessary preconditions (intermediate outcomes), and, to think about the causal linkages between what an initiative does and how it supports achievement of change (outcomes). Within this broad definition, the use of TOC remains flexible to work within specific program needs and is best thought of both a process and a product (Vogel, 2012). In AAS, working with TOC aimed to build better understanding of the change process through making explicit a TOC as "a theory of how and why an initiative works" (Weiss, 1995). An initiative, in this view, can be large or small, and the theory can be predictive or retrospective, describing what is expected to happen or explaining what has happened. In AAS, TOCs were developed with stakeholders looking forward to describe how change was expected to happen (program design), as well as looking backwards to describe how change had happened (evaluation). Implicit in using TOC in this way is the building of change models that make underlying assumptions explicit – these can be understood as 'frames of reference' with respect to how change happens.

¹ 'locations within key aquatic agricultural systems where innovation and learning can bring about development outcomes' (CRP AAS, 2013)

Commonly, logic models are used as illustrative tools (Kellogg Foundation, 2004), with multiple 'nested' logic models used to capture different levels of detail, scope, and context.

The PAR engagement cycles of co-inquiry with stakeholders embedded this use of TOC within them. The emancipatory theoretical foundation of PAR and its emphasis on participation and co-inquiry was intended to build rigor and legitimacy in how TOCs were developed and used, and attention to assumptions, use of critical reflection on the causal linkages between actions and outcomes, emphasized through use of TOC was expected would deepen the process of change further. The systems thinking metaphor of an 'iceberg' is useful to understand the program intention of 'digging deeper' through PAR and TOC working together.

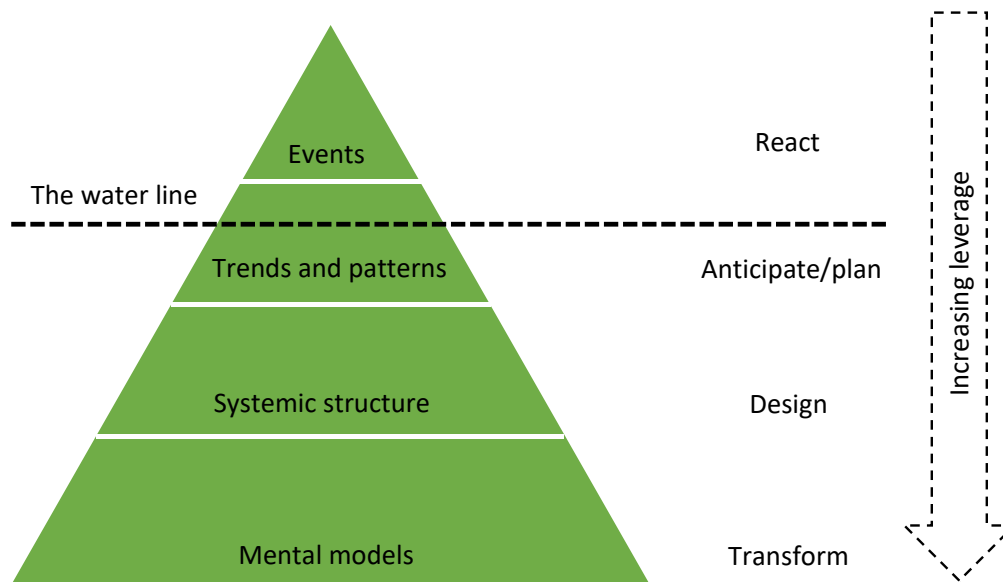


Figure 1. The iceberg model (adapted from Apgar & Douthwaite, 2013)

The iceberg model illustrates graphically that within any system there are various levels at which change may occur and may be influenced. At the surface one is reacting to events one can see above the water line. The deeper the level at which change is enacted, the higher leverage for system change. To foster more fundamental change, therefore, one must be redesigning the structure of the system or transforming mental models. In aquatic agricultural systems where poverty is entrenched, the iceberg model highlights the need to shift underlying structures and mental models to open up the potential for transformative change in the interest of the poor and marginalized. Further, these shifts require bringing diverse stakeholders together to reflect upon their 'system' and create a new and potentially different future together.

Learning from practice

In this section, we share our learning from implementing the espoused approach to PM&E in AAS through PAR engagement cycles implemented using a strengths-based approach to

vision, plan and reflect collectively. We used TOC to help think through how to enact change through designed interventions and evaluate how outcomes were achieved. We, the co-authors, have all been involved in aspects of facilitation, although we have different foci within the wider program. Two of us are researchers who implemented the PAR processes with stakeholders in hubs. The remaining authors were based externally and provided support - two researchers focused on evaluation research and use of TOC and two researchers whose main interest was on critical reflection in PAR. We present a case study that highlights the experience in a Pacific coastal-marine system (Malaita Province, Solomon Islands). Through the case study, we share our learning from working at the community and system levels with stakeholders in the context of sustainable farming. In the next section we add further learning from across sites, drawing on the documentation of PAR processes within and across hubs and findings from program level annual reflection workshops.

Case Study of Sustainable Farming in Malaita, Solomon Islands

Malaita Province is one of nine provinces of the Solomon Islands archipelago. With an estimated population of 137,596, it has the highest population density of all provinces and is amongst the poorest (Solomon Islands Government 2012). The majority of the population is rural, subsistence-oriented, smallholder farmers and fishers that depend on the aquatic agricultural system. Coastal marine resources provide the primary animal-source foods, while root crops, fruits and vegetables are produced in household gardens for consumption and sale (Andersen et al. 2013). In the face of increasing population and declining quality and availability of marine and land resources, the people dependent on these systems are confronting major challenges in declining fish catches (Bell et al. 2009) and intensification of cropping leading to soil degradation and declining crop yields.

In early 2012, we began to engage with system-level stakeholders and communities in Malaita hub to plan the program of work under AAS. During the participatory planning process, national and provincial stakeholders (representing a range of government, non-government and development organizations) and community representatives, developed a goal for their joint work in Malaita, framed as a hub development challenge “to improve the lives of people dependent on aquatic agricultural systems through more productive, diversified livelihoods that empower communities to be able to adapt to change and make more effective use of their resources” (Schwarz et al. 2013). Three main agricultural research initiatives were identified to focus joint efforts to tackle the challenge. These were: i) Resource governance for development; ii) Sustainable farming for nutrition and income; and iii) Transformative learning and change.

Direct community engagement in Malaita was focused in coastal and artificial island communities in North Malaita, the most densely populated rural area (Solomon Islands Government 2012). The fishing and farming communities of Lau Lagoon were identified as a priority area based on their high reliance on fishing and farming; the expressed interest of communities, the presence of community champions who could help facilitate PAR, and the support of community leaders. The community life competence process (CLCP) developed by a partner NGO², is a strengths-based approach that was adapted to the program’s PAR design to initiate community engagement in three local sites. The CLCP is aimed at supporting a community wide process, and comprises a number of steps that lead to development of community action plans, building on their strengths to achieve their vision for the future. In North Malaita, geographically isolated households do not typically work

² The Belgian NGO Constellation supported implementation of community engagement through use of their CLCP methodology (see <http://www.communitylifecompetence.org/> for more information)

together as a whole community, so the approach was adapted to work with smaller groups that are geographically close and have some experience of working collectively. Trained community facilitators guided discussions with groups, while community champions supported them and provided an ongoing link with wider program implementation team. Priority dreams identified in all locations through the action planning process were improved marine resource management (mangroves and/or fisheries) and improved soil fertility (through improved farming practices). Other priorities included improved income generating and marketing opportunities, improved community health (through construction of a local medical clinic), improved sanitation and environmental health and enhanced community partnerships with other stakeholders.

We focus here on learning from the PAR process across scales used to implement the Sustainable Farming for Nutrition and Income (SFNI) initiative that responded directly to the prioritized community dream of improving soil fertility. This example highlights a common challenge facing many agencies in development – when the local community asks for a service that they do not generally provide. This inability of external agents to respond appropriately to needs on-the-ground is one of the reasons that people in this area of Malaita are marginalized in the first place. In our case, this focus on farming required the lead organization, WorldFish, to look outside its own capability to build a collective response.

In March 2014, initial broad TOCs were developed with stakeholders and partners for all three research initiatives at the same time, to kick start program implementation and motivate collaboration across implementation teams. Organizations involved in the sustainable farming initiative at the outset included representatives from the Ministry of Agriculture and Livestock Development, Ministry of Fisheries and Marine Resources, AVRDC – The World Vegetable Centre (an international agricultural research center), Kastom Gaden Association (a grass-roots indigenous organization working on village food security), North Malaita Baetoloa Farmers Association (a network of farmers) and WorldFish (the lead CGIAR center). Figure 2 shows the summarized logic model developed by this group for the SFNI initiative. It includes the range of activities that were thought could lead to outcomes and in turn help achieve the collectively agreed development challenge.

Thinking through their TOC in this way helped this diverse group to negotiate and reach collective agreement of the outcome focus for planning interventions along multiple potential and interlinked outcome pathways. At the top of figure 2 we see the six main conditions (broad outcomes) and relationships between them, they agreed needed to be in place for the community visions to be achieved. For example, farmers adopting sustainable farming practices is required to address the issue of declining soil fertility driven by increasing population and demands on farming land. These improved practices were thought to lead to farmers producing a variety of crops for consumption which directly linked to the provision of these to the market in the form of good quality produce. The potential activities shown at the bottom of figure 2 were developed through discussions about how to achieve these outcomes, and refined through sharing their assumptions about how they might trigger change. For example, the use of demonstration plots and train the trainer approach was believed to provide a viable pathway to the adoption of improved farming practices, with an underlying assumption that practice change would happen through access to information, grassroots mobilization and social learning – all part of the espoused PAR design.

This use of TOC, however, moved beyond just the technical realm of farming activities and identified intermediate outcomes that relate to the way actors work together as important in achieving impact. Given the relatively isolated context of North Malaita, and the expressed desire by communities for being better connected to external stakeholders, the group felt

that an important outcome would be that *support organisations in Malaita are closely linked* and are committed to sharing knowledge and learning *through networking*, in order to be able to support farmers, transfer and implement innovations. As a result, the development of new partnerships was recognized as an important pre-condition. Most immediately, this required investing in building a coalition across organizations and sectors that do not usually work together – including from fisheries, agriculture, gender and markets, and local farmers. In this way we can see how the development of the TOC identified early on a gap in relationships that the program could then seek to foster.

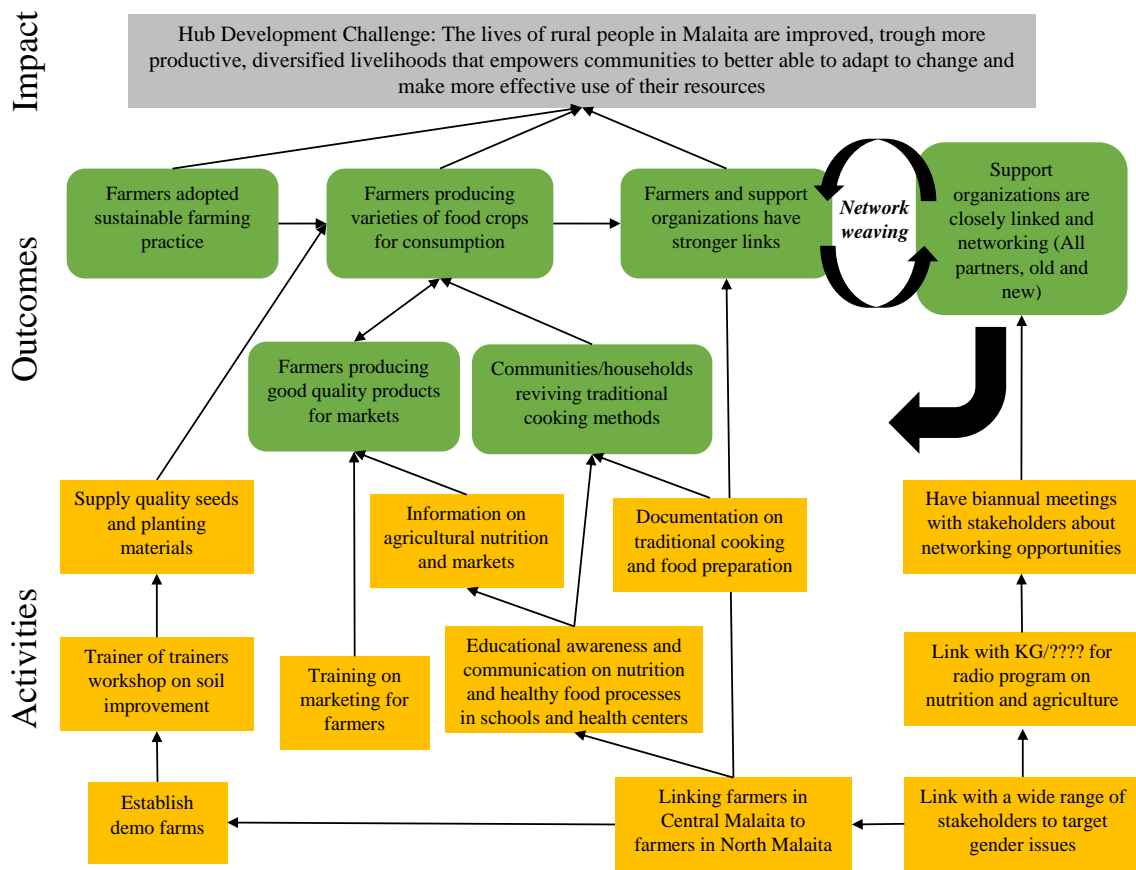


Figure 2. The logic model developed for the Sustainable Farming for Nutrition and Income initiative

The resulting expanded group of partners brought together for implementation of the SFNI initiative, then engaged in facilitated activities to build a coalition to work together. We provide snapshots of three activities to highlight key learning: (i) an initiative partnership planning workshop using TOC; (ii) a PAR training workshop to support implementation of activities on and off farm with appropriate methods and mindsets; and (iii) a reflection event that formed part of the hub level annual reflection workshop. All activities were designed and delivered to build capacity given that most partners were not used to working together in this way.

The planning workshop in December 2014 marked the moment when the coalition was able to develop deeper collective ownership of the SFNI initiative through further detailing the TOC, extending the original broad logic model. Participants revised the original six intermediate outcome areas identified (see Figure 2) into eight more detailed intermediate outcomes as shown in (see Table 1).

Table 1. Revised intermediate outcomes

Initial outcomes	Revised outcomes
Farmers adopted sustainable farming practice	Male and female farmers have adopted safer and sustainable farming practices
Farmers producing varieties of food crops for consumption	Male and female farmers are producing a variety of climate-change resilient, good quality, nutritious and safe food crops for consumption
Farmers producing good quality products for market	Male and female farmers are producing a variety of climate-change resilient, good quality and safe food crops for markets
Communities/households revising traditional cooking methods	Communities/households are revising and improving traditional cooking and preparation methods and adopting new efficient ways of cooking that retain nutrients
	Families are consuming more diverse nutrient rich local foods (and less energy-rich, poor nutrient imported foods)
Farmers and support organizations have stronger links	Farmer to farmer links are strengthened for sharing knowledge and learning
Support organizations are closely linked and networking (all partners – old and new)	Farmer and support organizations have stronger links for effective transfer and implementation of innovation
	Support organizations are closely linked and committed to sharing knowledge and learning

As partners revisited and redefined the outcomes through a facilitated process, they reflected more critically on what they wanted to achieve and how to achieve it together. For example, highlighting the importance of working with male and female farmers was brought about through reflecting on underlying gender norms, such as the inhibition of women to attend farmer training. By making explicit that the outcomes referred to both male and female farmers, opened up the space for certain partners to provide expert support and suggestions around this particular social dimension of agriculture, one that many partners had long struggled with. Another example that illustrates the importance of the common goal as the starting point, is that when discussing the requirements to achieve the hub development challenge, it was felt that as well as increasing the variety of crops, it was also necessary that new varieties be resilient to the impacts of climate change as well as being nutritious. During the discussion, the absence of national level partners in the field of nutrition in previous interventions was identified as an underlying cause for diversified crop interventions often being blind to nutritional value. As a result, appropriate personnel within the Ministry of Health and Medical Services were identified for subsequent follow-up and inclusion.

Discussing partnerships as an intermediate outcome was important as it reminded partners of the changes they needed to make in their own management and organizational practices to help support community visions. Accordingly, participants also spent time to collectively explore what a partnership means to them. They discussed and devised a rubric or performance framework to provide guidelines and a means of assessment for working together in a partnership (Table 2). Their reflection on what an effective partnership meant to the emerging coalition, provided clarity around the importance of a joint common vision, joint activities, regular communication, regular after action reviews (AARs) (a post activity group evaluation tool) and having a positive, trusting and balanced relationship (Albert et al., 2015).

Table 2. A partnerships assessment framework (summarized version of full shown in Albert et al. 2015)

Partnership Elements	Well-functioning partnership	Emerging partnership	Inexperienced partnership
Common agenda, and appropriate agreements	Agreement around common goals; Joint TOC through participatory consultations, organizational/individual alignment.	Agreement around common goals; mutual understanding between partners – but no formalized commitment	Little evidence of commitment to partnership; No agreement around common goals
Communication (continual dialogue) and guidance	Good evidence of regular and inclusive communication (e.g. regular meetings attended – constant email/communication)	Some evidence of two-way communication; not all partners actively communicating	No evidence of communication, No clear directives.
Joint research or activities	Well-planned participatory activities. Activities on-track and measured (with regular adaptation)	Some evidence of working towards joint research or activities (planning stage)	Poor evidence for participatory working, poor equality between partners.
Monitoring and evaluation	M&E jointly developed, implemented and results shared among partners. Regular use of AAR.	Some implementation and sharing of M&E and AAR	No evidence of M&E or AAR
Relationships (trust and conflict)	Positive and trusting relationship between partners.	A developing relationship between partners	Evidence of mistrust and conflict. No active collaboration

We found that developing a rubric of performance helped clarify expectations that people had for how they work together. By utilizing an assessment scale that is strengths-based, rather than judgmental, they also created a safe environment for participants to reflect on what they are learning about how they are working towards collective goals. For example, although the partnership was just beginning it was evident from the first evaluation that the partnership could assess itself as somewhere between 'emerging' and 'well-functioning'. As

evidence of this, the group could point to the fact that a clear TOC had been developed and agreed by partners, and partners had strong verbal agreements around working together, although working plans for specific outcomes still needed to be drawn up. Equally, because the partnership was in its establishment phase, and work plans were still being finalized, a ranking of 'inexperienced' to 'emerging' was given for progress around joint research and activities. Perhaps more important than how they assessed the state of the partnerships at the time, was that the discussions around the assessment tool itself helped them appreciate the need to move from a 'consultation' mode of participation to building co-researcher relationships, representing acknowledgement of the need to move along a participation continuum.

The second partnership activity focused specifically on learning tools and skills needed to build relationships with farmers as co-researchers for specific activities. For most partners, using PAR tools such as timelines and AARs to reflect on progress made in activities and surfacing learning to include farmers as active participants in research was new. Consequently, the workshop emphasized critical reflection and building the capacity of partners to adapt and evolve program using their own leaning. A session on operationalizing the reflection step in a PAR cycle was the most insightful as it illustrated how different this approach to M&E was from the indicator and externally driven processes they were used to. A key learning was that the hands-on, practically focused, capacity development approach used helped participants learn within the context of their joint work, which had been planned through the TOC workshop.

Participant interviews undertaken after the workshop highlighted that greater understanding of a PAR approach was making a difference to how partners saw their role, and how they managed their work – both in the partnership and in other areas of their working lives. An example of this from one participant is: "reflection in the PAR process stood out in what I have learnt during the workshop because it points to what I have done, have not done well and where I need to improve" [agricultural research organization representative]. For this agricultural researcher implementing 'on-farm trials' usually meant formal research staff undertaking the research on a farmer's farm. Now, for the first time they were implementing an approach whereby the farmer became a co-researcher and they could see the intrinsic value through enhanced uptake of interventions by other farmers in the communities.

The third activity was a program initiative AAR, held in May 2015 during the annual program reflection cycle, representing the reflection step in the PAR engagement cycle. The aim for this annual review was to i) reflect on partner activities undertaken with respect to the SFNI initiative; ii) delve a little deeper into nutrition and the inclusion of a new partner to the coalition; and iii) explore how and with who partners share information and knowledge and how knowledge sharing could be improved through a network mapping exercise. To share responsibility, and as a mechanism to further 'shift' ownership of the SFNI from WorldFish to the coalition, other partner organizations were encouraged to co-facilitate workshop activities. Although this was a successful mechanism and during the post-workshop evaluation several partners confirmed this, they also recognized that the convening and facilitation role played by WorldFish remained important in these early stages of the partnership. They expressed a need to have a champion, someone responsible for facilitating the internal process of learning together.

During the AAR, partners shared lessons from their work with farmers in the North Malaita communities, illustrating the cross-scale nature of reflection and learning. For example, representatives from a local farmers' association who had been engaged from the beginning could see that they were building their skills in critical reflection along with staff from research organizations and national agencies. This upskilling was manifest in an example

where a lead farmer recognized that gender and social norms were excluding women from the demonstration plots and training activities. This led to the creation of a new strategy for working with women's groups. Along with smaller groups organized geographically, this directly increased the reach of the lead farmer's activities to the most marginalized, and, opened up the possibility to engage with gender norms within farming activities. This practical shift in strategy provides an example of how the underlying assumptions in the TOC can be revisited and adapted as more detailed activities bring more learning of how to address emerging underlying dynamics that stand in the way of achieving outcomes in the interest of the poor and marginalized.

In conclusion, implementing the SFNI initiative using PAR and TOC was a process of forging relationships between organizations and individuals across scales in an aquatic agricultural system. A key lesson in the use of TOC is that movement from broad to more detailed and nuanced understanding of outcomes and activities requires that participants have a strong sense of collective ownership and can specify activities in a tangible and achievable way. Coalition members are now inviting each other to join other workshops, the reach of partners to networks of rural farmers has been broadened and agricultural extension officers have more opportunities to join farmer activities. For the Solomon Islands implementation team, the learning gained through using PAR and in particular its use of critical reflection has led to expanding research into areas previously overlooked (such as nutrition) and has broken down some long standing barriers to organizations working together.

Synthesis of Learning

The program design for PM&E was intended to help 'get beneath the surface' and enable engagement and change at the systemic structural and mental model levels of the 'system' (see Figure 1). This required stakeholders to engage with underlying power dynamics and assumptions, and facilitators to help uncover these in collective processes. Doing this is known to be a challenge in PAR (Cooke & Kothari, 2001; Arieli, Friedman, & Agbaria, 2009). The tension that can arise between supporting a collective process and making sure the voices of all in the room are heard is well-recognized by experienced practitioners (Roberts & Dick, 2003). In our experience of working across multiple stakeholders with critical reflection, we found that opening up 'safe spaces' (e.g. Wicks & Reason, 2009) to dig deeper was enabled through first investing in building a common goal as the starting point, and then staging a more critical practice alongside tangible interventions, all the while building skills for ongoing real-time reflection and learning.

The community visioning and stakeholder initiative planning implemented in all hubs, emphasized starting with a common development goal and getting started on actions, rather than a research question. This involved a strengths-based approach to engagement with TOC development. The outcome focus of TOC enabled deliberation of possible pathways to reach a long term goal collectively, helping to keep interventions focused on what can actually make a difference. In practice, facilitating this use of TOC with all stakeholders was not void of tensions. As the Solomon Islands case illustrates, the challenge of bringing new and unexpected partners together and building new ways of working collectively to reach the most marginalized required significant investment in the quality of participation with a capacity development lens.

Our experience across five hubs suggests that context influenced how tensions around shifting institutional roles played out, and what was potentially transformative in one context was not necessarily so in another. In all cases, WorldFish played a convening role which at times sat uncomfortably with the organizational culture and identity of delivering

agricultural research solutions. In some contexts, partners also struggled to shift from their own expertise as their starting point. In the crowded development context of the Tonle Sap in Cambodia, for example, NGO partners supporting community engagement were confronted with needing to respond to sensitive issues around fisheries law enforcement that could put them at odds with government partners. In the Philippines, on the other hand, a national coalition of research organizations emerged immediately in response to what had previously been an invisible community need to rehabilitate abaca plantations. We suggest, therefore, that attention to contextual starting conditions is critical with this approach. Yet it is also true that in all contexts, the facilitation skills to hold a multi-stakeholder group together for long enough as they learn to engage in more transformative ways was instrumental. And the leadership within WorldFish to appreciate the need to play a different, and at times uncomfortable role in order to better engage with development, was also a contributing factor.

We found that surfacing assumptions in the TOC process helped stakeholders not just define the goal and plan how to move towards it, but importantly, to bring a self-reflect as they review progress. The Solomon Islands case illustrates how this use of TOC enabled partners to reflect on their own roles and how to work together. Doing so critically, supported engagement with their mental models of how they respond to achieve development outcomes. A potentially more transformative approach became possible as NGOs, research and extension agencies reflected on their role as not just delivering a service, but in doing so in a way that facilitated relationships with farmers as co-researchers. The degree to which this was enacted institutionally varied and was driven in part by institutional capacities and incentives. In some countries, however, we have seen lasting change in how researchers and NGO partners perceive their potential to support the marginalized.

We have learned that emphasizing and structuring the reflection step of the PAR engagement cycle can enable stakeholders to surface and use their own learning to change their practice. Throughout the scales of program implementation – from communities, to research initiatives, to the hub level and cross hub level – AARs have proved to be critical moments that embody the idea of creating ‘depth’ in PM&E. AARs were structured simply so that they became a tool accessible to all through asking ‘what worked well?’, ‘what did not work so well?’ and ‘what did we learn?’ systematically after all activities (be they big or small). They supported the practice of reflection to become part of the culture of implementation. As teams learned to reflect safely in their own space, engaging with underlying dynamics and norms then started to become possible. A subsequent external evaluation found institutionalization of this reflection process as a learning mechanism to be a program strength (CGIAR-IEA, 2015). This suggests that a transformative change started to happen within the participating organizations, increasing the opportunity for them to facilitate transformative change beyond.

Our experience also points to greater appreciation of emergent and unexpected outcome pathways. In the Solomon Islands case, the example of the lead farmer shifting his way of working to support greater gender equity illustrates a constructive movement towards engaging with underlying power dynamics, opening up a new pathway to deeper change. In the Barotse Floodplain in Zambia, traders and fishermen working together to improve fish salting technologies to reduce post-harvest fish loss, ended up working to address a highly contested issue of implementation of a fishing ban. Particularly for the traders involved, this suggests a radical redefinition of their role from opposing policies that limited fish catches to one of conserving fish catches collectively. As the PM&E system enabled these new transformative pathways to become visible, the program could then respond to further catalyze the emerging potential. As a result, seemingly slow processes of change, could potentially be accelerated with this real-time knowledge of emerging pathways.

Conclusion

While the AAS initiatives we have described are still in their early phases, our experience thus far illustrates that use of PAR and TOC together, can open up the potential for deeper learning with stakeholders in aquatic agricultural systems. Nonetheless, it would be misleading to suggest that the road to using this approach to PM&E is all smooth. The power of the approach, we found, lies in its ability to guide program learning and adaptation from the real-life experiences of stakeholders. Many programs, however, continue to operate within donor imposed and often linear models of measuring impact in the short term. The power of TOC working with PAR can, therefore, be experienced by some managers as subversive. For many at the top of the development machine, accountability to donors continues to 'trump' learning. So, while use of TOC is being embraced by donors and implementers alike (e.g. Vogel, 2012) without more fundamental shifts towards appreciating emergent outcomes and focusing on building the capacity of stakeholders to reflect more critically, there is still some risk that TOC becomes nothing more than a complex log frame.

Finally, the capacity required to implement contextualized processes to build critical reflection and surface assumptions about development outcomes is not to be underestimated. In AAS we invested heavily in capacity development, yet we still met with challenges. After three years of implementation, we now appreciate empirically the relationship between the skills to use PAR and its critical reflection, and TOC and its emphasis on outcomes, in practice. We know now that designers and managers of PM&E (who tend to be far from the field) must be embedded in implementation processes and working along-side facilitators, to learn themselves how to make a complex idea work in context and to facilitate experiential learning of local teams as they open up potentially transformative pathways.

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