



Evaluation of the CGIAR Research Program on Aquatic Agricultural Systems (AAS)

Volume 1 – Evaluation Report

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Glossary and acronyms

AAS	Aquatic Agricultural Systems (also, the program)
ACIAR	Australian Center for International Agricultural Research
AIN	Aquaculture for Income and Nutrition
BoT	Board of Trustees (also, the board)
BUS	Basic Unit of Science
CGIAR	Consultative Group for International Agricultural Research
CO	Consortium Office
CRP	CGIAR Research Program
FARA	Forum for Agricultural Research in Africa
FC	Fund Council
FTE	Full-time equivalent
GCARD	Global Conference on Agricultural Research for Development
GFAR	Global Forum for Agricultural Research
GTA	Gender Transformative Approach
ICLARM	International Center for Living Aquatic Resources Management
IDO	Intermediate Development Outcome
IEA	Independent Evaluation Arrangement
IWMI	International Water Management Institute
IPGs	International Public Goods
ISPC	Independent Science and Partnership Council
JD	Job description
KSL	Knowledge Sharing and Learning
LEGS	Livelihood Enhancement Groups
M&E	Monitoring and Evaluation
MT	Management Team
NARS	National Agricultural Research Systems
NRM	Natural Resource Management
OCS	One Common System
PacFish	Improving Community-based Fisheries Management in Pacific Island Countries
PAR	Participatory Action Research
PLT	Program Leadership Team
PMP	Performance Management Plan
POP	Program Oversight Panel
POWB	Program of Work and Budget
PSU	Program Support Unit
R4D	Research for Development
RCT	Randomized control trial
RFF	Rice Field Fisheries
RG	Reference Group
RinD	Research in Development
SILC+	Savings and Internal Lending Communities Plus
SLG	Strategic Leadership Group
SRF	Strategy and Results Framework
TOC	Theory of Change
TOR	Terms of Reference
WF	WorldFish

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Executive Summary

Background and Context

The CGIAR Research Program (CRP) on Aquatic Agricultural Systems (AAS) was designed to bring together the CGIAR's strengths in agricultural research together with the experience and local knowledge of research and development partners. The program's aim is to improve the well-being of the people who depend on aquatic agricultural systems, defined as "agricultural systems in which the annual production dynamics of freshwater and/or saline or brackish coastal systems contribute significantly to total household income." The lead center is WorldFish, and there are two participating centers – Bioversity and IWMI.

The program is currently organized into four program flagships. Three flagships present the major aquatic agricultural that the program identified: Asia's Mega Deltas, Island Systems of South-East Asia and the Pacific, and African Inland Waters. The fourth focuses on program-level research and syntheses. The research covers seven themes and is designed to contribute to seven intermediate development outcomes (IDOs) related to income, nutrition, future options (greater resilience for advanced ecosystem services), productivity, gender and empowerment, and the capacity to innovate and capacity to adapt.

The program introduced an approach it termed "Research in Development" (RinD), in which agricultural research is embedded in on-going development actions and processes, and adds value by leveraging potential for innovation. RinD is operationalized through participatory action research (PAR) within the geographically defined hubs, which entail close collaboration with stakeholders from community to national levels. The ambition of AAS extends well beyond the boundaries of aquatic agricultural systems. Developing the RinD approach, AAS aims at influencing the way in which agricultural research is conducted in the CGIAR more generally. At the same time, conventional research continues to be conducted under AAS, mostly supported by bilateral funding.

At the time of the evaluation, the program had approximately 100 Full Time Equivalent (FTE) staff members. From its inception in July 2011 until the end of 2013, total expenditure by the programme was approximately US\$ 37.5 million, and the 2014 budget was estimated to be US\$ 31 million. Approximately half of the funds were supplied through bilateral projects, and 95 percent were allocated through WorldFish.

Purpose, Scope and Objectives of the Evaluation

The primary purpose of this evaluation of the AAS CRP was to provide essential evaluative information to program management, funders and partners that can inform decision-making on issues such as modification, extension and expansion, and program structure. The primary audience of the evaluation was the program and its core partners, its governing bodies, the CGIAR and the Fund Council. The evaluation was also intended to be of interest to the broader community involved in research on aquatic agriculture systems.

Given the long-term nature of agricultural research, the nature of this specific program, and the fact that AAS was operational for less than four years at the time of the evaluation, this evaluation was principally formative. As such the focus was on the design, implementation and evolution of the program since inception; the relevance and quality its research, the plausibility of the impact pathways for achieving their respective IDO; and the progress in relation to gender, partnerships and capacity building. The summative element to the evaluation assessed research that was done in the run up to AAS (the so-called “legacy” research).

The evaluation addressed two sets of evaluation questions. The first was a set of generic evaluation questions that refer to the standard criteria applied across the CRP evaluations: relevance, quality of science, likely effectiveness, expected impact, gender, capacity development and partnerships, and program governance and management. The second set of questions referred specifically to the AAS RinD approach, including its uniqueness, its implementation and its potential as a model for CGIAR research.

Approach and Methodology

Taking the program’s focus on action research into account, the evaluation team developed a methodology that can be characterized as “case-based, multi-level and mixed methods”. Case studies formed an essential building block of the evaluation. Two types of cases were conducted: “roll-out” cases and “bilateral project” cases. These case studies were conducted in four countries: Bangladesh (Southern Polder Zone (Khulna) Hub), Cambodia (Tonle Sap Hub), Zambia (Barotse Hub) and the Solomon Islands (Malaita Hub and Western Hub). Methods used for the case studies addressed the nested structure of the program and included an intensive review of documents, interviews with staff and stakeholders at national level and hub level, and community visits involving focus group discussions, participatory methods and field observations. The information from the case studies was combined with data collected through:

- desk review of key program documents;
- reviews of previous evaluations/assessments that were relevant;
- interviews of AAS managers, staff involved with the program, external partners, and professional peers (including interviews held for the case studies, 173 persons were interviewed, not including the focus groups);
- electronic survey of AAS staff and partners (91 responses);
- review and assessment of 83 research outputs published between 2009 and 2014; and a
- a bibliometric analysis of AAS publications from the same period.

Main Findings, Suggestions and Recommendations

As further detailed below, the picture that emerged from the evaluation was mixed. The evaluation team found that in the 3.5 years since its initiation AAS can point to a number of important achievements. At the same time, a number of significant problems were identified, which affect quality of science, relevance and effectiveness, and in order to be addressed, would require

substantial changes in key areas of program design, staffing and implementation.

Program design

The original AAS proposal framed the program in relation to the paradox that aquatic agricultural systems are characterized by high ecological productivity while at the same time featuring a high prevalence of poverty, vulnerability and inequity among social groups. The evaluation found that this is a strong and compelling framing. However, since the initiation of AAS it appears to have been de-emphasized.

The program design was based on a fundamental critique of conventional agricultural research, which was used to justify the RinD approach and the emphasis on PAR. From the beginning the idea was to use both RinD and more conventional research methods, and this was re-emphasized in the 2015-2016 extension proposal.

The evaluation team found that the systems research aspects of the program remain underdeveloped.

Human resources

The evaluation team found that AAS staff were enthusiastic about the program and satisfied that it provides a positive framework for their research. Staff noted that the program encourages a culture of innovative thinking, self-reflection and learning.

The educational profiles of AAS research staff varies significantly over the hubs and themes: while 60 percent of the research FTE in the Global hub are PhD level, in Bangladesh, Cambodia and the Solomon Islands this is 20 percent or less. Research staff resources are very unevenly distributed over the program's 30 "hub x theme" combinations: in 23 of the 30 combinations (i.e. 77 percent) there is less than one PhD-level FTE. Half of all researchers who responded to the electronic survey said they were involved in three or more research themes. The evaluation team concluded that the ratio of senior to junior researchers was in many cases too low to assure quality, cutting-edge research.

The operationalization of Research in Development (RinD)

Across the hubs the roll-out process had a number of important positive features. These include the strategy to conduct a thorough assessment of the situation, starting from the national context; the ability of the AAS hub teams to establish themselves as a trusted partner within the local development community and to build mutual understanding about and commitment to a jointly identified hub development challenge; an excellent cross-hub governance assessment; the use of a strength-based approach to community-engagement promoting self-reliance; a strong commitment to promoting GTA during the roll-out process and the dedicated efforts to sensitize partners for this concept.

At the same time, the evaluation team had a number of reservations concerning the roll-out process

that affect the quality of science and cost-effectiveness. The process was apparently not informed by a critical review of earlier approaches to farming systems research, participatory research or PAR inside or outside the CGIAR; there were few efforts to avoid elite capture or focus specifically on poor, vulnerable and marginalized groups; much of the roll-out activity was “outsourced” to NGOs, and consequently there was a low level of researcher-community interaction; and there was little indication that the roll-out process was leading to an interdisciplinary systems-oriented research approach.

At the time of the evaluation AAS was implementing more than 50 bilateral projects. These ranged in total budget from tens of thousands to several million dollars and accounted for approximately 50 percent of AAS funding. The four large bilateral projects reviewed for this evaluation ranged from one end of the research-development continuum to the other.

The cases studies point to both the potential and the limitations of large bilateral projects in contributing to the AAS research program. Their potential is in experimenting with different approaches to community involvement and participatory technology development on a much larger scale than is currently possible, which contributes to cost-effectiveness and potential impact. Limitations arise with those projects that focus almost exclusively on large-scale dissemination of existing technologies and leave little room for research.

Participatory Action Research (PAR)

PAR is a central element of AAS as it enables two crucial aspects of the program: the engagement of communities and hub level stakeholders in the research; and the integration of GTA and embedding of M&E processes. Progress in the implementation of PAR has varied over the hubs, in part because: some hubs started a year earlier than others; some hubs have had previous experience with similar approaches; and there were different levels of engagement of AAS senior researchers in action research in the communities.

Placing PAR at center stage is probably the most innovative aspect of AAS. While the emphasis on PAR may potentially contribute to the relevance and effectiveness of the program, to date this contribution has not been realized or convincingly demonstrated. Nor has a strong link yet been demonstrated between the use of PAR and quality of science.

Thematic research

The program’s thematic research is organized under seven headings: Sustainable Increases in System Productivity; Equitable Access to Markets; Socio-ecological Resilience and Adaptive Capacity; Gender Equality; Policies and Institutions to Empower AAS Users; Nutrition; and Knowledge Sharing and Learning.

Thematic research on “Sustainable Increases in System Productivity” has received the largest share of staff and funding, as compared to the other themes. Issues around productivity also featured prominently in most of the hub development challenges. This theme includes conventional research

and extension type activities that are funded at a substantial scale under bilateral projects, mostly in the area of fisheries and aquaculture productivity, one of the traditional areas of expertise of WorldFish. An excellent literature review of productivity-enhancing interventions in the AAS hubs was conducted. In Bangladesh, the program experimented with innovative technologies that have potential to benefit poor and marginalized men and women, such as shaded ponds, small indigenous fish and vegetable towers. A link between productivity research and nutrition research was established. The evaluation team also identified some important challenges regarding this theme. The systems dimension of the productivity research remains underdeveloped, which affects the program's effectiveness. Most PAR activities related to productivity have, so far, focused on individual components of aquatic agricultural systems rather than systems productivity, and some faced technical challenges. Progress in leveraging expertise across the CGIAR system to strengthen integrated productivity research has been limited.

Value chain studies dominated the theme "Equitable Access to Markets." The legacy research of WorldFish in this area was found to be excellent. The ongoing work in the hubs had important positive features, such as a high buy-in of stakeholders in Zambia, but it was also characterized by delays and the lack of an analytical cutting edge. Research on "Socio-ecological Resilience and Adaptive Capacity" is in an early stage. The review of legacy research indicated that this is another field of traditional strength of WorldFish on which AAS can draw.

Work on Gender Equality, which is both a thematic research area and a cross-cutting topic, was identified as one of the major achievements of the program. While the GTA is not new, the evaluation team found its systematic application across a number of aquatic agricultural systems to be innovative. This work has the potential to make an important contribution to understanding changes in gender norms, perceptions and relations and to have impact beyond the boundaries of the program. The evaluation also identified a challenge regarding the gender work: its ability to add value to agricultural research and development programs remains to be demonstrated.

The research on the theme "Policies and institutions to Empower AAS Users" has benefitted from the established expertise of WorldFish in the area of governance. The theme has demonstrated that if a coherent conceptual framework is developed and applied consistently, broadly relevant knowledge that address cross-hub issues can be produced in a relatively short time. Following the initial assessment exercise subsequent research under this theme in the hubs was limited by scarce staff resources.

"Nutrition" was introduced relatively recently as a research theme in AAS. The evaluation team considers this theme highly relevant, since harnessing the role of aquatic resources for nutrition is one of the justifications for investing in a research program on aquatic agricultural systems. Based on available publications and field observations, it would appear that the program offers multiple opportunities to conduct high quality research on nutrition using a variety of qualitative and quantitative research methods. A promising start has been made. AAS has increased its research capacity in this area and developed new partnerships, including with the CRP on Agriculture for Health and Nutrition (A4HN) to address this topic.

The Knowledge Sharing and Learning theme played a significant role in establishing a culture of self-reflection and learning within AAS. Under this research theme, hub-level theories of change were developed as a tool for theory-based evaluation, and hub teams have been experimenting with outcome evidencing. While the evaluation team acknowledges these efforts to develop innovative instruments, the evidence from the country case studies show that the quality and relevance of the information collected using these instruments is problematic. A major limitation is the fact that this approach does not establish links with the existing literature.

Partnerships and capacity building

The evaluation team distinguished between research partners and development partners. AAS has established many partnerships of both types at local, national and international level.

The evaluation team found that partnerships with the other CGIAR centers directly involved in AAS to be critically important but not sufficiently developed. The two CGIAR partners directly involved in AAS, Bioversity and IWMI, receive only five percent of funding through AAS, and neither center maps any of their bilateral projects to AAS. There are project and hub-specific partnerships with other CGIAR centers. These have potential, but they have not yet led to an integrated research agenda.

AAS has strong partnerships with universities in the North. These partnerships build on past WorldFish research and support key areas of AAS, such as the gender work. With regard to gender and GTA, the evaluation team also found that the partnerships supported well-coordinated and cost-effective capacity development activities. Less progress has been made in establishing partnerships for other areas of AAS, especially farming systems research and PAR.

The country case studies indicate that individuals from universities and research institutions in the South have been involved in AAS, but research organizations in the South do not play the role of core partners that was foreseen in the AAS partnership strategy. The limited involvement of senior researchers at the community level also constrained the opportunities for capacity development of partners through joint “learning by doing”.

Partnerships with development organization are essential for the success of RinD, and the roll-out case studies showed that AAS was able to establish collaboration with a wide range government and non-government organizations. In some hubs NGOs were intensively involved in the community-level activities. The country case studies indicated that partnerships with government organizations were well developed at the hub level, but less so at the national level. In Zambia, the balance of working with the Barotse Royal Establishment vis-à-vis working with locally elected governments could have been based on a more critical assessment of the opportunities and dangers of close alignment with local power structures.

Knowledge production and development outcomes

AAS takes an explicitly place-based and context-specific approach to the production broadly relevant research knowledge, including IPGs, which contributes towards development outcomes. The

evaluation team acknowledges the value of such a place-based approach, especially for complex development challenges, which involve collective action and working across scales. At the time that this evaluation report was written, the process of developing detailed designs for hub-based research initiatives was still underway. The evaluation team was not convinced that sufficient guidance has been provided to ensure that widely relevant knowledge is produced.

The review of a sample of 83 publications and the bibliometric analysis showed that the overall quality of publications was high, and well in line with what should be expected from a CGIAR center. WorldFish/AAS researchers were clearly successful in placing their work in international journals. The publications reviewed were based on quantitative and qualitative research methods, and in some cases combined both. The sample contained almost equal shares of empirical and review or synthesis publications. In the qualitative research included in the review, there was some focus on developing conceptual tools and frameworks, although many were essentially descriptive. The use of advanced analytical methods, however, was not prominent in either the qualitative or the quantitative publications.

There was variation in the degree to which the reviewed publications addressed key AAS concerns such as poverty, systems, gender and the use of PAR. The review indicated that there was an increasing focus on both poverty and gender in the publications produced by the program. With regard to the systems perspective, the sample contained a number of publications that presented findings from different hubs in a comparative perspective or that contributed to a better understanding of the farming systems in the individual hubs. There was, however, a scarcity of publications that used methodologies commonly used in farming systems research (such as developing typologies and characterizing types of farming systems) or in agro-ecosystems research (such as using systems theory to identify linkages between different components of aquatic agricultural systems).

The bibliometric analysis showed that sixty-seven articles were published in international journals during 2012-2014, of which sixty percent appeared in journals primarily focused on fisheries, marine or aquaculture issues, or on environmental science or management. This reflects what the evaluation team understands to be the historic research strengths of WorldFish.

With regard to development outcomes, the evaluation notes that because AAS has been in existence only since mid-2011, it is unrealistic to expect that the influence of the activities started under the roll-out process will already be visible in large-scale development outcomes on the ground. The evaluation team notes that AAS has made a number of claims about large-scale development impacts (referring to millions of people), but was concerned that the evidence basis supporting these claims was not well documented.

The evaluation team recognizes the potential for development benefits for poor and marginalized groups associated with some of the innovative technologies that are being promoted under AAS in Bangladesh, especially those that require little space and/or are not dependent on high capital inputs. Otherwise, the limited emphasis on innovations that enhance overall systems productivity, and the lack of a specific focus on poor and marginalized people, affect the program's potential for

contributing to development impacts.

Governance and management

The governance arrangements of AAS are comparable to those of other CRPs. According to its Terms of Reference, the Program Oversight Panel (POP) should play a key role in program governance. The 2014 CRP Governance and Management Review concluded that compared to other centers, structure and procedures at WorldFish were above average in terms of independence and inclusiveness. However, in relation to AAS, the evaluation team found that governance of the program has essentially been left in the hands of WorldFish and AAS management because: (i) between 2012 and 2014 the POP played only an advisory role and not the oversight role foreseen in the ToR; (ii) although the POP is independent, its agenda is controlled largely by AAS management; and (iii) the WorldFish board is not itself in a position to provide detailed oversight since its Scientific Advisory Committee was closed when the POP was established.

Management arrangements within AAS have evolved considerably since its initiation. The emergent nature of the AAS programme, combined with the diversity and complexity of the issues it works on and the contexts it work in, pose important challenges to management.

AAS staff who responded to the electronic survey generally appreciated the program's management style and arrangements. Some expressed concerns about too much time spent in meetings and other non-research activities.

The evaluation team found that in the first three years of the program, research management, especially the management of W1/W2 funds, has been affected by the lack of a system that could ensure interdisciplinarity, coordination and quality of science. The recent move to the planning of hub research initiatives is positive, but it is too early to assess to what extent this will overcome the problems observed around the earlier Activity Plans.

On financial management, the evaluation team found that AAS dominates the finances and programming of WorldFish, and the financial management of the programme and centre are therefore closely linked. W1/W2 funds have been used primarily to support research themes and hubs that did not have access to bilateral projects, namely the roll-out activities and gender equity and knowledge sharing and learning themes, and the Zambia and Global Science and Scaling hubs.

AAS benefits from the well-established finance management systems of WorldFish and a wide range of internal policies and regulations. The introduction of One Common System (OCS) has improved financial management, but better use could be made of Basic Unit of Science (BUS) codes.

As in case of financial management, AAS benefits from the well-established human resource management system of WorldFish. A performance management system for staff is in place. Positive staff perceptions on key aspects of human resource management were documented through the staff survey.

Overall conclusion and recommendation on the way forward

Overall the evaluation team concluded that:

- Aquatic agricultural systems present issues of sufficient importance and relevance to justify further investment by the CGIAR;
- AAS has a number of important achievements, where the potential for progress can be demonstrated; and
- The program faces a range of obstacles and challenges, which affect quality of science, relevance and effectiveness, and to be overcome will require substantial changes in key areas including program design, staffing and implementation

The evaluation team concludes that to date, AAS has been led and managed primarily from perspective of using AAS as a way to establish and legitimize new skills and competences. Insufficient attention has been given to the historic competences of WorldFish and other CGIAR centers. Instead of minimizing the value of these competences and experiences, the evaluation team recommends using them as an invaluable springboard.

It is, therefore, the **primary recommendation** of the evaluation team that the CGIAR should justify further investment in aquatic agricultural systems more on the grounds of comparative advantage. This recommendation has a number of implications, including the need to:

- Strengthen and nuance the conceptualization of aquatic agricultural systems so that there is a more coherent and compelling justification for geographic hubs. One option would be have a strong programmatic focus on integrated aquaculture-agriculture systems where the linkages between aquaculture and agriculture are clearly specified and central to the research agenda;
- Use the AAS paradox to strengthen the strategic aspects of the research program;
- Shift the focus away from PAR as the core research methodology, implemented largely in parallel with other approaches as it now is, towards a transdisciplinary mixed-methods approach. Continuing work around PAR should then take an explicit research stance, and ask if, where, when, with whom, in relation to what kind of problems or technologies, and why, it is or can be useful;
- Significantly increase the proportion of PhD-level researchers working at field level, and re-invigorate an ethos of field-based research among senior scientists;
- Significantly strengthen the capabilities for systems research; and
- Mover toward a truly collaborative, multi-center research program.

RECOMMENDATION 1. Strengthen research strategy and design

AAS should strengthen its research strategy and design by:

- Taking an explicit research stance vis-à-vis RinD, comparing and contrasting it with other approaches and collecting data that will make it possible identify its comparative advantages.
- Re-focus research questions on the AAS paradox;
- More effectively engaging with, benefitting from and contributing to existing bodies of

experience and scholarship around agricultural systems and the methods used to study and improving them.

RECOMMENDATION 2. Strengthening research capacity

AAS management should re-think its approach to staffing and to the allocation of human resources by:

- Basing more experienced senior researchers in the hubs. This would allow them to take the lead in designing and implementing research.
- Undertaking a detailed analysis of the factors that constrain the hiring and retention of qualified research staff, particularly in the hubs. If these factors cannot be overcome directly, alternative models, including shared staff, partnerships, should be explored. There is already some important experience with these models within the program.
- Ensuring a critical mass of research capacity to a level that would justify expenditure in relation to any given hub – theme combination. If the program faces resource limitations, consolidation and prioritization over hubs and themes will be essential.

Until these concerns are addressed, the evaluation team recommends that no expansion into new hubs or research themes should be contemplated.

RECOMMENDATION 3. Revising the roll-out process

The evaluation team suggests that any continuation or extension of the roll-out process would benefit from: (1) allowing for experimenting with different approaches to community engagement and priority setting in ways that allow results to be compared; (2) ensuring that adequate time and resources are available to conduct in-depth, critical reviews of the relevant research-based literature and experience; (3) ensuring a much greater level of direct involvement by senior researchers; and (4) striving toward the development of an explicit and robust systems perspective using an interdisciplinary research approach.

RECOMMENDATION 4. Increasing alignment of AAS activities

The decision to associate bilateral projects with AAS should be based primarily on their potential to further the AAS research agenda. In the design and implementation of all bilateral projects, maximum synergies with W1/W2 funded work should be sought. In particular, AAS management should seek to use bilaterally-funded projects to experiment with different approaches to community involvement and participatory technology development on a larger scale than is currently possible.

RECOMMENDATION 5. Partnership and capacity building strategies

AAS management should undertake a strategic review of both the program's partnership and capacity development activities. Potential partners could be assessed more critically. More emphasis could be placed on partnering with research organizations in the South, including institutes and universities, as a cost-effective way of bringing expertise into the program, particularly where it has

been difficult to recruit experienced staff. A senior staff member could be given responsibility for partnerships and capacity development.

RECOMMENDATION 6. Potential to generate broadly relevant knowledge

AAS research management should take more active steps to ensure that research activities in the hubs are conceived and planned in ways that will allow widely relevant knowledge, including IPGs, to be generated so as to ensure that Impact Pathway 3 can function. Specifically, stronger engagement with the relevant literature, comparative research designs, and more detailed analysis of the other contexts within which the research may be relevant are recommended.

RECOMMENDATION 7. Strengthened governance

In order to fulfil its oversight role, and thus provide AAS with a more robust governance structure, the position of the POP must be significantly strengthened in relation to both the program management and WorldFish. Its links to the BoT of WorldFish need to be reinforced. Given the ongoing discussions about CRP governance, it is not for the evaluation team to detail how this should happen, but stronger and more independent oversight is essential.

RECOMMENDATION 8. Clarification of roles

The management of AAS and WorldFish should clarify the roles, responsibilities and reporting relations of WorldFish staff relative to AAS staff, and in particular as they relate to scientific management. The proposed AAS Science Director should be encouraged to spend considerable time in the hubs.

RECOMMENDATION 9. Management information

A functional research management information system should be established. This system should make it possible for AAS management to monitor and assess key program indicators such as the distribution of resources and the research outputs produced by hubs and themes.

1. INTRODUCTION TO THE EVALUATION

1.1 Context of the evaluation

In 2008 the CGIAR initiated a major reform that aimed at improving the coordination, demand-orientation and development impact of its research. A major element of the reform was the establishment of 15 CGIAR Research Programs (CRPs). The CRPs were conceived as large, long-term, multi-center and results-oriented research programs that place the link between research and development at center stage. The overarching goals, the System-level Outcomes (SLOs) to which the CRPs should contribute, are formulated in the CGIAR's Strategy and Results Framework, initially approved in 2011. The revised framework for the period from 2015-2025, which is in the final stages of approval, identifies three main goals: reduce poverty; improve food and nutrition security for health; and improve natural resource systems and ecosystem services. The evolving niche of the CGIAR is characterized by: providing research leadership and international public goods; safeguarding and utilizing genetic resources; strengthening research capacity at national level; partnering for impact; informing global debates and managing open data and sharing knowledge.¹ The CRPs are funded through a mechanism by which the donors pool their funds (the CGIAR Fund²) as well as through bilateral funds to individual Centers. In 2015, the Fund Council will put forward a 2nd call of CRP proposals with implementation scheduled to begin in 2017.

In November 2013, the Fund Council of the CGIAR agreed that all current CRPs should undergo some form of evaluation before preparation of full proposals in response to the second call of CRPs. The Independent Evaluation Arrangement (IEA) of the CGIAR, which leads the implementation of the CGIAR Policy for Independent External Evaluations³ was specifically requested by the FC to commission an evaluation of the CRP on Aquatic Agricultural Systems (AAS).

1.2 Purpose and audience

The primary purpose of this evaluation of the AAS CRP is to enhance the contribution that research on aquatic agriculture systems is likely to have towards reaching the CGIAR goals and enhancing the productivity and sustainability of aquatic agriculture systems and the livelihoods of poor producers and consumers dependent on them. The evaluation aims at providing information to program management, funders and partners that can inform decision-making on issues such as modification, extension and expansion, and program structure.

The primary audience of the evaluation is the AAS CRP and its core partners, its governing bodies,

¹ See CGIAR (2015) Strategy and Results Framework 2016–2025, Draft for final consultation, p. 14 ff.

² The CGIAR Fund is a multi-donor, multi-year funding mechanism that provides funding to (i) CRPs through two "Windows"; Window 1 across CRPs as per Consortium decision and Window 2 to donor-specified CRP; and to (ii) donor-specified Centers through Window 3.

³ http://www.cgiarfund.org/sites/cgiarfund.org/files/Documents/PDF/CGIAR_evaluation_policy_jan2012.pdf

the Consortium and the Fund Council. The evaluation is also intended to be of interest to the broader community involved in AAS and in research on aquatic agriculture systems.

1.3 Evaluation scope

Given the long-term nature of agricultural research, the nature of this specific program, and the fact that AAS was operational for less than four years at the time of the evaluation, this evaluation is principally formative.⁴ The evaluation team considered program assumptions, design principles and implementation choices to be critically important aspects of the evaluation. There was also a more summative element to the evaluation in that the evaluation team was asked to look at research that was done in the run up to AAS (the so-called “legacy” or “transferred” research). Considering that approximately half of AAS funds come from Windows 1 and 2 (W1/W2) and the other half from bilateral projects, the evaluation was designed to cover activities conducted under both types of funding.

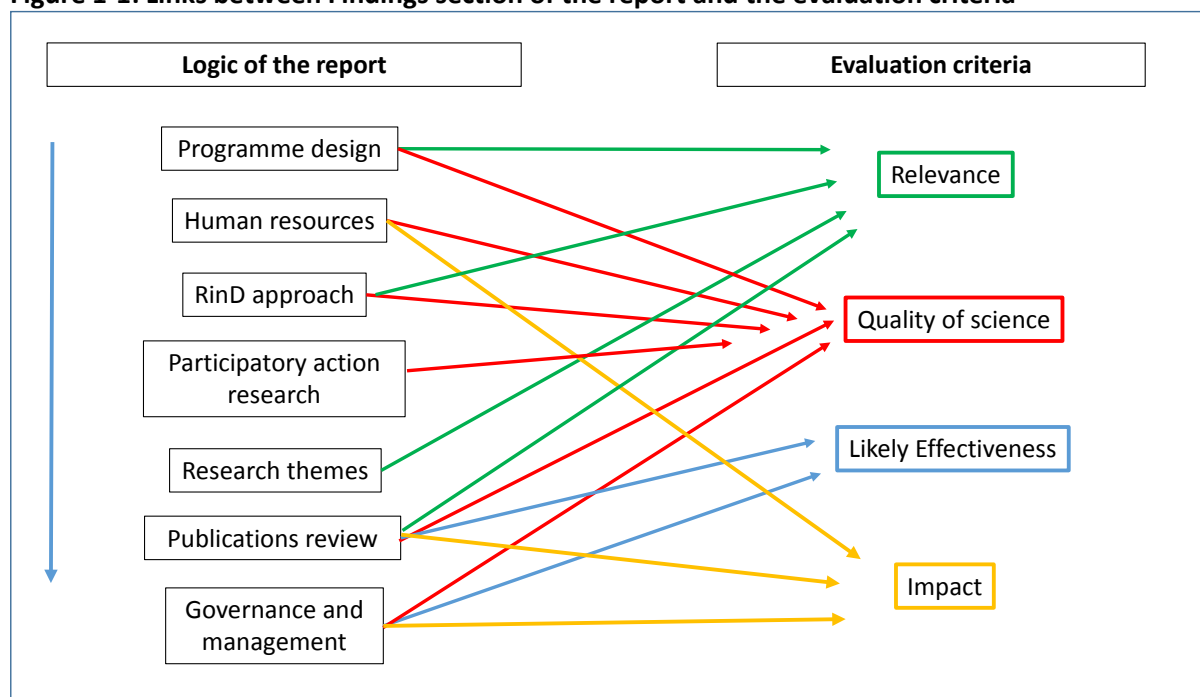
1.4 Structure of the evaluation report

The document proceeds as follows. The remainder of this Chapter presents a brief introduction to AAS. The next Chapter provides a short preface to the evaluation approach, and then presents the evaluation team and describes the methodology. Chapter 3 presents the findings of the evaluation, addressing in turn program design; financial and human resources; the operationalization of the *Research in Development* (RinD) approach; participatory action research; the research themes; partnerships and capacity building; and governance and management. The logic of this structure, regarding the presentation of the evaluation results, is to bring together the evaluation team’s findings and assessment in a single comprehensive Chapter. Because governance and management are essential determinants of program performance, this dimension is also included in Chapter 3. Chapter 4 presents an overall assessment based on the main evaluation criteria – of relevance, effectiveness and likely impact, and quality of science – and a synthesis of the evaluation team’s recommendations.

Figure 1-1 illustrates how the different components of Chapter 3 (Findings) address the main evaluation criteria.

⁴ The IEA Glossary of Evaluation Terms defines the terms formative and summative as follows: “Formative evaluation focuses on program/project implementation and is improvement-oriented”. “Summative evaluation focuses on assessing worth of the program/project lessons learnt (results and consequences), for instance to enable assessments with respect to change, continuation or enlargement of the program/project.” (CGIAR Standards for Independent External Evaluation, 2015, p. 21).

Figure 1-1: Links between Findings section of the report and the evaluation criteria



Source: Evaluation team.

1.5 The Aquatic Agricultural Systems CRP – An Overview

The Aquatic Agricultural Systems CRP (AAS, also referred to here as “the program”)⁵ is one of three “systems” CRPs (initially referred to as CRP 1.3) that emerged from the CGIAR reform process. The proposal and budget were approved by the Fund Council with light adjustments in July 2011⁶ (henceforth “the proposal”), after which AAS formally initiated activities. The program is led by WorldFish Center, with Bioversity International and the International Water Management Institute (IWMI) as main CGIAR partners. Table 1- 1 provides a timeline of the evolution of the program, featuring major events.

⁵ For clarity we use AAS and “the program” to refer to the CRP, and “aquatic agricultural systems” to refer to the systems that are its focus. In some documents AAS itself uses the both “AAS” and “aas” to refer to these systems.

⁶ CGIAR Research Program 1.3. Harnessing the Development Potential of Aquatic Agricultural Systems for the Poor and Vulnerable, Proposal, March 2011.

Table 1- 1: Evolution of AAS (selected events)

Date	Event
2010	
2010	First call for CRP proposals
Jul 2010	1 st CRP 1.3 Global design workshop, Penang
Aug 2010	2 nd CRP 1.3 Global writing workshop, Penang
Sep 2010	First version of CRP 1.3 proposal for internal revision
2011	
2011	AAS proposal submitted to the Fund Council
Jul 2011	AAS approved by Fund Council
Jul 2011	AAS begins operations
Oct – Nov 2011	Scoping in Western Province, Zambia Scoping in Bangladesh Scoping in Malaita Province, Solomon Islands
Nov 2011	Establishment of Program Oversight Panel (POP)
Dec 2011	Establishment of Program Leadership Team (PLT)
2012	
Jun 2012	Publication of "Gender Strategy Brief: A Gender Transformative Approach to Research in Development in Aquatic Agricultural Systems"
Oct 2012	International dialogue on "Building Coalitions, Creating Change: An Agenda for Gender Transformative Research in Development"
May 2012	Publication of "Rollout Handbook v1.0"
2013	
June 2013	Presentation of Theory of Change to donors at Montpellier
2014	
Jan 2014	6-month extension proposal/POWB 2014 submitted
May 2014	6-month extension approved by FC
Feb 2014	Publication of "Monitoring and Evaluations Strategy Brief"
April 2014	2015-16 Extension Proposal submitted to CGIAR Consortium Office
Aug 2014	Revised Extension Proposal submitted to CGIAR Consortium Office
Nov 2014	12 th FC meeting approval of the 2015-16 Extension Proposal with an amendment of 25% reduction to the W1/2 funding

Source: Evaluation team

As set out in the proposal, AAS has as the overall goal “to improve the well-being of AAS-dependent people”, with aquatic agricultural systems being defined as “agricultural systems in which the annual production dynamics of freshwater and/or saline or brackish coastal systems contribute significantly to total household income.”⁷ The program is framed by the "paradox of high ecological productivity [of aquatic agricultural systems] mingled with high prevalence of poverty, vulnerability and inequity" (henceforth, “the paradox”). The proposal also suggested that past research investments in these systems focused on single components, and were thus in tension with the integrated livelihoods in these systems.⁸ AAS seeks to promote increased productivity of aquatic agricultural systems; improved access to services and markets; improved resilience of marginalized people; reduced gender disparities; better policies and institutions; and improved knowledge sharing and learning.

⁷ See original AAS proposal, page 1, footnote a

⁸ AAS Proposal (2011), p. 1.

These objectives form the basis of the original six (now seven) research themes and also underpin the seven AAS-specific Intermediate Development Outcomes (Table 1-2). AAS was designed to deliver both broadly relevant knowledge, international public goods (IPGs), and place-based development outcomes.

Table 1- 2: AAS research themes and Intermediate Development Outcomes (IDOs)

<p>Research themes</p> <ol style="list-style-type: none"> 1. Sustainable increase in system productivity 2. Equitable access to markets 3. Social-ecological resilience and adaptive capacity 4. Gender equality 5. Policies and institutions to empower AAS users 6. Knowledge sharing, learning and innovation 7. Nutrition (added in the 2015-2016 extension proposal) <p>Material IDOs</p> <ol style="list-style-type: none"> 1. Income: Increased and more equitable income from agricultural and natural resource management and environmental services earned by low income value chain actors in aquatic agricultural systems 2. Nutrition: Improved diet quality of low income households in aquatic agricultural systems, especially by nutritionally vulnerable women and children 3. Future Options: Greater resilience in aquatic agricultural systems for enhanced ecosystem services <p>Enabling IDOs</p> <ol style="list-style-type: none"> 1. Productivity: Improved productivity in aquatic agricultural systems (water and total factor productivity) 2. Gender & Empowerment: Increased control of assets, inputs, decision-making and benefits by women and other marginalized groups in aquatic agricultural systems 3. Capacity to innovate: Increased capacity to innovate within low income and vulnerable rural communities in aquatic agricultural systems 4. Capacity to adapt: Increased capacity to adapt to environmental and economic variability, shocks and longer term changes in low income communities in aquatic agricultural systems
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Source: 2015-2016 extension proposal.

AAS research activities are based principally in five countries that present examples of what the program has identified as three major aquatic agricultural systems (Table 1-3). WorldFish was active in all of these countries before the advent of AAS, although not necessarily in the specific areas; and in some countries, such as Bangladesh and the Solomon Islands, for 26 and 29 years respectively.

Table 1- 3: Main AAS research sites

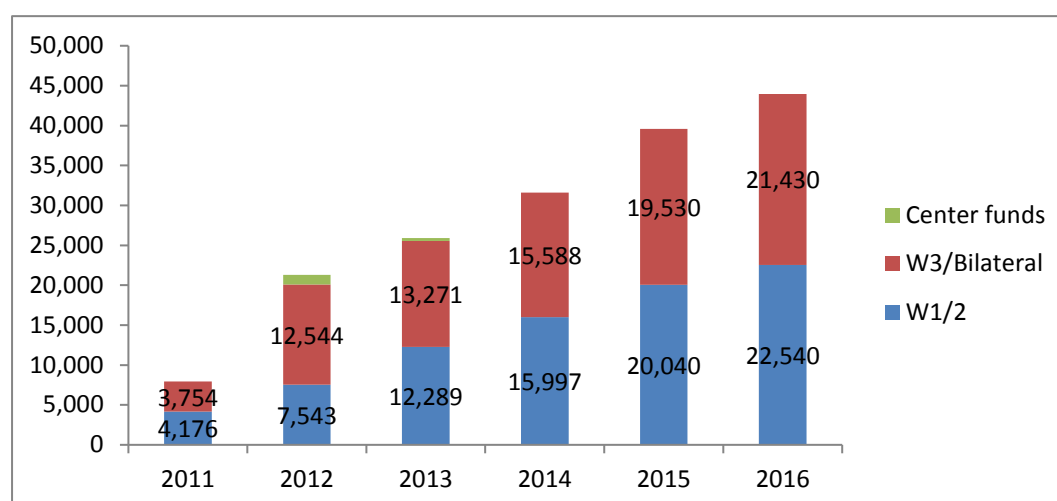
Country	Hub	Aquatic agricultural system	AAS activities initiated
Bangladesh	Southern Polder zone	Asian Mega deltas	Oct-Nov 2011
Cambodia	Tonle Sap	Asian Mega deltas	Jan 2013
Solomon Islands	Malaita and Western Provinces	Asia-Pacific islands	Oct-Nov 2011
Philippines	Visayas-Mindanao archipelago	Asia-Pacific islands	Jan 2013
Zambia	Barotse floodplain	African inland	Oct-Nov 2011

As further detailed in Section 3.2, approximately 100 Full Time Equivalent (FTE) staff members work on AAS, including program leaders and managers, researchers, administrators and others, the vast majority of whom are employed directly by WorldFish.

In the first 2.5 years of implementation (June 2011 to December 2013), AAS received and spent around USD 54 million, somewhat above what was projected in the proposal. Most of the total expenditure (96 percent) was through WorldFish, while the remainder was through IWMI and Bioversity. Figure 3-1 shows the expenditures for 2011 to 2013 and the budget estimates for 2014 to 2016. W1/W2 funding in the first 2.5 years accounted for 42 percent of the budget. The largest bilateral donors have been USAID, IDRC and ACIAR. CRP Until the end of 2013, the expenditure for “Management and Coordination accounted for 33 percent of the total expenditures. This figure includes expenditure for partnership, communications, science leadership and support in addition to governance and management.

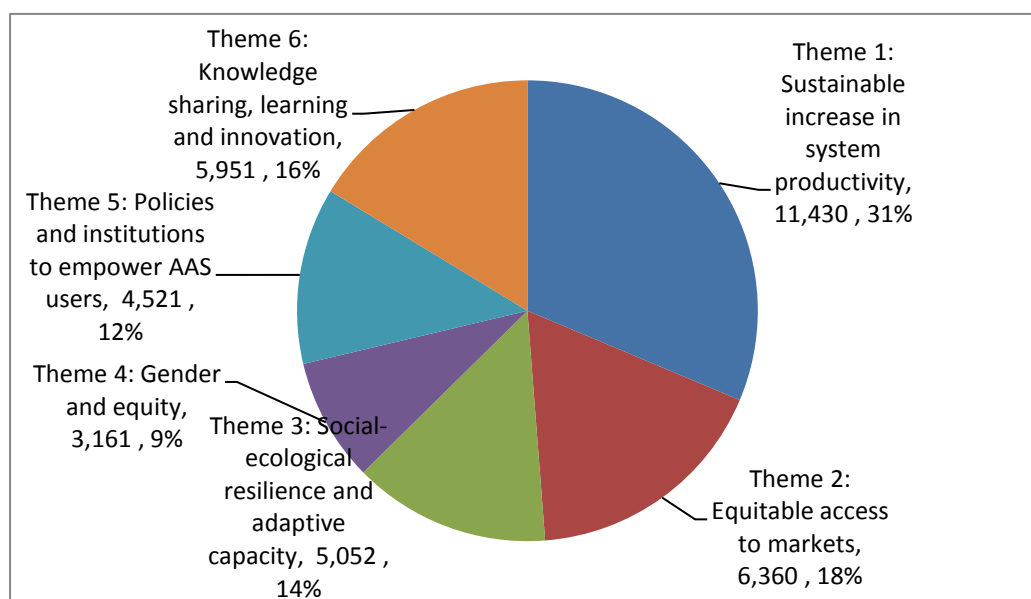
Figure 1-2 displays the distribution of funds to the different research themes within AAS. Theme 1 (Productivity) received the largest share, accounting for almost one third of AAS expenditure.

Figure 1-2: AAS Expenditures (2011-2013) and expected budget (2014-2016) in USD thousands



Source: Financial Reports 2012 and 2013 (L101), POWB 2014, Extension Proposal 2015-2016.

Figure 1-3: Expenditure (from mid-2011 to 2013) per Theme*



Source: AAS Financial Reports 2012 (L101) and 2013 (L131)

Note: This figure does not include management and coordination expenditures.

Table 1- 4 shows how funding is distributed over the different flagships. In 2014, AAS activities funded through W1/W2 were based on 78 Activity Plans. W1/W2 funds was distributed across all research themes and hubs, and were particularly important for activities, hubs and themes that were not supported by bilateral projects (e.g. the roll-out activities, the Gender Equality and Knowledge Sharing and Learning themes, and the Zambia hub). Zambia received by far the largest share of W1/W2 funding, apart from the global flagship.

The largest Flagship overall is Global Science and Scaling, which accounts for about 46 percent of W1/W2 funds. According to AAS management, a substantial share of the funding under this Flagship is spent on design, implementation and analysis of research in the geographical flagships.

Table 1- 4: Overview of AAS Flagship Projects Portfolio (figures in USD thousands)*

Flagship project	Number of Activity Plans / Projects			Budget			
	W1/W2	Bilateral	Total	W1/2	Bilateral	Total	%
1 – Bangladesh	7	9	16	1.417	6.593	8.010	25
2 – Cambodia	6	6	12	1.029	1.126	2.155	7
3 – Philippines	5	5	10	1.052	1.999	3.052	10
4 – Solomon Isl.	5	6	11	1.099	1.250	2.350	7
5 – Zambia	6	2	8	4.080	0.800	4.880	15
6 – Global	7	21	28	7.572	3.838	11.410	36
TOTAL	36	49	85	16.252	15.607	31.860	100

Source: AAS Project database, as of Aug 2014.

The two projects which are mapped to SOL and GLO Flagships are counted in SOL for this overview.

In 2014, there was a total of 49 bilateral projects mapped to AAS, all of which are led by WorldFish of which several were mapped to different Flagship projects. In contrast to other CRPs, the participating centers have not mapped any of their bilateral projects to AAS. There are a number of “legacy projects” which are a continuation of, or which build on, research undertaken by World Fish in the pre-AAS period. Some of the current bilateral projects were designed before the formal start of AAS. Almost 90% of bilateral projects have budgets less than USD 250,000: there are only seven projects with budgets of more than USD 500,000 (Table 1- 5).

Table 1- 5: Bilateral projects larger than USD 500,000 (figures in USD thousands)

Project Title	Budget	Start	End	Funder
Expansion of Cereal Systems Initiative for South Asia (CSISA) in Bangladesh	0.556	2010	2015	IRRI
Feed The Future (FTN): Aquaculture for Income and Nutrition (AIN)	4.750	2011	2016	USAID
Rice field fisheries improvement project	0.609	2012	2016	USAID
Pacific Fisheries	1.327	2013	2017	ACIAR
Improving research and development of Myanmar's inland and coastal fisheries	0.670	2012	2016	ACIAR

Source: AAS Project database, as of Aug 2014. A small part of the Pacific Fisheries project is mapped to Solomon Islands

In the proposal, AAS is presented as an innovative and much needed departure from conventional or business-as-usual approaches to agricultural research. The proposal suggests that these approaches have yielded few benefits for poor and marginal people dependent on aquatic agricultural systems. It states that the “central hypothesis driving the program's approach” is that “the CGIAR can have greater impact on AAS by moving beyond the linear production model that has dominated much agricultural research and embracing a more integrated, innovative view of how to achieve development in agricultural systems.”

This is to be achieved through “an action research and partnership-driven approach to development that moves far beyond the view of development as a purely technical process, as well as the persistent views of development as charity.”⁹ Thus, AAS presented itself as a systems-oriented research program – focused on overarching development issues including livelihoods, systems productivity, transformational social change, sustainability and resilience – with an explicit commitment to action research. In subsequent documents, the term participatory action research (PAR) was introduced, and PAR is now a central tenant of much AAS research activity. The AAS view of PAR is described in Box 1-1.

⁹ AAS Proposal (2011), p. 7-8

Box 1-1: The AAS view of Participatory Action Research (PAR)

“PAR represents a departure from conventional disciplinary research characterized by a separation of researcher and researched. Within a PAR process, people in communities are recognized as experts in their own development process and as co-owners and active participants of the research and inquiry process, not passive subjects. This has a number of profound implications for the research process:

1. Co-ownership of research – people in communities and other stakeholders are involved in the research design including the research questions, the methods of inquiry and the analysis of data. The research questions and design are defined through a collaborative process between researchers and communities.
2. The hierarchy between researcher and researched becomes less, with researchers taking on the role of facilitators rather than extractors of data. This means that researchers need to acquire additional skills of facilitation to enable people in communities to articulate their views, concerns and priorities, to analyze and reflect on these, and deliberate on solutions and actions to address them, and to document and share the lessons elsewhere.
3. The research process is designed in such a way that allows for multiple voices within communities to be heard and to influence the analysis, deliberations and outcomes, with special attention to the most marginalized voices.
4. The dialogic method of inquiry that PAR employs, results in new understanding and raised awareness amongst both participants and researchers/ facilitators. This realization has the potential to transform relationships between participants, and between participants and facilitators, as prevailing norms, attitudes and behavior are critically questioned in deliberations on future paths.

PAR is best thought of as a cyclical or iterative process; each round of inquiry is followed by reflection and learning that informs the next round. Researchers plan for each stage of the engagement process with people in communities, act on the plan, observing and documenting how it went. Reflecting on the engagement activities is an important part of the learning process for researchers and participants. Reflection involves both interpreting the data generated as well as reflecting on the process of engagement. Lessons from both aspects of reflection support researchers as they prepare for the next round of engagement activities”

Source: Participatory Action Research in AAS Guide for Facilitators Part I: Background to PAR and AAS Section 1: Introduction and Overview of the PAR process in AAS Version 1 2014, p.8

There are numerous definitions and typologies of action research. As a reference for this evaluation, the following definition is used: “Action research (AR), sometimes called *participatory action research* (PAR), is a research framework that evolved from a number of different intellectual traditions. It can be defined as a kind of collective self-reflective enquiry undertaken by participants in social relationship with one another in order to improve some condition or situation with which they are involved. Thus, it is a highly collaborative, reflective, experiential, and participatory mode of research in which all individuals involved in the study, researcher and subjects alike, are deliberate and contributing actors in the research enterprise” (Berg, B. 2009. *Qualitative Research Methods for the Social Sciences*, 7th Edition, Allyn & Bacon, Boston etc, p. 247). Following Lewin, who is widely acknowledged as having coined the term “action research”, action research approaches typically involve a spiralling of steps, each of which is composed of some type of planning, action, and evaluation. p. 248). Berg (2009) distinguishes three modes of action research: (1) a technical / scientific / collaborative mode, (2) a practical / mutual / collaborative mode, and (3) an emancipating or empowering / enhancing / critical science mode. The original AAS proposal suggested that the program aims to pursue the third mode, but as the program developed, all three modes are being applied.

The program also introduced Research in Development (RinD) as its major approach to research.¹⁰ The suggestion is that through RinD agricultural research is embedded in on-going development actions and processes, and adds value by leveraging potential for innovation. RinD is operationalized through PAR within the geographically defined hubs. The action research promoted by AAS emphasizes engagement with farmers, fishers, NGOs and government institutions in each hub to identify the main challenges and thereby research priorities, and in subsequent research activities.

It is important to note that the ambition of AAS extends well beyond the boundaries of aquatic agricultural systems. The original proposal states that: “Pursuing our work in this way will challenge the CGIAR to move beyond traditional circles and change the way we do much of our research. By emphasizing approaches that call for research *in* development — rather than research *and* development or research *for* development — we will pursue a conscious change in emphasis and mind set, one that can help the CGIAR to conceive and deliver our research differently. We therefore envisage CRP 1.3 as an exemplary vehicle for implementing the fundamental changes in ways of working that the CGIAR reform process foreshadowed and the Global Conference on Agricultural Research for Development (GCARD) has endorsed.”¹¹

The strong focus on RinD was not seen to exclude the use of conventional research approaches. The original proposal already stated that action research provides “a platform *upon which more traditional agricultural research for development still has an important contribution to make* but will do so much more effectively because of stronger engagement with the development context that CRP 1.3 [AAS] will foster” [emphasis added].¹² The Extension Proposal also makes it clear that in the hubs, both RinD and conventional research are conducted and expected to influence each other.¹³

A program theory of change (TOC) was presented in the proposal (Figure 1-2). It identifies constraints, objectives, hypotheses of change, and outcomes and impacts (income and asset building; resilience and adaptive capacity; and social, political and economic rights). A note accompanying this figure states: “The program recognizes a set of six broad constraints driving poverty and vulnerability in AAS. Looking at these constraints through the lens provided by our analysis of multi-dimensional poverty (income and asset poverty, vulnerability, marginalization), we identify six hypotheses describing possible pathways to remove these constraints. Each of these hypotheses in turn corresponds to one of the program’s six objectives.”

Impact pathways were later re-named scaling pathways and more clearly articulated, as shown in

¹⁰ Also see Chapter 3 of “Harnessing the development potential of aquatic agricultural systems for the poor and vulnerable. 2013 AAS Science Handbook” for a more complete articulation of the RinD. Others, including the Global Forum for Agricultural Research (GFAR) and the Forum for Agricultural Research in Africa (FARA), use the terms “agricultural research for development” (AR4D) and “integrated agricultural research for development” (IAR4D). The term “research in development” is also used by other CGIAR centers including ICRAF, but in different ways to how it is used by AAS (see e.g. Coe et al. (2014)).

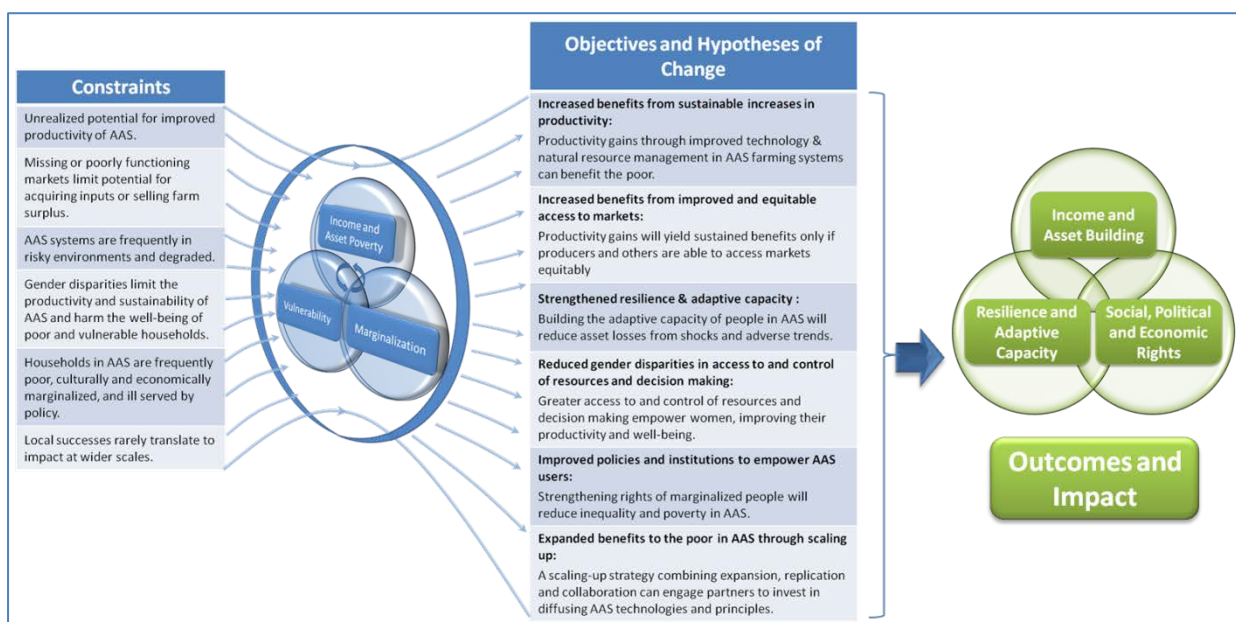
¹¹ AAS Proposal (2011), p. 1.

¹² AAS Proposal (2011), p. 7-8.

¹³ AAS Extension Proposal (2014), p. 3.

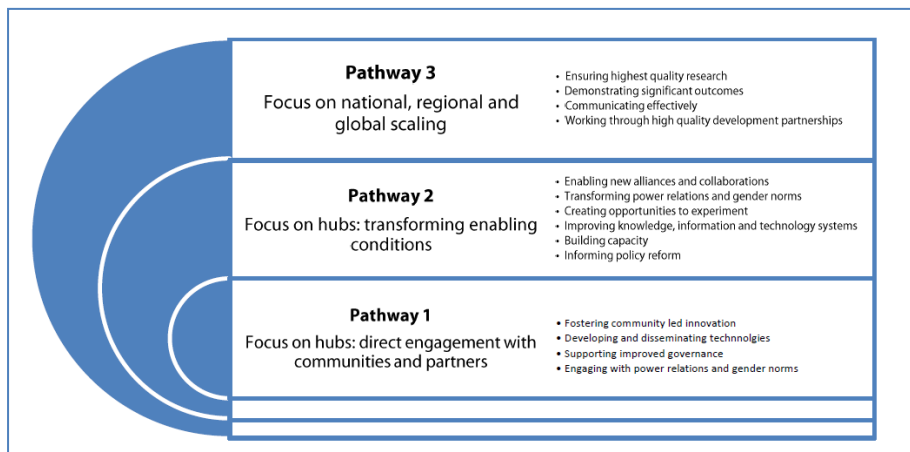
Figure 1-4). In the revised 2015-2016 extension proposal the presentation of the TOC and impact pathways had evolved still further (Figure 1-4).

Figure 1-4: Theory of change for AAS



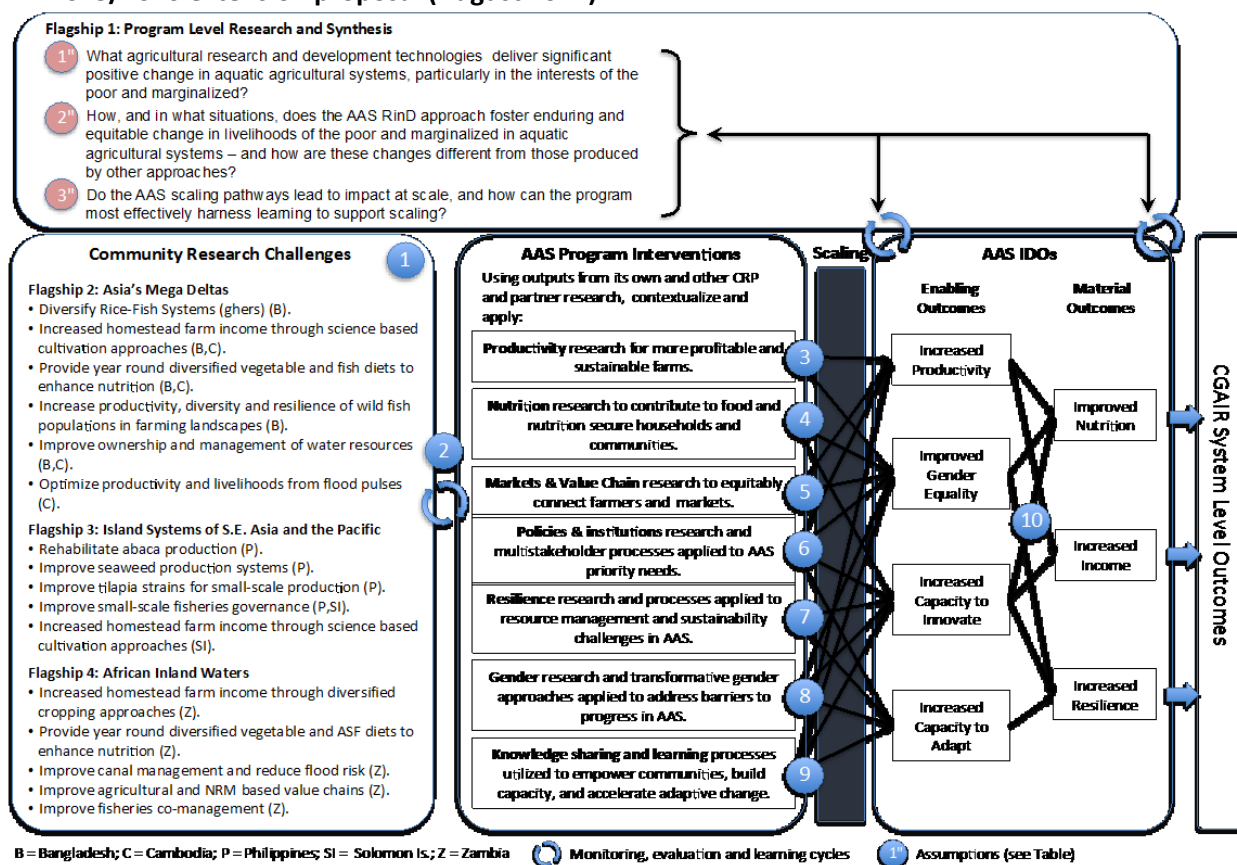
Source: AAS Proposal

Figure 1-5: AAS scaling pathways



Source: AAS Working Paper. Using theory of change to achieve impact in AAS

Figure 1-6: AAS summary impact pathways and theory of change as presented in the revised 2015/2016 extension proposal (August 2014).



Source: 2015-2016 extension proposal

2. EVALUATION PROCESS, APPROACH AND METHODOLOGY

2.1 Preface

There are four important considerations that informed the evaluation team's approach to its task. First, a significant challenge was the evolving nature of the AAS and the changing CGIAR context within which it operates and is funded. There are a number of important differences – in terms of language, emphasis, orientation and organization – between what was in the proposal that was approved in July 2011; what AAS looked like on the ground during the evaluation period; and what is in the 2015-2016 extension proposal approved by the Fund Council (FC) in November 2014 (henceforth “the 2015-2016 extension proposal”).¹⁴ The evaluation team used the proposal as an important starting point, but the evaluation very much took account of how the program has evolved over time.

Second, it is important to recognize that the CGIAR change process did not end with the commissioning of the CRPs, and subsequent changes within the CGIAR and mandates by the CGIAR have had a direct impact on the CRPs, including AAS. There have, for example, been a number of reviews – of governance and of the reform process more generally¹⁵ – that continue to impact AAS. The evaluation of AAS took place at a time of budget cuts within the CGIAR and in the run-up to the 2nd call the CRPs (of which the 2015-2016 extension proposals were a part), which inevitably created increased levels of uncertainty.

Third, it is not appropriate to think of or to evaluate AAS as an entirely new research program that started with a clean slate in July 2011. While there were certainly important elements of the program that were new, there was also considerable continuity with earlier research and development work undertaken by WorldFish, including continuity of personnel, research themes, methods, countries, communities, and partners. The interplay of this continuity with the new elements introduced through AAS is, by necessity, an important focus of the evaluation.

Finally, it is appropriate that the evaluation of a systems research program itself takes a systems perspective. In so doing some of the key elements that the evaluation team broadly considered included CGIAR and WorldFish history; the pre-AAS commitments, relationships and networks of WorldFish; organizational and individual incentives; ideas; and specific drivers (e.g. the CGIAR reform process, the need to articulate and address IDOs and be more development relevant). Taken together these can help to explain why certain design and implementation choices were made, and outcomes observed.

¹⁴ CGIAR Research Program on Aquatic Agricultural Systems Extension Proposal 2015-2016, 22 August 2014

¹⁵ CGIAR Mid-Term Review 2014, Delivery at the CGIAR (2014), CGIAR Governance Review Phase 1 and Phase 2 (2013), etc.

2.2 Evaluation process

The evaluation of AAS took place in four sequential phases, starting in February 2014.¹⁶ In the preparatory phase (until May 2014), the team was recruited and the TOR were developed.¹⁷ In the Inception phase (June 2014-August 2014), the team developed the evaluation approach and methodology, conducted preliminary analyses of project documents and wrote the Inception Report.¹⁸ The Inquiry Phase ran from September to December 2014 and included country visits, a visit to WorldFish Headquarters, and stakeholder interviews. The Reporting phase followed, which included a team meeting in Rome in February 2015 and feedback sessions with the Reference Group and AAS management. Both the Inception Report, which developed the evaluation methodology, and the Evaluation Report were finalized taking feedback from the Reference Group and AAS management into account. The draft Evaluation Report was also reviewed by two independent reviewers, whose comments and suggestions were also taken into account. More detail on the evaluation process is given in Annexes D-G.

2.3 Evaluation team

The evaluation team included six members: Professor Regina Birner (joint team leader), Dr James Sumberg (joint team leader), Dr Ram Bhujel, Dr Eva M. Rathgeber, Professor Nadarajah Sriskandarajah, and Dr Felix von Sury. As shown in the profiles of team members in Annex B (Vol. II), the team combines different areas of expertise relevant to AAS. The team was supported by Sophie Zimm (IEA), and the evaluation was managed by Dr Sirkka Immonen (IEA).

2.4 Evaluation approach

The evaluation approach was developed to address the specific nature of the AAS program, taking the program's strong focus on action research into account. It can best be described as a "case-based, multi-level and mixed methods" approach. Case studies formed the essential building blocks of the evaluation. Two types of cases were distinguished: "roll-out" cases and "bilateral project" cases. The roll-out cases refer to the hub-based efforts to implement the RinD approach as laid out in the program's Roll-out Handbook.¹⁹ Bilateral project cases, as the name implies, refer to individual bilaterally funded projects that are "mapped" to AAS. They account for a considerable share of the program's funding and activities and it is therefore important to understand how they function.²⁰

¹⁶ More detail on these phases and the schedule of evaluation activities is given in Annex A, which also contains information about the Evaluation Reference Group.

¹⁷ http://www.iea.cgiar.org/sites/default/files/AAS%20Evaluation%20ToR_Jun2014.pdf

¹⁸ AAS evaluation inception report (<http://www.iea.cgiar.org/sites/default/files/AAS%20Inception-Report-FINAL-OCT-2014.pdf>)

¹⁹ CGIAR Research Program on Aquatic Agricultural Systems: Roll-Out Handbook

²⁰ As was explained in the Inception Report, case studies are a research design that is widely used in the social sciences, health sciences and other disciplines. The goal of the case study approach is to understand a phenomenon by conducting an in-depth and holistic study of one or more carefully selected cases. The case

The case studies were combined with three other components: a staff survey, a publications assessment, and interviews with management, staff and stakeholders.

This case-based, multi-level and mixed-methods approach was developed to allow the evaluation team to strike an appropriate balance between the goals of (i) providing guidance for the stakeholders in the CGIAR system in terms of both accountability and future decision making, and (ii) supporting AAS leadership, management and staff by creating opportunities for learning and identifying options for improvement. In developing the assessment tools and interpreting the results, the evaluation team explicitly acknowledged that there are different epistemological stances across disciplines and research communities regarding what constitutes evidence; what methods are appropriate to generate and analyze evidence; and what inferences and insights can be drawn from different types of evidence and analysis. The evaluation approach also reflected the requirements of the Independent Evaluation Arrangement (IEA) for the evaluation of CRPs²¹, which respond to the needs of the funding agencies and the principles of evaluation in international organizations.²²

Given the CGIAR's ambition to deliver international public goods²³ and contribute to development outcomes, the evaluation team considered it important to be clear about its understanding of and approach to IPGs (Box 2-1).

study approach involves more than just examining a single case or situation (cf. Baxter and Jack, 2008). In particular, it entails studying the selected cases (i) in their specific contexts, (ii) applying different disciplinary perspectives, and (iii) using different methods of inquiry.

²¹ As stated in the "Evaluation Policy, Guidelines and Standards", see www.iea.cgiar.org

²² See for example, UNEG, 2005. "Standards for Evaluation in the UN System". United Nations Evaluation Group (UNEG)

²³ As per the revised SRF, 2015.

Box 2-1: International Public Goods (IPGs) and agricultural research

The concept of “international public goods” (IPGs) is widely used to identify the activities for which organizations have a comparative advantage and for which they should receive public funding. Morrissey et al. (2002) define an IPG, as “*a benefit providing utility* [emphasis added] that is in principle available to everybody throughout the globe” (Morrissey et al., 2002). The idea that the CGIAR should be considered as a provider of IPGs goes back more than three decades (Sagasti and Timmer, 2008, p.7). Harwood et al. (quoted in CGIAR Science Council, 2006, p.7) defined IPGs in the context of the CGIAR as “research outputs of knowledge and technology generated through strategic and applied research that are applicable internationally to address generic issues and challenges consistent with CGIAR goals.” There has been an extensive debate in CGIAR about the concept. One important feature of the debate was the question of a potential trade-off between focusing on IPGs by conducting strategic and applied research, and achieving impact on the ground by focusing on country-specific participatory-adaptive research and extension (cf. CGIAR Science Council, 2006). The debate remains unresolved: recent CGIAR strategy documents do not provide much guidance on this topic. The 2011 CGIAR Strategy and Results Framework mentioned the term IPG only once without elaborating it, and the 2015 Draft Strategy (p. 14) defines the term only vis-à-vis private sector research.

The IPG criterion has played an important role in some earlier evaluations of the CGIAR. For example, an evaluation by the Independent Evaluation Group (IEG) of the World Bank estimated the percentage of CGIAR project outputs that could be considered global public goods versus national public goods with or without spillovers (see Sagasti and Timmer, 2008). The IEA Glossary of Evaluation Terms suggests a different approach to IPGs by stating that, in the context of the CGIAR, the term refers to “*issues* [emphasis added] that are deemed to be important to the international community; and typically cannot, or will not, be adequately addressed by individual countries or entities acting alone.”

Taking this long-standing debate on IPGs in the CGIAR and the nature of AAS into account, the evaluation team considered that IPG’s produced by AAS would likely take one of the following forms:

- New knowledge of wide interest and/or broad applicability related to CGIAR goals: such knowledge may provide new insights into an important or persistent paradox or question; develop or strengthen concepts and/or theory that open new avenues for analysis; re-frame a problem or debate in a way that opens up new avenues for understanding; and push a debate to higher level with new empirical research; and
- Technical, institutional or methodological innovations that have been demonstrated to contribute to reaching CGIAR goals and are (or are likely to be) relevant in other countries, regions, situations or contexts.

New knowledge and technical, institutional and methodological innovations can be made available in different forms. The results of agricultural research can be published as research papers, reports, policy briefs and manuals. Data sets that others can use are also an IPG. Importantly, agricultural research can generate technologies, such as crop varieties or germplasm sources or aquaculture technologies. These may be dealt with in publications, as a strategy to make them known and establish their novelty, but the IPG is the technology itself. The same applies to institutional innovations, such as, for example, new forms of agricultural insurance. The fact that the results of CGIAR research are published in an international, peer-reviewed journal can be seen as one (albeit imperfect) indicator that the research has made a contribution to broader knowledge and understanding.

CGIAR Science Council, 2006: Positioning the CGIAR in the Research for Development Continuum, Rome. Morrissey, O., te Velde and, D. W. and Hewitt, A. 2002. “Defining International Public Good: conceptual issues” in Marco Ferroni and Ashok Mody (eds), “International Public Goods: Incentives, Measurement and Financing”, Washington, DC: The World Bank; Sagasti F. and Timmer, V. 2008. “An Approach to the CGIAR as a Provider of International Public Goods.” Lima and Vancouver.

As outlined in the Inception Report the evaluation was structured around two sets of questions. The first was a set of generic evaluation questions that refer to the standard criteria applied across all CRP evaluations: relevance, quality of science, likely effectiveness, impact and sustainability, gender, capacity development and partnership, and aspects of program governance and management. The second set of questions was more specific to AAS (Box 2-2).

Box 2-2: Specific evaluation questions regarding the AAS approach

1. How does the AAS approach to research draw on earlier and on-going work, especially participatory action research approaches, from inside the CGIAR and elsewhere?
2. What progress has been made so far in developing and implementing the AAS approach to research?
3. What are the challenges faced while implementing the AAS approach and are there any missing links or actions, which could help to make the AAS approach more effective?
4. To what extent is the AAS approach better suited than other research approaches to meet the challenges faced by people living and working in aquatic agricultural systems? To what extent is it better suited to reach marginalized groups and women and to address the inequities they face?
5. Is the AAS approach to research, as it is being implemented in the various hubs, likely to deliver both international public goods and the identified IDOs?
6. What are the comparative advantages and the added value of the CGIAR via AAS in developing and implementing this approach to research in aquatic agriculture systems?
7. To what extent is the AAS approach a model for other CGIAR research programs, especially with regard to the CGIAR's stated aim of moving from a "supply-driven" to a "demand-driven" mode of research?
8. How do partners and networks understand the AAS approach and its implementation?

Source: AAS Evaluation Inception Report.

2.5 Evaluation methods

This section provides a brief overview of the methods used during the evaluation. More details are provided Annexes D-G.

2.5.1 Case studies of roll-out activities

The aim of the case studies was to provide insight into the RinD approach and its interplay with the research themes. Four roll-out cases were selected:

- Bangladesh: Southern Polder Zone (Khulna) Hub
- Cambodia: Tonle Sap Hub
- Zambia: Barotse Hub
- Solomon Islands: Malaita Hub and Western Hub

In selecting these cases the goal was to cover the three types of aquatic agricultural systems considered by AAS (Bangladesh and Cambodia for the mega deltas of Asia; Solomon Islands for the island systems of Southeast Asia and the Pacific; and Zambia for Africa's inland waters). Moreover, the intention was to include countries with substantial "legacy research" (Bangladesh and Solomon Islands), as well as one "second generation" roll-out case (Cambodia). The methods used for the case

studies are further described in Annex D. They included an intensive review of documents, interviews and discussions with program staff and stakeholders, and community visits during which individual and group discussions were conducted and observations made. Special attention was paid to assessing research design and methods; interactions between program staff, communities and partners; and, as far as possible, dissemination activities and results.

As can be derived from the detailed time schedules in Annex D, the time spent by the team members during the field visits included meetings with project staff, meetings with counterparts and partners at national and hub levels (which were often conducted in parallel by different team members), and community visits. In addition, travel time to the field was used for interviews with staff. In all four case study countries, debriefing sessions were held with project staff at the end of the field visits to share insights (See Annex D for details).

2.5.2 Case studies of bilaterally-funded projects

The following four bilaterally-funded projects were selected:

- Bangladesh: Aquaculture for Income and Nutrition
- Cambodia: Rice field fisheries improvement project
- Zambia: Harnessing Aquatic Agricultural Systems for Livelihoods and Nutrition Security in Northern Province Zambia
- Solomon Islands: Pacific Fisheries

The goal was to select larger projects and to allow for field observation and discussion with program staff during the roll-out case study visits to supplement a review of documentation. In Zambia, however, field observation was not possible because the selected bilateral project was not being implemented in the same area as the roll-out case. For all bilateral projects, project proposals, reports and other documents were available. A template was developed to guide the assessment (Annex E in Vol. 2).

2.5.3 Assessment of publications

The evaluation team formally reviewed 83 research outputs, including journal articles, book chapters, working papers and reports. All of the publications reviewed had, in principle, already been through some kind of peer review process. The publications were selected using a stratified random sampling approach. More detail on the selection procedure is given in Annex F in Vol. 2. A standardized assessment format was utilised, with a focus on quality and relevance to AAS, and also links to key program concerns like gender and PAR. The report on this analysis is presented in Annex F.

It is important to note that over the course of the evaluation, many other documents were read including manuals, policy briefs and unpublished drafts.

2.5.4 Staff survey

To create space for all staff members to reflect on their experiences within the program, and to contribute their views and insights to the evaluation, a staff survey was conducted. An internet-based questionnaire was sent to all AAS staff involved in research and technical activities (120 in total), and selected individuals in collaborating centers and partners. The questionnaire was essentially the same as that used in other CRP evaluations. In total 91 individuals completed the survey. Selected results from this survey are integrated into the main report.

2.5.5 Interviews

In addition to the interviews conducted with AAS staff, community members, partners and others during the roll-out case studies, two other sets of interviews were held. One set was conducted with AAS management, research theme leaders and staff members. In addition to several interactions by skype, a one-day seminar was held in Bangladesh involving the entire evaluation team, AAS management and research leaders. The co-team leader and one team member visited WorldFish HQ in Penang for three days of interviews with research management and staff, including administrative staff. These interviews complemented the extensive set of interviews held with AAS research leaders and staff in the countries visited for the case studies, where the majority of AAS staff members are located.

Another set of interviews were held with stakeholders, partners and experts to deepen insights and address questions that arose from the other components of the evaluation. Interviewees included members of AAS and CGIAR governing bodies; partners and funders of AAS; leading academics with insights into AAS research; and long-term members and observers of the CGIAR system who are particularly familiar with the history of action research or comparative approaches in the system. In total 173 semi-structured interviews were completed. A list of people interviewed is presented in Annex H in Vol. 2.

2.6 Propositions and Assumptions of the Evaluation

The evaluation was based on a number of propositions and assumptions, which are specified in Box 2-3.

Box 2-3: Propositions and assumptions of the evaluation

<p>Proposition 1: On the comparative advantage of the CGIAR</p>	<p>This evaluation is based on the proposition that the CGIAR has some comparative advantage CGIAR vis-à-vis national research or development organizations to generate knowledge that adds to already existing global knowledge and that is applicable in other locations that the specific location where the knowledge was generated (referred to as “broadly relevant knowledge” in this report). The evaluation team acknowledges that it is justified to conduct research and development activities that solve local people’s problems without adding to global knowledge or without being applicable elsewhere. However, the evaluation is based on the assumption that it is more cost-effective and sustainable to fund national research and development organizations rather than the CGIAR for this purpose. This assumption underlies the evaluation’s focus on the so-called International Public Goods (see Box 2-1).</p>
<p>Assumption 1: On epistemology</p>	<p>The evaluation acknowledges that epistemological assumptions differ between and within disciplines. One relevant epistemological distinction is between nomothetic explanations, which assume that it is possible to discover laws, regularities or principles that can be applied to multiple cases, and ideographic explanations, which assume that each case is singular and should be treated as such. Related to Proposition 1, this evaluation is based on the assumption that nomothetic explanations are possible. This does not imply a “one-size-fits all” approach, but leaves room for the possibility to generate insights from specific cases that are relevant for other contexts. One could think of an alternative evaluation scenario, which is based on the ideographic assumption, e.g., the assumption that every case (e.g., every community) is so unique that insights generated in one community are not relevant for another. In such a scenario, some of the essential conclusions from this evaluation would not apply (e.g., the criticism regarding the lack of engagement with the existing literature and existing experience). This scenario was not developed because the evaluation considers the ideographic assumption to be incompatible with the very nature of the CGIAR.</p>
<p>Proposition 2: On the importance of reviewing existing knowledge</p>	<p>The evaluation team acknowledges that there are inductive research methods, such as Grounded Theory, which do not start with an analysis of existing knowledge. Otherwise, the widely accepted practice of starting with a review of the existing literature and identifying knowledge gaps, open questions and contested issues before setting out a research agenda has much to recommend it. This approach is fully compatible with an action-oriented research agenda (PAR) that focuses on community needs.</p>

3. FINDINGS

This chapter presents the findings of the evaluation. It starts with a review of the program design, drawing on the proposal and other key documents, and considering change over time. An analysis of allocation of financial resources and human resource capacity follows. Findings regarding the roll-out process in the hubs, the bilateral projects, and PAR are then presented. Next, research conducted under the different themes is discussed, before dealing with partnerships, program governance and program management.

3.1 Program Design

This section speaks primarily to questions about relevance, as well as questions about the uniqueness of the program. The evaluation team drew evidence from its extensive review of the program's proposals and other documents, interviews, its knowledge of other relevant literature and observations made during the field visits.

3.1.1 Framing

As indicated in the introduction, AAS is one of the three “systems CRPs” that were created as part of the CGIAR reform process. As presented in the proposal, the program revolved around six big ideas:

- The concept of “aquatic agricultural systems”, which need to be researched from a systems perspective;
- the “paradox” that these aquatic agricultural systems are characterized by high ecological productivity while at the same time featuring a high prevalence of poverty, vulnerability and inequity among social groups;
- the focus of conventional research on specific components of such systems, which does not address the multiple choices faced by men and women in such systems requiring integrated research approaches;
- the failure of conventional approaches to agricultural research to address the needs of poor and marginalized people in aquatic agricultural systems, and beyond; and
- the notion of and need for social transformation, in particular with regard to gender relations; and
- the empowerment and emancipatory potential of action research.

This combination of ideas defined AAS – and the RinD approach – and very strongly influenced how the program developed in the years following its initiation. With these ideas in place, a critical program design choice was made: in the first years AAS would place a strong focus on the development of the RinD methodology through a particular approach to hub-level and community engagement, following an assessment of the national context. This choice was very much in line with the program's bottom-up philosophy, that an empowering, potentially transformative, demand-driven research agenda could only emerge by meeting the communities and hub-level stakeholders

on their own ground and building mutual understanding, trust and capacity.

The cross-hub literature review on productivity-related interventions by Castine et al.²⁴, the cross-hub analysis on governance by Ratner et al.²⁵, the report by Béné and Teoh on the number of poor people living in aquatic agricultural systems²⁶, and the cross-hub review of gender equity²⁷, provided some further elaboration of different dimensions of aquatic agricultural systems.

Apart from these important outputs, the evaluation found that there has been relatively little other investment in strategic research that would enable a more comprehensive and at the same time more synthetic understanding of drivers, dynamics and outcomes within aquatic agricultural systems. The paradox and the proclaimed need to use integrated approaches, which provide a major justification for having a systems CRP focusing on aquatic agricultural systems, did not figure strongly in either the research questions presented in the proposal or those articulated in the revised 2015-2016 extension proposal. The research questions do not suggest that understanding or explaining the paradox or applying an integrated systems perspective is a central research focus. The ISPC already drew attention to this challenge in its comments on the original AAS proposal:²⁸ “A low emphasis on strategic or more fundamental research in particular is noticeable”. The evaluation team’s concerns about the limited role of strategic research are also reflected in the view of the AAS Director in his slide presentation to the evaluation team in late 2014, which contained the bullet point: “Strategic research – (low but increasing)”.²⁹

The proposal’s critique of conventional approaches to agricultural research and their failure to deliver benefits to poor people living in aquatic agricultural systems was another justification for AAS. This critique was rather generic and not developed any further, neither in the original proposal, nor in subsequent documents. Little attempt was observed to engage with the very significant literatures and experience – within ICLARM, WorldFish, the CGIAR and beyond – relating to farming systems research, participatory research or participatory technology development within agriculture.³⁰ The proposal appears to suggest that the previous work of WorldFish and the CGIAR,

²⁴ See Castine, S.A., Senaratna Sellamuttu, S., Cohen, P., Chandrabalan, D., and Phillips, M. (2013). “Increasing productivity and improving livelihoods in aquatic agricultural systems: A review of interventions”. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Working Paper: AAS-2013-30.

²⁵ Ratner, B. 2012. “Guidance Note: Collaborative Governance Assessment”. Working paper, AAS-2012-27; Ratner, B. D., P. Cohen, B. Barman, K. Mam, J. Nagoli, and E. H. Allison. 2013. Governance of aquatic agricultural systems: analyzing representation, power, and accountability. *Ecology and Society* 18(4): 59.

²⁶ Béné, C. and Teoh, S. J. 2014. “Estimating the numbers of poor living in aquatic agricultural systems”. Final Report dated April 2014. Unpublished.

²⁷ Weeratunge, N., Chiuta, T.M., Choudhury, A., Ferrer, A., Hüsken, S.M.C., Kura, Y., Kusakabe, K., Madzudzo, E., Maetala, R., Naved, R. T., Schwarz, A., and Kantor, P. (2012) “Transforming aquatic agricultural systems towards gender equality: a five country review”. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Working Paper: AAS-2012-21.

²⁸ ISPC comments on AAS proposal (21 Aug 2011)

²⁹ Bullet point on a slide from the AAS Director’s presentation to the Evaluation Team in Dhaka, 7 November 2014.

³⁰ See e.g. Lightfoot, C., P.T. Dalsgaard, M.P. Bimbao, and F. Fermin. 1993. Farmer Participatory Procedures for

based as it was on conventional research approaches, had delivered few if any benefits to poor people. There is a body of literature and a number of studies that contradict such a conclusion, including some by WorldFish.³¹ The evaluation team found only limited evidence that since the initiation of AAS these important literatures and bodies of experience had been engaged with systematically.³² A workshop was held at which earlier approaches and experiences were discussed, but to date, the planned review has not been completed, reportedly because of a lack of time and resources.

The idea that new approaches should be combined with conventional approaches to agricultural research, already indicated the 2011 proposal, is expressed more explicitly in the 2015–2016 extension proposal. It states: “Our approach is founded on the premise that we will most effectively improve the lives of poor rural people if we combine more traditional approaches for introducing technical innovations with approaches that both recognize social and ecological complexity, and foster social and institutional innovation. By bringing to bear the strengths of the CGIAR in biophysical and social sciences, and combining this with the strengths of partners, AAS aims to test the efficacy of this innovative approach and deliver significant development outcomes.”³³ As the three overarching research questions in the extension proposal indicate (Box 3-1), the comparison of different approaches is now being emphasized to a greater degree. This is a positive development as research along these lines should provide evidence of any comparative advantage of the AAS approach.

The goal of gender transformation remains central to AAS. This has been an area on which AAS has placed considerable emphasis, as is evident in the elaboration and promotion of the program’s Gender Transformative Approach (GTA).³⁴ As further detailed in the section on GTA below, the

Managing and Monitoring Sustainable Farming Systems. *Journal of the Asian Farming Systems Association* 2(2): 67-87; Brummett, R. E., and R. Noble. 1995. “Aquaculture for African smallholders” (Technical report 46). Manila, Philippines: International Center for Living Aquatic Resources Management; Andrew N., Béné C., Hall S.J., Allison E.H., Heck S. and Ratner B.D. 2007. “Diagnosis and management of smallscale fisheries in developing countries”. *Fish and Fisheries* 8: 277-240; Boso, D., Schwarz, A. 2009. “Livelihoods and Resilience Analysis in Two Community Clusters: the Funa’afou and Foueda Artificial Island communities, Lau lagoon, Malaita Province, Solomon Islands”. WorldFish Center Report to ACIAR, project FIS/2007/116).

³¹ See e.g. Khondker Murshed-E-Jahan Diemuth E. Pems. 2011. “The impact of integrated aquaculture–agriculture on small-scale farm sustainability and farmers’ livelihoods: Experience from Bangladesh”; Sivan Yosef. 2009. “Rich Food for Poor People: Genetically Improved Tilapia in the Philippines”. IFPRI Discussion Paper 00925; also see the section of this report on Impact and Development Impacts.

³² As one example of the kind of analysis of past experience the evaluation would have expected, see: Waters-Bayer, A., Kristjanson, P., Wettasinha, C., van Veldhuizen, L., Quiroga, G., Swaans, K. and Douthwaite, B. “Exploring the impact of farmer-led research supported by civil society organisations”. *Agriculture & Food Security* (in press)

³³ AAS Extension Proposal, 2014, p. 1.

³⁴ Kantor, P., Apgar, M. (2013). “Transformative Change in the CGIAR Research Program on Aquatic Agricultural Systems”. Penang, Malaysia. Program Brief: AAS-2013-25; Morgan, M. 2014. “Measuring gender transformative change”. Penang, Malaysia: CGIAR Research Program on Aquatic Agricultural Systems. Program Brief: AAS- 2014-41; Underwood CR, Leddy AM and Morgan M. 2014. “Gender-equity or gender-equality scales

evaluation identified important achievements in this area.

One would expect that a systems CRP with a focus on aquatic agricultural systems would articulate a strong or coherent systems perspective and weave this perspective through all of its work. In relation to either theory, concepts or methods, it was difficult for the evaluation team to discern any such systems perspective in either the work undertaken since the program was launched or that outlined in the 2015-2016 extension proposal. There are few apparent links in the documents reviewed by the evaluation team, the discussions with staff and the field activities observed, to the rich intellectual and methodological traditions associated with research on farming systems, to which ICLARM made a contribution,³⁵ or agro-ecological or livelihood systems more broadly. Recently, the three systems CRPs have made efforts to work together in further developing systems research approaches. A conference in Ibadan in March 2015 was an important step, to which AAS contributed.

The focus on action research remains very strong. This is an area on which the program has placed considerable emphasis, especially in its activities at the community and hub-level. The approach to and experience with PAR is addressed in greater detail in a later section.

3.1.2 Research questions

The questions around which AAS was constructed provide important insights into its orientation, ambitions and likely outputs. In the proposal there is a discernible tension between the idea that research questions should arise from interactions with communities on the one hand, and the need to provide specifics about the nature and scope of the proposed research program on the other. The proposal manages this tension by providing what are described as preliminary and illustrative research questions. Using Bangladesh as an example, the proposal identifies 32 “key research questions” relating to eight proposed hubs within the country. Across all locations, 40 additional research questions are provided that relate to the individual research themes. An annex to the proposal provides 123 more research questions broken down by the six research themes and five countries. Most of these questions are generic and appear to aim at generating descriptive information, rather than being analytical in nature. Examples are the following: “How can investments in value chains for aquaculture best capture opportunities for the poor and vulnerable?”; “What are best practices in postharvest processing of aquaculture products for Cambodia?”. Very few of the research questions are aimed at developing a better understanding of the underlying reasons for persisting poverty in aquatic agricultural systems, or the socio-technical and/or environmental dynamics within and across aquatic agricultural systems. Such analytical questions would more likely be “why?” questions. The Activity Plans, the major planning document for the use of W1/W2 funding do not contain research questions; hence they were not used to

and indices for potential use in aquatic agricultural systems”. Penang, Malaysia: CGIAR Research Program on Aquatic Agricultural Systems. Program Report: AAS-2014-37.

³⁵ For example, Lightfoot, C. 1990. Integration of aquaculture and agriculture: a route to sustainable farming systems. NAGA – *The ICLARM Quarterly*, January 1990, pp9-12.

further elaborate the research questions pursued by the program.

The research questions presented in the revised 2015-2016 extension proposal had been significantly revised. The extension proposal sets out three overarching research questions (Box 3-1) and 22 theme research questions.³⁶ The hub development challenges also figure in the 2015-2016 extension proposal, and in late 2014 and early 2015 the program was developing a series of “initiative” research questions (by hub and theme) (see Annex I, Vol. 2). The second overarching research question puts the AAS approach at center stage, and as such can be seen to respond to comments by the ISPC that the AAS approach be treated more explicitly as an object of research interest. The revised research questions in the 2015-2016 extension proposal do not explicitly address the underlying reasons for persistent poverty in aquatic agricultural systems and its relations to the bio-physical conditions of such systems.

Box 3-1: AAS overarching research questions

1. What agricultural research and development technologies deliver significant positive change in aquatic agricultural systems, particularly in the interests of the poor and marginalised?
2. How, and in what situations, does the AAS RinD approach foster enduring and equitable change in livelihoods of the poor and marginalised in aquatic agricultural systems – and how are these changes different from those produced by other approaches?
3. Do the AAS scaling pathways lead to impact at scale, and how can the program most effectively harness learning to support scaling?

"We refer to all three questions together as **the AAS research program**, and research designed specifically to address Question 2 as research on the AAS approach"

Source: Revised 2015-2016 Extension Proposal

3.1.3 Assessment

There has been a significant evolution in the way the program is framed. The research questions have also changed. Overall, there has been an increasing emphasis on combining conventional research with action research approaches. Importantly, there has been a shift to making RinD itself subject to research. This is an important positive change.

The evaluation team finds that the need to better understand the underlying reasons for persistent poverty in aquatic agricultural system that have high agro-ecological potential, originally formulated as “paradox”, was and remains highly relevant. .

The evaluation team finds that the systems and systems research aspects of the program have been underdeveloped.

³⁶ In the 2015/2016 extension proposal the research themes are listed as: Productivity, Gender, Nutrition, Equitable Markets, Governance and Resilience

RECOMMENDATION 1. Strengthen research strategy and design

AAS should strengthen its research strategy and design by:

- Taking an explicit research stance vis-à-vis RInD, comparing and contrasting it with other approaches and collecting data that will make it possible identify its comparative advantages.
- Re-focus research questions on the AAS paradox;
- More effectively engaging with, benefitting from and contributing to existing bodies of experience and scholarship around agricultural systems and the methods used to study and improving them.

3.2 Human resources – the foundation of research quality

This section deals with the profile and allocation of human resources. The management of staff is further discussed in the Section on Management.

3.2.1 Profile and allocation of human resources

This section contributes to the assessment of quality of science. A prerequisite for the success of any research program is assembling and appropriately deploying the required research skills and competences.

In what follows, considerable emphasis is placed on the qualifications of the research staff, and particularly the number and distribution (across hubs and themes) of researchers trained to PhD level. This is not to suggest that a PhD is essential to be a productive researcher, or that only staff holding PhDs should be involved in research. It is rather an acknowledgement that in an international research program – whether based on conventional, participatory or action research methods – it is reasonable to expect that PhD level staff, or senior, experienced researchers, will play the major role in research planning, supervision, data collection and analysis and publication. In the view of the evaluation team, the direct involvement of PhD level researchers in field research activities is also essential and common practice in comparable research programs, both in conventional research and in PAR.

Issues such as quality of supervision and mentoring, incentives for high quality research, time available for writing are addressed in section 3.8 on Research Management.

During the field visits the evaluation team found that by-and-large, AAS staff were enthusiastic about the program and satisfied that it provided a positive framework for their research. This finding was very much echoed in the responses to the staff survey. The very positive attitude of the staff can be seen as one of the program's most important assets.

The establishment of AAS was associated with a major increase in the overall budget of WorldFish, requiring the recruitment of many new staff: 52 percent of the staff members who completed the staff survey had joined since 2011.

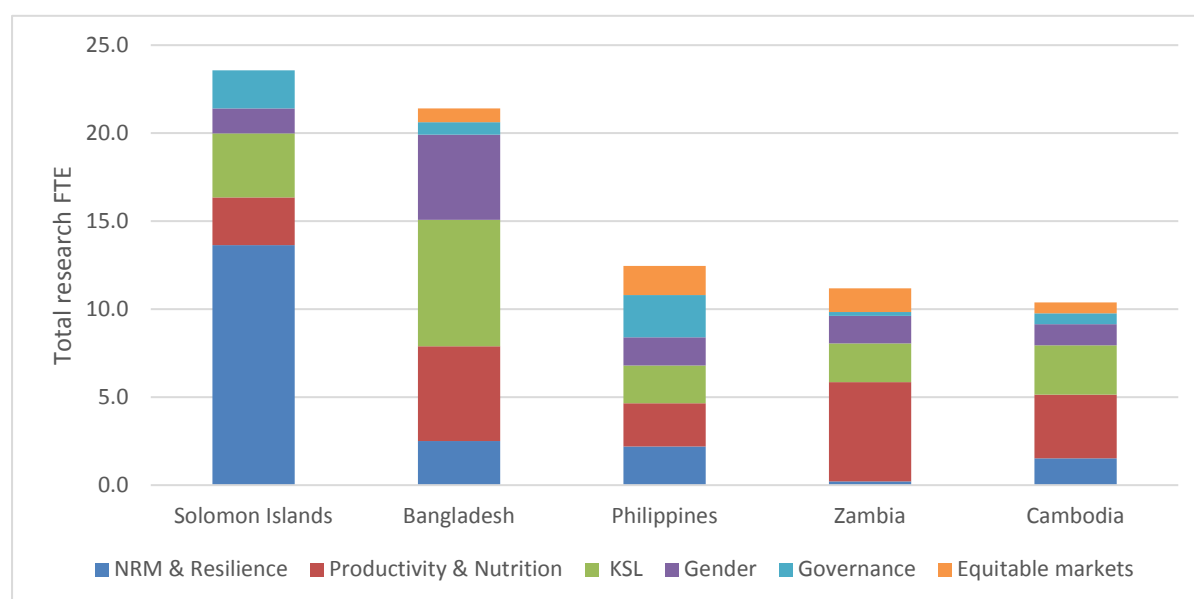
As of February 2015, the evaluation team’s best estimate was that overall, the AAS staff time devoted to research included 96 full-time equivalent (FTE), of which 38 percent were at the PhD level, 38 percent MA or MSc, and 29 percent undergraduate or below (Table 3-1). The educational profiles of the research staff varies significantly over the hubs: while 60 percent of the research FTE in the Global hub are PhD level, in Bangladesh, Cambodia and the Solomon Islands this is 20 percent or less. Over the program’s research themes, NRM and Resilience, Productivity & Nutrition and KSL account for the majority of the available research FTEs, while the deployment of researchers over the research themes varies by hub (Figure 3-1). In Solomon Islands for example, nearly 58 percent of research FTE is mapped against the theme NRM & Resilience, while in Zambia this theme accounts for only 2 percent. FTEs devoted to the Gender Equality theme varies from a low of 6 percent in Solomon Islands to a high of 23 percent in Bangladesh.

Table 3- 1: Research FTE by degree level and base

Base	Education level			Total	%
	PhD	MA/MSc	UG and below		
Global	12.7	5.6	0.0	18.3	19%
Bangladesh	3.4	16.0	2.0	21.4	22%
Solomon Islands	5.0	2.5	16.1	23.6	24%
Cambodia	2.0	6.1	2.4	10.4	11%
Philippines	4.2	3.7	5.0	12.9	13%
Zambia	4.0	3.2	3.0	10.2	11%
Total	31.2	37.0	28.4	96.6	100%
%	32%	38%	29%	100%	

Source: Evaluation team, based on data provided by AAS country teams

Figure 3-1: Distribution of research FTE by hub and research theme.

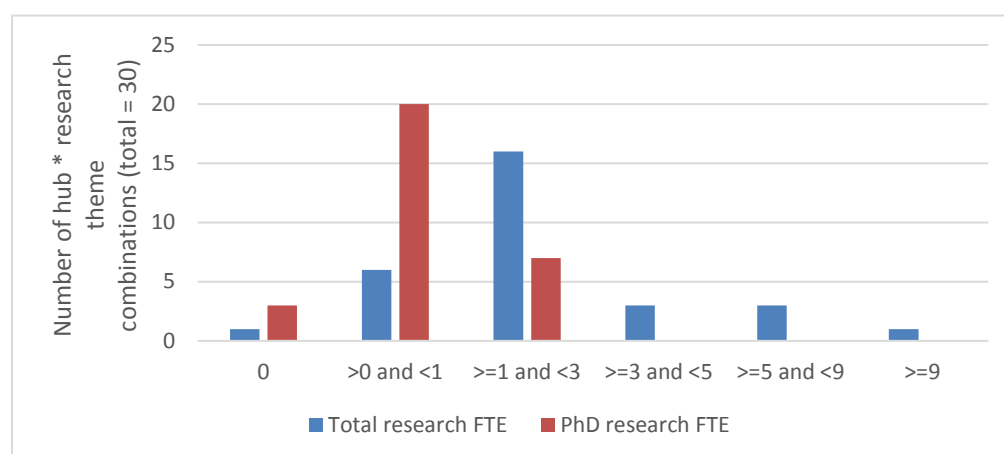


Source: Evaluation team, based on data provided by AAS country teams

AAS research is structured by locations (five hubs)³⁷ and research themes (six were identified in the proposal and Nutrition was added in the 2015-2016 extension proposal). For the purposes of this analysis Nutrition has been combined with Productivity, resulting in 30 hub x theme combinations. Figure 3-2 displays the distribution of total research FTE and PhD FTE over these 30 combinations. In 23 of the 30 combinations (i.e. 77 percent), there is less than one PhD-level FTE. These figures somewhat underestimate the research effort because they do not include staff based at Penang and other locations who may also contribute to theme research in hubs.

The dispersion of research resources is also highlighted by the staff survey: half of all respondents reported that they worked on three or more research themes (Table 3-2). The evaluation team questions the ability of most researchers to be on top of the literature and the latest methods relevant to three or more themes.

Figure 3-2: Distribution of research FTE over 30 hub x research theme combinations



Source: Evaluation team, based on data provided by AAS country teams

Table 3- 2: Number of different research theme worked on per staff member.

No. of themes worked on	Frequency	Percent
1	31	34.4
2	14	15.6
3	10	11.1
4	18	20.0
5	9	10.0
6	8	8.9
Total	90	100

Source: AAS evaluation staff survey

³⁷ In fact, the work in Solomon Islands takes place in two hubs so there are six in total. However, for the purposes of this analysis we will consider Solomon Islands to be one hub.

The very limited allocation of PhD-level staff per hub and theme combination, and the fact that many researchers are expected to contribute to three or more themes, suggests to the evaluation team that (i) the current staffing profile is light on PhDs relative to other research staff, particularly given the high proportion of staff with only undergraduate degrees, and (ii) the program's limited research staff are being spread too thinly over too many hubs and themes.

As noted previously the proposal gave prominence to action research, systems perspectives and gender, three areas where WorldFish did not have significant research capacity previous to AAS. There is one PhD-level staff member who takes primary responsibility for guiding the PAR work, while other staff have some experience with PAR. A productive relationship with a PAR specialist (consultant) has been established. No new PhD-level specialists in systems research have been recruited. It also appears that in the gender and social transformation area, the program has not yet been able to establish a stable core of experienced PhD-level researchers.

While recruiting good researchers is one challenge, deploying them so that their expertise and skills are utilized fully is another. A number of examples indicated to the evaluation team less than optimal deployment of available talent. There was one particular example of a highly experienced researcher whose previous work spoke directly to key AAS themes, but instead of doing or directing research, this individual was being used principally to do hub administration and management tasks.

In at least three countries the evaluation team was told that it was difficult to recruit international staff because of local conditions. In two hubs – Malaita (Solomon Islands) and Tonle Sap (Cambodia) – there are no hub-based PhD level researchers. In the Solomon Islands the strategy that the program uses to get around this is to build relationships with organizations and individual researchers who live elsewhere and engage with hub-based work through periodic visits. In hubs where recruitment of qualified staff is difficult, strategies like this are required if the research is to be of sufficient quality.

Since the PAR approach requires an intensive interaction with communities, the survey included a question about the amount of time that staff spend in the field (Table 3-3). Across the hubs, the median reported number of days spent in the field over the last year ranged from a high of 51-60 days in the Philippines, to a low of 0-10 days in Zambia.

The median for respondents based at WorldFish HQ in Malaysia was 11-20 days. Many of these staff travel a good deal, but overall, the figures suggest that the engagement of Penang-based staff at the community level was rather limited, particularly considering the centrality of PAR, and thus community engagement, to the program. This may have contributed to what the evaluation team saw as an overemphasis on processes and concepts that were not sufficiently linked with field realities (see further details in the assessment of the roll-out process below).

Table 3- 3: Reported number of day spent in the field in the previous year (NB: blue shading extends to the median interval – i.e. it covers at least 50 percent of the respondents)

Country base	Days in field in last year									
		0-10 days	11-20 days	21-30 days	31-40 days	41-50 days	51-60 days	> 60 days	N/A	Total
Philippines	Count	1	1	0	0	2	3	6	0	13
	%	7.7%	7.7%	0.0%	0.0%	15.4%	23.1%	46.2%	0.0%	100%
Bangladesh	Count	1	4	2	1	2	2	6	1	19
	%	5.3%	21.1%	10.5%	5.3%	10.5%	10.5%	31.6%	5.3%	100%
Cambodia	Count	2	1	0	1	1	0	2	0	7
	%	28.6%	14.3%	0.0%	14.3%	14.3%	0.0%	28.6%	0.0%	100%
Solomon Islands	Count	5	3	2	3	1	0	1	0	15
	%	33.3%	20.0%	13.3%	20.0%	6.7%	0.0%	6.7%	0.0%	100%
Malaysia	Count	6	2	2	1	2	1	1	0	15
	%	40.0%	13.3%	13.3%	6.7%	13.3%	6.7%	6.7%	0.0%	100%
Zambia	Count	4	0	1	2	0	0	0	0	7
	%	57.1%	0.0%	14.3%	28.6%	0.0%	0.0%	0.0%	0.0%	100%
Australia	Count	2	0	1	0	0	0	0	0	3
	%	66.7%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Europe	Count	4	0	0	0	1	0	0	0	5
	%	80.0%	0.0%	0.0%	0.0%	20.0%	0.0%	0.0%	0.0%	100%
Other	Count	3	1	2	0	0	0	0	0	6
	%	50.0%	17%	33%	0%	0%	0%	0%	0%	100%
Total	Count	28	12	10	8	9	6	16	1	90
	%	31.1%	13.3%	11.1%	8.9%	10.0%	6.7%	17.8%	1.1%	100%

Source: AAS evaluation staff survey

3.2.2 Assessment and recommendations

The evaluation team notes again that the program has a very committed and enthusiastic staff.

There are a number of significant problems associated with the profile of the program's research staff and their allocation across hubs and themes. One is the balance of PhD-level researchers to researchers with lower levels of training. While a profile containing approximately 30 percent PhD-level researchers (corresponding to two research assistants per PhD-level researcher) might be appropriate for the type of research conducted in AAS, the problem arises in the allocation of staff with different levels of training and experience across hubs and themes. There is a relatively high concentration of PhD level researchers at WorldFish headquarters, while too few are based in the hubs. Moreover, the time of research staff is spread over far too many different themes.

The evaluation team concludes that the program has not yet been successful in assembling and deploying a staff with sufficient research training and experience to shape and address its ambitions research objectives. There is an insufficient number of experienced, PhD-level researchers in key areas, and as a consequence, the research capacity located in most hubs and addressing most research themes is not adequate. The lack of a critical mass of qualified researchers affects the program's ability to make progress in relation to the complex problems it is addressing and to achieve results that have wider applicability. Key areas like PAR, systems and gender remain seriously understaffed. The evaluation team is also concerned that limited number of days that the many staff spend in the field is not consistent with the PAR approach.

The limitations associated with the research staff profile, and the fact that there is limited engagement of senior researchers in field work, are referred to repeatedly in the remainder of this report.

RECOMMENDATION 2. Strengthening research capacity

AAS management should re-think its approach to staffing and to the allocation of human resources by:

- Basing more experienced senior researchers in the hubs. This would allow them to take the lead in designing and implementing research.
- Undertaking a detailed analysis of the factors that constrain the hiring and retention of qualified research staff, particularly in the hubs. If these factors cannot be overcome directly, alternative models, including shared staff, partnerships, should be explored. There is already some important experience with these models within the program.
- Ensuring a critical mass of research capacity to a level that would justify expenditure in relation to any given hub – theme combination. If the program faces resource limitations, consolidation and prioritization over hubs and themes will be essential.

Until these concerns are addressed, the evaluation team recommends that no expansion into new hubs or research themes should be contemplated.

3.3 The operationalization of RinD

This section focuses the program's Research in Development (RinD) approach, and how it has been implemented. The analysis of RinD helps address evaluation questions relating to relevance, quality of science and the uniqueness of the program. The section is primarily based on the roll-out and bilateral project case studies.

3.3.1 The roll-out process

Roll-out refers to the initial process of reconnaissance, planning and engagement which the program uses to initiate the implementation of the RinD approach. According to the Roll-Out Handbook, typical hub roll-out should take six to eight months. The process is expected to lead to a long-term hub strategy, a three-year medium-term plan and one-year operational plan.³⁸ As emphasized in the Handbook, the planning does not end with the end of the roll-out process: the subsequent twelve months are considered an extension of the planning process. The essential elements of the roll-out process are planning, scoping, diagnosis and design.

The evaluation team notes that the Handbook provides a clear and concise presentation of the roll-out procedure. It is an operational guide; but given that it is the product of a research program it is surprising that it does not contain any references; and that it provides nothing on how the particular approach to community engagement was chosen or whether alternative approaches were considered. It is not clear from the Handbook how the process draws on earlier experience with e.g. participatory planning in agricultural and rural development.

The roll-out studies indicated that in all four cases, the roll-out process generally followed the sequence and procedures indicated in the Handbook. The consistency of the roll-out should greatly facilitate learning across hubs. First there was a planning phase, in which stakeholders were contacted and partnerships formed. Second was a scoping phase, which involved an analysis of the national setting as well as hub scoping, during which stakeholders were consulted and the "hub development challenge" was identified. The evaluation team observed that there were differences in the quality of the analysis of the national setting. In Zambia, for example, the national development context was analyzed very well, including drivers of change; whereas in Bangladesh, a generic account of national development context was presented and the analysis of drivers of change was lacking. In terms of depth and breadth of analysis, much of the documentation produced during the roll-out process is comparable to that produced by development organizations in the appraisal phase of their projects.

The third phase involved the formation of multidisciplinary Diagnosis and Design teams, involving AAS staff and stakeholders. Communities were selected and community planning meetings organized. The community interaction was based on an approach promoted by the group

³⁸ CGIAR AAS (2012): Roll-Out Handbook, Ver. 1.0

Constellation,³⁹ which was selected by AAS as a key partner. Constellation has developed an approach to community engagement called the Community Life Competence Process, which aims to build on the strengths of communities, and their ability to help themselves, rather than putting the focus on problem identification and the organization of external assistance. Constellation also facilitated the stakeholder interaction during the roll-out process.

Following the approach developed by Constellation, communities were lead through “dreaming” and “visioning” exercises, following which prioritized “action plans” were developed. These action plans are the basis for continuing engagement with the program. In Bangladesh and Solomon Islands, AAS staff were at the heart of this community engagement process with support provided by Constellation. In the other cases, researchers were less integrally involved as the task was contracted out to partner NGOs, who were supported by Constellation. In the case of Zambia, community members trained as village facilitators were key to the process, while AAS staff had limited involvement; in Cambodia, partner NGOs played an active role in the process, again supported by Constellation. The program’s emerging Gender Transformative Approach was seen as an integral part of the community interaction, and roll-out provided an opportunity to introduce elements of GTA to partner organizations.

The diagnostic phase was also expected to include a partner analysis, gender analysis, and governance analysis, as well as analysis of the socio-economic characteristics of the villagers.

Design was the last phase of the roll-out process: community plans were aggregated, a gap analysis was performed, and a design workshop was held, with the objective of developing a research agenda. These agendas included both community-identified and researcher-identified research activities. Subsequently, a hub team orientation and training was held, and an in-country “after action review” was conducted.

After completion of the roll-out phase, the PAR activities started in the villages, mostly facilitated by the NGOs that had been involved in the roll-out. In Bangladesh, this task was performed by project staff. In addition to community-level PAR, work started on the other studies identified during the Design Workshops.

3.3.2 Assessment and recommendations

Across the hubs the roll-out process had a number of important positive features, which set AAS apart from some other agricultural research programs and projects. These include the following:

- The strategy to conduct a thorough assessment of the situation, starting from the national context; this strategy was particularly useful in situations such as the Zambia hub, where WorldFish had no prior involvement.
- The ability of the AAS hub teams to establish themselves as a trusted partner within the local

³⁹ <http://www.communitylifecompetence.org/en/>

development community and to start to build mutual understanding about and commitment to a jointly identified hub development challenge.

- The situation assessments conducted for the governance theme, which were based on a common framework. They resulted in an insightful cross-hub assessment, which was subsequently published in a journal. This underlines the potential of the roll-out process to lead to more broadly relevant knowledge.
- The use of a strength-based approach to community-engagement, for example, by staying clear of the provision of free inputs. As an indicator of the relationship created with community members, a number of the villagers interviewed by the evaluation team in Bangladesh referred to themselves as “farmer scientists” (although this was not observed in the other three hubs).
- The strong commitment to promote GTA during the roll-out process and the dedicated efforts to sensitize partners to it, and to build their capacity. Interaction with community members during the hub visits suggested that the women who were engaged in the roll-out process were stimulated to reflect on gender norms and gender roles.

The evaluation team has a number of reservations concerning the roll-out process. The team found that it was not informed by a critical review of earlier approaches to farming systems research, participatory research or participatory action research inside or outside the CGIAR. Such a review would have highlighted, for example, the importance of understanding socio-economic differentiation and power relations within communities prior to forming groups. Steps might then have been taken to help avoid elite capture, and identify the research that is most relevant to poor and marginalized. This issue eventually became evident to the AAS team, but it could have been picked up much earlier in the process.

While the program’s stated focus is on poor, vulnerable and marginalized groups, the evaluation team saw few specific efforts to reach these sections of the communities. Since it has been a long-standing criticism that conventional agricultural research and extension are prone to capture by the relatively better-off farmers, the evaluation team would have expected special efforts to first analyze the local power structures in the communities and then target engagement activities accordingly. The evaluation team recognizes that some engagement with local elites is often necessary, but the existing engagements (e.g. with the Barotse Royal Establishment in Zambia or local opinion leaders in Bangladesh) did not seem to be accompanied by the critical analysis that would be essential if problems such as elite capture are to be avoided.

Meaningful community engagement is an important goal. AAS could have combined it more effectively with other methodologies to yield, for example, a better understand of the biophysical and socio-economic dynamics in the systems and communities under consideration. Diagnostic studies on these topics have been conducted, but mostly in parallel to each other and to the community engagement process, partly resulting in research fatigue by part of the communities, as both community visits and partner interviews confirmed.

The evaluation also found that the choice of the partnership with Constellation limited the options open to the program with regard to community-level engagement. The organization had its own

well-developed approach, but it had no background in agriculture or research. As further detailed in the roll-out case study reports (Annex D), the evaluation team found that its community engagement approach was not particularly suitable for the specific requirements of AAS. This approach resulted in a very broad initial list of priorities for action research, and the process of narrowing them down remained opaque.⁴⁰ It would have been useful to compare the Constellation method with alternative priority setting approaches, including those that involve a more direct long-term interaction between research staff and community members.

Moreover, the evaluation team believes that the outsourcing of community interaction to NGOs observed in some hubs made it difficult to fully realize the potential of PAR.

The Handbook made no explicit provisions for conducting thorough reviews of relevant research literature or related experience before or during the roll-out process. The review on productivity interventions is a good example of an effort to develop an understanding of the literature, so that research designs could be informed, e.g., by actual knowledge gaps or contested issues. The evaluation team would have expected to see more such examples from the other research themes.

In principle, avoiding thorough literature reviews at the beginning of a research project could be a design choice, since some research approaches, such as Grounded Theory,⁴¹ specifically foresee conducting literature only at a later stage of the research to avoid that researchers go to the field with pre-conceived ideas. Even if this was a design choice (for which no evidence was found), there is a considerable trade-off in using such approaches, since not engaging with the literature increases the likelihood of coming up with findings that are already well established, which reduces the cost-effectiveness of the program.

The evaluation team saw few indications that the roll-out process fed into the development of interdisciplinary, systems-oriented research. Instead, the research activities have, so far, mostly been pursued in parallel by different researchers and by different centers, and the link to the community engagement has been limited. The “action” in the PAR has focused primarily on single commodities (such as trying new crop varieties) or specific natural resource management activities (cleaning canals; forming fisheries co-management groups). Interdisciplinary, systems-oriented research, e.g. for the sustainable intensification of the complex social-ecological systems in which AAS operates, could not be identified on the ground. AAS management argued that these were problems of staging that will be overcome at an appropriate point. The evaluation team accepts that developing a PAR-based research agenda takes time, but questions whether adequate foundations for interdisciplinary, systems-oriented research are being established. The work with Bioversity on Sustainable Intensification and Ecosystem Services, as presented at a conference of the three systems CRPs in Ibadan in March 2015, is a useful step in this direction.

⁴⁰ There are numerous other NGOs with substantial experience in participatory action research in agricultural settings, especially in South Asia, and many of them have a focus on community empowerment. How AAS arrived at the conclusion that Constellation has comparative advantage is not well documented.

⁴¹ Bryant, A. & Charmaz, K. (Eds.) (2007) “The SAGE Handbook of Grounded Theory”. Los Angeles: Sage

Meeting the hub development challenges in complex social-ecological systems requires a research agenda that bridges multiple scales (from the field to the landscape level), multiple agricultural activities (crops, livestock and fisheries), multiple natural resource management challenges (such as soil fertility management), as well as multiple social and institutional aspects (such as land rights; intra-household issues, local power structures). The disciplinary mix of researchers to be involved in such a systems approach depends on the research problems identified on the ground. The program needs to find ways to acquire expertise (either from other CGIAR centers or other partners) in research areas where it does not have the required expertise, e.g. agronomy and farming systems research.

RECOMMENDATION 3. Revising the roll-out process

The evaluation team suggests that any continuation or extension of the roll-out process would benefit from: (1) allowing for experimenting with different approaches to community engagement and priority setting in ways that allow results to be compared; (2) ensuring that adequate time and resources are available to conduct in-depth, critical reviews of the relevant research-based literature and experience; (3) ensuring a much greater level of direct involvement by senior researchers; and (4) striving toward the development of an explicit and robust systems perspective using a interdisciplinary research approach.

3.3.3 The role of bilateral projects

At the time of the evaluation AAS was implementing more than 50 bilateral projects. These ranged in total budget from tens of thousands to several million dollars and accounted for approximately 50 percent of AAS funding. Creating linkages between the use of W1/W2 funding in the roll-out process and the bilateral projects offers an important opportunity to increase the efficiency and effectiveness of resource use and the expected impact of the program. Hence, a major concern of the review of bilateral projects was the extent to which this opportunity was used.

The evaluation team reviewed four bilateral projects, which differed in their funding level and stage of implementation (Table 3-4), and in a number of other respects. Along the research-development continuum, PacFish (Solomon Islands) can be located clearly at the research end focusing on community-based fisheries management, whereas AIN (Bangladesh) was formulated essentially as a development project to disseminate existing aquaculture technologies. The other two projects are situated in between these two extremes. The Rice Field Fisheries (RFF) project in Cambodia conducts applied research to enhanced fish habitat, and promotes improved practices. Like AIN, the Zambia Project aims to improve the income and nutrition of resource-poor households through the introduction of agriculture and aquaculture technologies. It had, however, a stronger focus on identifying those technologies through applied research rather than promoting technologies that had already been established.

Table 3- 4: Bilateral projects included in review

Country	Project name	Funding	Start	End	Donor
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		Million USD			
Bangladesh	Aquaculture for Income and Nutrition (AIN)	4.750	2011	2016	USAID
Cambodia	Rice Field Fisheries Improvement Project (RFF)	0.609	2012	2016	USAID
Zambia	Harnessing Aquatic Agricultural Systems for Livelihoods and Nutrition Security in Northern Province Zambia	0.420	2013	2018	IRISHAID
Solomon Islands	Pacific Fisheries (PacFish)	1.327	2013	2017	ACIAR

Source: Evaluation Team

The projects differed in the degree to which their proposals reflect the framing and language of the AAS program. The framing of PacFish was most closely aligned with the RinD approach. A range of well-established social science research methods are used in this project, including household surveys, focus group and other interviews, landings surveys, and participant observation. The project also uses methods promoted by AAS, such as interviews focusing on outcome evidencing and identifying most significant change. While a number of participatory research methods are used, PAR aspects of the research were not particularly evident. The project engages with larger debates and has a regional framing, and clearly has the potential to produce important, broadly relevant knowledge in relation to community-based fisheries management. At the time of the evaluation, four papers were published in international journals.

AIN in Bangladesh was formulated as a technology dissemination project that targets more than 50,000 and 60,000 fish and shrimp farmers respectively. What is striking is the scale of the project compared to the AAS activities promoted in the roll-out case, which were limited to 16 villages. The most direct link to AAS was an on-farm trial on shaded ponds, one of the technologies identified during the roll-out process as promising for resource-poor households. Twelve households under AIN participated, next to more than 80 households funded by other projects. Another link was through the AAS gender team, which interacted with AIN, but so far the project has used a more conventional women-in-developed approach (as opposes to GTA). Technologies were designed specifically for women, which are now being critically examined. Through the interaction with AAS, GTA has been integrated into home pond aquaculture training and there are plans to take it “to scale” in 2015.

Overall, one could have expected AIN to provide considerable scope for experimenting with and applying PAR approaches. However, an interview with a representative of the funding agency indicated that the strict focus on reaching a large number of households in a comparatively short time limited this opportunity.

The AIN project offered some scope for applied research, and five journal articles along with other research outputs have been produced.

The bilateral project in Zambia targets 16,000 households and also provides, in principle, significant scope for applying the AAS approach on a larger scale. The different geographic location of the

project and the hub creates a challenge, but the assessment showed that there were innovations, e.g., in the field of nutrition, that were equally applicable in both sites. Since the project just started, it is too early to assess the extent to which this opportunity will be used.

The RFF project in Cambodia is implemented in 50 locations and ultimately targets 100,000 people. One interesting aspect of the project is that it seeks to integrate agriculture and aquatic activities (rice and fish). The review found an important opportunity for synergy with AAS. However, as discussed in more detail in the case study report, the project faced implementation challenges in terms of the choice of technologies being tested, and in relation to research design, which seems to have limited its effectiveness.

3.3.4 Assessment and recommendations

The analysis indicates that the bilateral projects that are closer to the development end of the research-development continuum offer, in principle, significant scope for upscaling, since they target much larger numbers of households than the AAS activities pursued with W1/W2 funding. However, to date this opportunity has been only partially seized. Challenges include strict donor targets that do not leave much room for experimentation, as in case of Bangladesh; differences in geographic location, as in case of Zambia; and technical challenges faced by the bilateral projects, as in case of Cambodia. The case of PacFish shows that there is also considerable room for positive synergy between research-oriented bilateral projects and the program. This project is producing knowledge of broad relevance, and the research is of good quality: as such it contributes positively to the program's quality of science.

The case of AIN in Bangladesh also raised the question of the programmatic justification for implementing large development or technology dissemination projects under AAS. While the evaluation team is sensitive to the financial considerations that come into play around bilateral projects, ultimately these projects must be justified in terms of their contribution to the AAS and CGIAR research agenda.

In summary, the cases studies point to both the potential and the limitations of large bilateral projects in contributing to the AAS research program. They provide an opportunity to experiment with different approaches to community involvement and participatory technology development on a much larger scale than is currently possible. Difficulties arise with those projects that focus almost exclusively on large-scale dissemination of existing technologies. Key research staff spend most of their time in dealing with the day-to-day management challenges of running large-scale extension-type projects, leaving little room for research. Such projects are better implemented by national organizations, which can then draw on AAS/CGIAR expertise as appropriate.

RECOMMENDATION 4. Increasing alignment of AAS activities

The decision to associate bilateral projects with AAS should be based primarily on their potential to further the AAS research agenda. In the design and implementation of all bilateral projects, maximum synergies with W1/W2 funded work should be sought. In particular, AAS management should seek to use bilaterally-funded projects to experiment with different approaches to community involvement and participatory technology development on a larger scale than is currently possible.

3.4 Participatory Action Research

This section focuses on the program's conception, implementation and use of PAR. As such it addresses evaluation questions about relevance, quality of science and uniqueness. As indicated previously, PAR is a central element of AAS as it relates to two crucial aspects of the program: the involvement of communities and hub level stakeholders in the research, and the integration of GTA and embedding of M&E processes.

PAR is defined by AAS as an approach to research that recognizes the expertise and centrality of people in communities to deliberate on their own reality, to negotiate change with others and transform their own lives. The use of PAR within the program started with the roll-out activities. The community actions identified as part of the roll-out process cover a wide spectrum, ranging from on-farm trials of different crop varieties or pond management techniques to community-based natural resource management activities such as fisheries co-management.

The 2013 Science Handbook has a chapter on PAR⁴², and in early 2014 "A Guide for Facilitators of PAR" was produced.⁴³ This guide is a significant resource document: it builds on the work of Constellation and the specific experience of the consultant, and articulates the PAR approach in simple and practical terms. It is presented as a roadmap for facilitators to support them to deliver a rigorous PAR process; it provides guidance for effective facilitation that allows for critical reflection throughout the engagement process.

Progress in the implementation of PAR varies over the hubs, in part because some hubs started a year earlier than others; some hubs had previous experience with similar approaches; and there has been no program-wide approach. The plan is that the Cambodia facilitators guide will provide the basis for such a program-wide approach. As was indicated above, the evaluation team noted that in some hubs, senior AAS researchers were not directly engaged in interactions with the communities. A comment made by a member of the Global hub team during the Dhaka briefing for the evaluation team indicated that this was not considered a priority: "You can't have highly paid CGIAR scientists spending all their time in the villages". This comment reinforces the observation that the time spent

⁴² See Chapter 8, "Harnessing the development potential of aquatic agricultural systems for the poor and vulnerable. 2013 AAS Science Handbook"

⁴³ "Participatory Action Research in AAS Guide for Facilitators" Version 1 (2014)

by senior research staff in the field has been limited. In Zambia the evaluation team observed that even junior researchers were discouraged from spending time in the communities.

The evaluation team considers that without very significant inputs of senior researcher time at the community level, PAR is unlikely to deliver broadly relevant knowledge or contribution to positive, scalable development outcomes. This is because PAR is particularly dependent on the interaction between researchers and community members.

The emancipatory approach to action research, which AAS espouses, is closely linked to social movements in the South, and has been championed by, among others, Professor Anisur Rahman in Bangladesh. Some efforts to link with such organizations have been made, e.g., through a workshop in Bangladesh and through a collaboration with the NGO ADIC in Cambodia. Overall, the evaluation suggests that greater engagement with these organizations could prove valuable.

Except for the case of Bangladesh, the evaluation team saw relatively little evidence of systematic collection of data associated with the PAR activities. The strategy to assess the impact of PAR has, so far, focused on a theory-based evaluation, which is suitable to demonstrate whether the PAR “has made a difference,”⁴⁴ but does not make it possible to compare the effectiveness of this approach with other approaches, because this strategy does not include the collection of baseline data in communities where PAR was implemented and comparison communities. Hence, such data were not systematically collected. The Evaluation Proposal indicates that a comparative approach will be used in the future.

3.4.1 Assessment and recommendations

The program’s approach to and use of PAR is still very much a work in progress. The strong commitment to PAR expressed in program planning documents has not yet been matched with a cadre of researchers trained and experienced in its use.

Because of this lack of training and experience, the evaluation team sees the risk that completing PAR cycles becomes an end in itself, rather than the means to transformation and change. The criterion of success in effective PAR should not be that participants faithfully go through the steps but rather that they have an authentic and strong experience of change in their *practices*, their *understandings* of those practices, and change in the wider *situations* in which they practice.

In summary, placing PAR at center stage is probably the most innovative aspect of AAS. While the emphasis on PAR may potentially contribute to the relevance and effectiveness of the program, to date this contribution has not yet been realized or convincingly demonstrated. Nor has a strong link yet been demonstrated between the use of PAR and quality of science.

There is significant scope for the program to strengthen its in-house expertise in action research, and

broaden its engagement with the action research literature and with institutions and academic groups who have established competences in this area.

SUGGESTION 1. The evaluation team suggests that the program becomes much more explicit and aggressive in exploring and demonstrating the added value of PAR through deliberate and critically analysis of “the approach as espoused” versus “the approach in use”. An important element of this could be within and between hub comparisons, which will need to be a carefully considered element of the program’s research designs.

3.5 AAS thematic research

This section presents an assessment of the program’s research conducted under the different themes, with a specific focus on the evaluation criteria of relevance and quality of science. Progress to date and outputs are also reviewed. This section draws on the publications review, the roll-out and bilateral project case studies, and interviews with research theme leaders and staff.

3.5.1 Sustainable Increases in System Productivity

This theme addresses the first program objective in the AAS proposal. The topic was framed around the concept of the “yield gap”, but the proposal also included research questions that referred to the role of integrating crop, livestock and fish production; to the efficient use of inputs; and to the role of governance and gender in enhancing productivity. Apart from mentioning the taking of a PAR approach to technology adaptation, the proposal did not suggest any specific methodologies that would be used.⁴⁵

The 2015-2016 extension proposal maintains productivity as a research theme. Total Factor Productivity (TFP) at village and hub level are specified as indicators for the productivity IDO.⁴⁶ The four research questions regarding this theme refer to estimating and addressing yield gaps in aquatic agricultural systems; sustainable intensification for the poor and vulnerable; the contribution of farming and fishing enterprises to GTA; and upscaling. The last three questions are common question all themes.⁴⁷

Except for the Western Hub in Solomon Islands, productivity was a central element of all the hub development challenges that emerged from the roll-out process. Productivity was also the theme that has received most funding and the largest allocation of staff. The major share came from bilateral projects.

An excellent review of interventions that aim to improve agricultural productivity in the hubs was

⁴⁵AAS Proposal (2011), p. 27.

⁴⁶ AAS Extension Proposal (2014), p. 27. Even though TFP is a standard indicator, the table in the proposal on p. 20 that specifies the measurement of the IDO indicators has the entry stating that the measurement still needs to be developed. Also see: http://ispc.cgiar.org/sites/default/files/ISPC_StrategyTrends_Metrics.pdf

⁴⁷ AAS Extension Proposal (2014), p. 27

completed.⁴⁸ The evaluation team was informed that a review of participatory research interventions that aim at improving productivity is underway.

While the word “system” is in the title of the theme, the research has not been elaborated from a systems perspective. The AAS Science Handbook contains no section on productivity, even though related aspects, such as the social ecological systems framework and climate change are addressed. Interviews indicated that program staff have many ideas about how productivity might be addressed across the different hubs, but there is no document that brings these together. Likewise, there does not seem to be ongoing activities or plans to identify and analyze how the aquatic agricultural systems being studied in the hubs relate to other aquatic agricultural systems. This would require developing more finely grained typologies of aquatic agricultural systems.

Some studies by the partner centers aim to enhance understanding of the foundations of productivity problems in the hubs. These include agro-biodiversity and ecosystems services assessments and work on nutrition-sensitive landscapes with Bioversity, and a study on flood risk management by IMWI. The information available from staff interviews suggest that some innovative approaches are being used, e.g., a participatory eco-services assessment methodology that pays specific attention to gender. However, at the time of the evaluation, it was too early to assess this work.

A draft paper by Carmona Estrada (2014) on participatory landscape analysis shows potential. One published report presenting an agrobiodiversity assessment was available for the Barotse hub.⁴⁹ It provides a generic description of different resources, drawing on a limited number of literature sources. It is only the first report from the study and an additional report presenting empirical findings is being prepared.

An important achievement of the productivity research is the establishment of a close link with the nutrition theme, which has led to the publication of several policy briefs, manuals and brochures based on the program’s small fish productivity and nutrition research.

The publications review showed that most of the productivity-focused publications dealt with fisheries, reflecting the traditional area of expertise of WorldFish. These papers were mostly published in international journals; they were also mostly rated to be excellent by the evaluation team. The country case studies indicated that especially in the case of Bangladesh, a comparative large number of excellent studies on productivity related to fisheries was produced. The ten most cited papers from the period 2009–2014 dealt with the environmental, policy and socio-economic dimensions of fisheries, rather than productivity *per se*. An example of recent work that aims to address productivity from an integrated aquaculture-agriculture perspective is a working paper that applied a Tradeoff Analysis for Multi-Dimensional Impact Assessment (TOA-MD) to assess the impact

⁴⁸ Castine et al. (2013)

⁴⁹ Baidu-Fordsen et al. (2014): Assessment of agrobiodiversity resources in the Borotse flood plain, Zambia. AAS Working Paper

of adopting aquaculture-agriculture technologies in Bangladesh.⁵⁰

Productivity-oriented research that is currently underway as part of PAR in the hubs is relatively recent. The evaluation team is not convinced that the priority setting methods used in the roll-out process resulted in the identification of those areas and activities that have the greatest potential to lead to sustainable increase in productivity, as further detailed in the case studies (Annex D). This would require a more intensive and longer-term interaction between community members, and the involvement of other actors and researchers with expertise in productivity improvement.

Apart from the challenges with priority setting, the observations on productivity research during the roll-out case studies revealed a mixed picture. On the positive side, some of the on-farm experiments in Bangladesh were focused on technologies that are particularly suitable for resource-poor households, such as challenged ponds, wish-ponds, small fish, vegetable towers and floating gardens. On the less positive side, the evaluation team could not identify any systematic efforts to collect and use information on essential dimensions of agricultural productivity across the hubs, such as yield levels, crop and livestock production systems, soil quality, etc. A closer collaboration with partners such as the ministries of agriculture and their agencies could facilitate the collection of such data. The 2015-2016 extension proposal indicates that data on TFP will be collected. But taking Zambia as an example, the hub team did not have even a rough estimate of yield levels of major crops. Information on productivity of aquaculture and fisheries has mostly been collected through bilaterally-funded projects, as in Bangladesh and Solomon Islands. These do not cover other productivity aspects of aquatic agricultural systems, such as crop yields. In Zambia, the program supported fisheries co-management apparently without collecting any data on the resource base. There was no fisheries expert who supported the country team in this respect.

The PAR activities that fall under the productivity theme have to a large extent focused on a single crop or variety (such trials to test new types of vegetables), using technologies and expertise from the national agricultural research and extension systems. The choice of such technologies may be justified by strategic considerations, such as the need to start building capacity and winning trust by realizing “quick wins.” Still, it is not clear whether or how these activities will be further developed to address agricultural productivity from a systems perspective – i.e. with a focus on the sustainable productivity of the entire system, while taking ecosystem services into account. Combining international and local expertise to address productivity problems in aquatic agricultural systems is an obvious potential contribution of the CGIAR. The case studies indicated that, especially as far as crop-related PAR activities are concerned, there has been relatively little progress along these lines.

Observations made during the evaluation team’s field visits revealed a number of technical problems with the program’s fisheries and aquaculture activities, which may point to lack of appropriate backstopping and quality control. For example, in the Cambodian RFF project the presence of an excessive number of carnivorous snakehead fish had the potential to drastically reduce the productivity and diversity of other fish in the refuge ponds. This situation was not being addressed.

⁵⁰ Murshed-e-Jahan et al, (2013).

Likewise, the farmers are feeding catfish with small (trash) fish which can have negative consequences for biodiversity. In Bangladesh, the AIN project supported private tilapia hatcheries, with the idea that quality fry are essential for productivity improvement. The results achieved in the hatcheries in terms of percent of monosex male fry appeared to be below the level required to ensure economic viability (i.e. >99 percent male). Shortcomings were also observed in some of the agricultural activities. In Zambia, for example, the seeds for some crops arrived too late for optimal planting, and there was apparently no systematic data collection from the on-farm crop trials, even though this had been planned. A study on the adoption of conservation agriculture, which was presumably a major activity under the productivity theme, was left to junior staff without adequate backstopping.

Overall, the theme remained conceptually underdeveloped at the time of the evaluation. The work with Bioversity on Sustainable Intensification and Ecosystem Services, as presented at a conference of the three systems CRPs in Ibadan in March 2015, can be seen as a step towards developing a stronger conceptual foundation for this work.

SUGGESTION 2. The theme leaders might be asked to develop a clear strategy for the program's productivity research. This strategy could make the conceptual foundations of the research explicit, and identify the research methodologies to be used, the types of data to be collected, and the analytical methods to be used. The evaluation team believes that an agro-ecosystems perspective could be a useful framework. The strategy should engage with current debates around productivity, including yield gaps, sustainable intensification, agro-ecology, and eco-system services, and build on ideas presented by the theme leaders at the Ibadan conference in March 2015. A focus on the productivity-relevant linkages between the aquatic and the agricultural components of aquatic agricultural systems is of central importance as it would appear to be one of the big opportunities created by AAS. Through this strategy system productivity could be addressed in an interdisciplinary way, which will require intensified collaboration across the participating centers and partners, and the formation of teams who directly interact with the communities.

SUGGESTION 3. As part of the strategy development process a senior researcher might be tasked with reviewing existing methods for community-based problem identification and priority setting, and critically assessing their relevance to the productivity theme. Based on this review the program might decide to experiment with different methods with the objective of both improving implementation and contributing to methodological development.

3.5.2 Equitable Access to Markets

This theme was introduced in the 2011 proposal, which suggested participatory and gendered value chain analysis would be the main methodologies used. The theme is also included in the 2015-2016 extension proposal, but in the diagram that displays the IDO indicators, value chains do not appear

and there is no indicator that would capture, for example, improved access to markets.⁵¹ It is also important to note that both the Livestock and Fish and the Policy, Institutions and Markets CRPs also do work on value chains relating to fisheries.

Approximately 18 percent of AAS funding has been allocated to this theme. The theme is covered in the AAS Science Handbook,⁵² which outlines what is presented as a specific AAS approach to value chain development that combines value chain analysis with PAR. The establishment of “value chain platforms” is proposed. The Science Handbook also includes a checklist of information needed for gendered value chain analysis and makes reference to the toolkit for value chain analysis developed by the Livestock and Fish CRP.⁵³

For the roll-out cases, three studies were available in the form of reports, two of which were still in draft form. One is a report of a fish value chain study in the Barotse hub, following the approach outlined in the Science Handbook. The study used participatory and survey data collection methods, as well as workshops with stakeholders to share results and receive feedback, and can be seen as the starting point of PAR since two follow-up actions were initiated (fisheries co-management and promotion of salted fish). Specifically, an innovation platform was established to promote salted fish production. According to staff, it has been challenging for the project to keep up with stakeholder expectations. Interviews conducted by the evaluation team in the hub confirmed that the study was well known and appreciated by stakeholders. The study report itself is largely descriptive, and further efforts would be required to make it of more than local interest. The draft report does not address questions about power relations within and around the value chains. This was a choice motivated by the concern not to disturb the ongoing process of engagement with local power structures. Journal publications are planned to publish insights gained on this topic, such as the existence of a powerful ‘cartel’ of local traders as well as the power relationships between (male) fishers and (female) traders based on ‘transactional sex’. It was also planned that a study of beef and rice value chains would be conducted in the Barotse hub, but due to time constraints, this has not yet been done.

A value chain study was conducted on carp seeds under the AIN project in Bangladesh. An internal report was completed, and a paper has meanwhile been submitted to a journal. The study provides a wealth of information and is a practical or applied work in the tradition of subsector analysis. A third study was conducted in the Solomon Islands and presents a gendered analysis of two value chains. The emphasis is placed on gender-differentiated roles, livelihoods and assets; decision making; and gender equity. The main purpose was to provide advice to the Solomon Islands’ Ministry of Fisheries and Marine Resources. The results were written up in an internal report and a brief to the Ministry, which is mostly descriptive.

The publications assessment included six studies on markets and value chains, which were based on

⁵¹ AAS Extension Proposal (2014), p. 19

⁵² AAS Science Handbook (2013), p. 89ff.

⁵³ See: http://livestock-fish.wikispaces.com/VC_Toolkit

research conducted prior to AAS. All of these studies related to aquaculture and fish. Four of the publications were articles that were published in international journals (*World Development*, *Food Policy*, *Aquaculture*), and two were working papers. Five of the six papers were rated as excellent by the evaluation team, and one, which is a working paper, was rated as average. The team found that all papers made important contributions to the literature by providing new insights to relevant topics, such as food safety and certification, and by providing innovative perspectives that are also of interest from a methodological perspective, e.g., on value chain governance. One paper used advanced econometric methods.

In summary, the program clearly has the capacity to conduct high quality research, produce broadly relevant knowledge and contribute to development outcomes around value chains. Observations from the roll-out cases indicated that a start has been made to combine the value chain approach with PAR. In one case, more than a year after completing studies under this theme, findings were not yet available in form of a final report, and in two other cases, the final reports are not publicly available. Journal publications were in preparation. In some hubs the program's expertise in this area is limited, which may explain the evaluation team's assessment that some of the work lacks an analytical edge. The evaluation team considers that if equitable access to markets is to remain a priority research area, the evaluation team suggests that a greater investment in appropriately trained staff at the hub level should be considered.

3.5.3 Socio-ecological Resilience and Adaptive Capacity

This theme was introduced in the proposal with the justification that people living in aquatic agricultural systems are vulnerable to a range of shocks and have limited resources to deal with them. The proposal highlighted the resilience concept and suggested a participatory approach to vulnerability and risk management. In the 2015-2016 extension proposal, resilience is maintained as a theme. The IDO indicators that refer to resilience focus on the capacity to adapt through collective action.⁵⁴ The Science Handbook has a chapter on resilience which provides a detailed overview of the concept, as well as a chapter on climate change which focuses on adaptive capacity. The chapter on the social ecological system framework also relates to this theme. The concept of eco-system services used by the theme provides a conceptual link to productivity as it includes provisioning services, but this link has not been further developed. The two themes are treated independently in the program's planning documents and, as the case studies indicate, also in practice.

Approximately 14 percent of the AAS budget is dedicated to the theme. The staff working on this research is rather unevenly distributed over the hubs, with 14 FTE mapped to it in the Solomon Islands and almost none in Zambia.

The roll-out cases provided limited evidence of research activities that were related to the resilience theme. An IWMI study on flood risk management was underway in the Barotse hub, involving a multi-disciplinary team with expertise in GIS and Remote Sensing, hydrological modeling, gender and

⁵⁴ AAS Extension Proposal (2014), p. 19

institutions. It is too early to assess these activities. In Bangladesh, the scoping report identified water management as one of the major problems in the polder zone, and the two Activity Plans (one by WorldFish and one by IMWI) specified numerous research outputs on issues related to water management (see Bangladesh Roll-out Case Study in Annex D). A number of relevant IMWI publications on these topics were made available to the team, which were produced in connection with the Challenge Program and Water and Food. In the Solomon Islands resilience and adaptive capacity related to community fisheries management played an important role in the roll-out activities, and a substantial share of staff FTE is mapped to this theme. In Cambodia, outputs were also produced that refer to resilience with respect to fisheries management.

The publications assessment covered 12 publications that were classified under resilience, seven of which were journal articles. They were all published in international journals and cover a range of different topics, from vulnerability of HIV/AIDS affected households in Malawi to whether aquaculture can add resilience to the global food system. Five of the ten most frequently quoted papers by WorldFish during 2009 - 2014 refer to resilience topics. Overall, the publications review documents significant expertise within WorldFish regarding resilience research.

In summary, resilience in the context of fisheries management is one of the major areas of expertise of WorldFish, from which AAS can benefit. The publications record indicates that WorldFish researchers have played a global leadership role in important debates on this topic, such as adaptive co-management. AAS could build on this track record in applying resilience thinking in the wider context of aquatic agricultural systems. The collaboration with IMWI on water management and with Bioversity on ecosystem services is also particularly important in this context. A promising start has been made, but at the time of the evaluation, it was too early to assess the application of these concepts in the wider context of aquatic agricultural systems.

SUGGESTION 4. The evaluation suggests that AAS use its expertise on resilience related to fisheries to shed much needed light on resilience issues in the wider context of aquatic agricultural systems. The collaboration with IMWI and Bioversity in the area of resilience should be continued. It is suggested that the work on resilience could be much more closely linked with that on system productivity, not only conceptually, but also through PAR activities in the field.

3.5.4 Gender Equality

The program's work on gender has two key strands. First, Gender Equality is one of the six research themes. Second, gender is dealt with as a cross-cutting issue. Research under the Gender Equality theme is guided by the AAS Gender Strategy, which states that "We will [...] invest in systematic testing of different AAS program designs or suites of interventions developed to marry 'technical' interventions delivering better access to assets, markets or new technologies, with those directly targeting the norms, values and attitudes identified as underlying gender and wider social inequalities." The overall method for achieving this is the Gender Transformative Approach (GTA). The enabling elements include capacity development and organizational change, and coalition building for knowledge sharing, learning and scaling.

GTA aims "to influence retrogressive social norms in addition to bridging the gaps in access to and

control of productive resources between men and women”.⁵⁵ The key features of the GTA comprise broad-ranging research processes and inclusive and integrative practices, which are intended to continually inform each other and lead to an enabling social environment ensuring better outcomes for poor women and men. It is suggested that understanding and addressing both the causes and consequences of gender inequalities will lead to lasting improvements in productivity, incomes, adaptive capacity and innovation capacity and ultimately result in empowerment. The notion of transformation is central to GTA, and according to the Science Handbook, AAS understands this to mean “deep, enduring change in the form of something such that ‘what emerges is fundamentally different from what went before’ (Brookfield 2012, p. 131)”.⁵⁶

Under this theme AAS developed partnerships with:

- The University of East Anglia to provide gender research training and backstopping
- The Johns Hopkins University, Center for Communication Programs to help identify and understand pathways to change and develop effective communication strategies
- Helen Keller International to extend implementation in the Khulna hub communities and to improve monitoring, evaluation and learning frameworks
- Promundo-US, to design inputs into and deliver a gender capacity development strategy.
- And numerous others such as Caritas/ Catholic Relief Services, CARE, CONCERN, Peoples’ Participation Services, Barotse Royal Establishment, and ministries of agriculture, livestock and fisheries to help deliver AAS interventions

These partnerships are weighted heavily towards institutions based in the North. It would have been useful to create partnerships with academic institutions based in the countries or regions where the program is based. Many such institutions (e.g. in southern and eastern Africa, India and Thailand) have expertise in gender and gender studies programs. In addition, the involvement of students and faculty from such institutions would enhance the sustainability of the GTA in particular and AAS in general.

Commitment amongst staff involved in the gender work is high. However, many come from a development background and have little or no training in research (5.22 FTEs at MA/MSc level, 1.90 FTE at PhD level). In some hubs PhD level input into this theme is extremely limited, e.g. 0.02 FTE in Solomon Islands and 0.20 in Cambodia. This has resulted in relatively little local-level mentoring or encouragement to write up and publish work. AAS is trying to address this problem through long distance coaching by Penang-based gender staff and an intensive collaboration with the University of East Anglia. There are several papers in press or in draft form. Most have been written by a small core of gender staff, including some who are in partner organizations.

⁵⁵ Chapter 6, Science Handbook

⁵⁶ Chapter 6, Science Handbook; Ref: Brookfield, S.D. (2012). “Critical theory and transformative learning.” In *The Handbook of Transformative Learning: Theory, research and practice*, ed. by E.W. Taylor, P. Cranton and Associates, pp. 131–146. Jossey-Bass: San Francisco.

Work under the gender theme has included a number of social and gender analyses in the hubs. These studies have resulted in a source of baseline data that the program suggests will eventually be used to document social transformation and progress towards the gender equality.

The rollout case studies provided evidence on the application of GTA. In Zambia and Bangladesh community-based activities include savings groups and variety trials. In Zambia, AAS works through Caritas on a savings-led micro finance system known as Savings and Internal Lending Communities Plus (SILC+). The plus refers to the addition of GTA to the basic SILC activities already being carried out by Caritas in various locations. SILC+ is meant to empower both men and women by helping them save or borrow money to open small businesses or meet unexpected expenses. It also goes further in organizing critical discussions about gender roles and norms. In addition, AAS sponsored various small field trials on vegetables and rice and has involved women in activities such as canal clearing that previously were carried out exclusively by men. The program also produced agricultural calendars and recipe books to help improve nutrition.

In Bangladesh, work under this theme facilitated discussion groups on horticulture and other agricultural issues and encouraged both men and women to think of themselves as farmer-researchers. The program has worked with poor women and men on the improvement of home gardens, livestock, and home fish ponds as well as on crop variety trials (e.g. ginger, chilies and turmeric). Both women and men have been taught to make regular measurements and keep record books. Through these activities, AAS suggests it is addressing the first part of its theory of change, which involves the establishment of norms for greater gender equality at the community and hub level. In both Zambia and Bangladesh, the AAS program has sought to provide poor, marginalized women and men with spaces where they can discuss problems and find solutions together. The evaluation team was not clear about how these activities will be replicated and scaled out.

In both Bangladesh and Zambia, vegetable production trials were run, and in Bangladesh trials on fish production were established. To date, few new technologies have been developed or identified for dissemination. Some partners indicated a level of disappointment at the slow progress with provision of technologies, as they saw these as being the most important drivers for improved livelihoods and ultimately, social change.

The publications review indicated an increased focus on gender since the initiation of AAS. All papers included in the reviewed sample that specifically focus on gender were published after 2012, and the share of papers that addresses gender issues in some form also increased after 2011. The review also found that six out of 30 publications in the sample that made reference to gender made use of the GTA. One of the six publications was an article published in the journal *Fish and Fisheries*, which is ranked number one in the field of fisheries.

In summary, while the GTA approach itself is not new, its systematic application across a number of aquatic agricultural systems is, as is the strong linkage to PAR. Additionally, the RinD and PAR elements of the program add important dimensions to the GTA. Overall, the work being done on gender transformative approaches within AAS is conceptually well-grounded. It has the potential to make an important contribution to understanding changes in gender norms, perceptions and

relations. Moreover, AAS has been diligent in recording processes of self-reflection and learning. In the long run, the gender work has the potential to have impact beyond the boundaries of the program. Gender researchers and development workers may benefit from the GTA. Its ability to add value to agricultural research and development programs remains to be demonstrated. Indeed, this emerged as a frequent criticism of the AAS gender work in the interviews the evaluation team conducted with partners and stakeholders.

SUGGESTION 5. The evaluation team suggests that it may now be time to shift the focus so that work under this theme contributes more directly to efforts to evaluate productivity enhancing innovations and processes and dynamics of technological change. This would be very much in line with the program's stated ambition to "marry 'technical' interventions delivering better access to assets, markets or new technologies, with those directly targeting the norms, values and attitudes identified as underlying gender and wider social inequalities."

3.5.5 Policies and Institutions to Empower AAS Users

The research theme Policies and Institutions was introduced in the 2011 proposal with the justification that the "policy environment has a powerful influence on people's lives and that, in the absence of favorable policies and supporting institutions, improved technologies at the field level are generally of little long-term benefit."⁵⁷ The 2015-2016 extension proposal also includes this theme. None of the IDOs or IDO indicators make direct reference to changes in policies or institutions. Similar to the case of the value chains and resilience themes, research under this theme was able to draw on substantive earlier experience of WorldFish.

Approximately 12 percent of AAS budget is allocated to the Policies and Institutions Theme. Staff capacity in relation to this theme is distributed unevenly across the hubs. In Cambodia and Bangladesh, the allocation was low, and in Zambia almost absent.

The AAS Science Handbook deals with policies and institutions under the heading "governance", and presents a framework for governance analysis in aquatic agricultural systems that built around stakeholder representation, distribution of authority and mechanisms of accountability.

The governance assessments conducted as part of the scoping studies were of excellent quality, especially considering the short-term nature of the exercise. For example, the Zambia scoping⁵⁸ study provided a very helpful overview of the complex institutional setting prevailing in the hub. The study also identified a number of important points that needed to be addressed.

Due to staff limitations the research on governance has not yet moved much beyond these initial assessments. This was particularly evident in Zambia and Bangladesh. The roll-out case studies indicated a need for a governance expert to be involved at the hub and community levels. This might

⁵⁷ AAS Proposal (2011), p. 36

⁵⁸ Madzudo et al. (2013), "A Governance Analysis of the Barotse Floodplain System, Zambia: Identifying Obstacles and Opportunities", Project Report: AAS-2013-26.

have enabled the program to assess local power relations (such as those related to the Barotse Royal Establishment in Zambia, or village-level politics in Bangladesh), and to critically analyze the role that AAS itself plays in this context. The PAR work on fisheries co-management and community-based canal clearing in Zambia would also have benefitted from more access to expertise in governance. Moreover, in view of the strong focus on productivity reflected in the hub development challenges, the evaluation team would have expected more critical research attention to the institutions that directly affect productivity, such as agricultural extension.

The theme has been successful in producing high quality journal publications from research in the hubs. This progress was facilitated by the development of a specific conceptual framework for governance analysis in aquatic agricultural systems, and its application across the different hubs. A paper applying the framework in Cambodia, Bangladesh, Malawi and the Solomon Islands was published in the international journal *Ecology and Society*. Eleven publications dealing with governance and institutions were included in the publications assessment, eight of which were journal articles. Significant outputs under this theme were produced under the bilateral (GIZ) funded Strengthening Aquatic Resource Governance (STARGO) project.

In summary, the research on policies and institutions has benefitted from the established expertise of WorldFish in the area of governance. The theme has demonstrated that if a coherent conceptual framework is developed and applied consistently, broadly relevant knowledge that address cross-hub issues can be produced in a relatively short time. Following the initial assessment exercise subsequent research under this theme in the hubs was limited due to scarce staff resources, especially in Zambia and Bangladesh.

If Institutions and Policies is to remain a priority research theme the evaluation team strongly suggests that additional staff should be allocated to it. It would also be highly desirable to have researchers with expertise in this field based in the hubs and directly involved in PAR activities in the communities, where they could contribute to addressing governance issues that are relevant for the success of PAR, such as local power relations.

3.5.6 Nutrition

The nutrition theme was not included in the original AAS proposal. Reflecting the increasing attention to nutrition within the development community and the CGIAR, the 2015-2016 extension proposal includes improved nutrition as an IDO, and identifies consumption of nutrient-rich fish and vegetables by women and children as IDO indicators. The research questions are framed around the role of fish in the diet, and the potential contribution of micro-nutrient rich small fish.⁵⁹

The roll-out and project case studies provided the opportunity to observe some of the program's work under this theme. In Zambia, an intern supervised by three senior researchers in AAS was working in communities to promote diet diversity. Food calendars and a cookbook were developed

⁵⁹ AAS Extension Proposal (2014),p. 27-28

as part of this work. The feedback from community members indicated that this initiative was highly appreciated. The analysis of diets upon which this activity was based was itself based on secondary data from NGOs and government statistics. In Bangladesh, participatory research or PAR on nutrition work was planned but had not started due to concerns of overloading the communities with too many activities.

The program's major nutrition intervention in Bangladesh is through the AIN project, which includes a large-scale nutrition education component. According to the women interviewed as part of the group discussions, this activity was valued. In Cambodia, the bilateral project included in the review also had a nutrition component, but this appeared to be rather neglected.

Four publications focusing on nutrition were included in the sample drawn for the publications review. All four were reviews of mixed quality; there were no journal articles amongst them. The publications on nutrition provided for review by AAS management included an excellent journal article on the role of aquaculture for food and nutrition security in Bangladesh (published in *Food Policy*), and a draft paper on "The role of small indigenous fish and other local, nutrient-rich ingredients in food products for the first 1,000 days". The third was a literature review on food and nutrition security in the Solomon Islands, which made good use of existing data sources. These publications indicate the potential of AAS to produce broadly relevant research-based knowledge under this theme in the future.

In summary, due to the recent inclusion of the nutrition research theme, the evaluation team considers it too early to make a meaningful assessment of the theme as a whole. Based on available publications and field observations, it would appear that the program offers multiple opportunities to conduct high quality research on nutrition using a variety of qualitative and quantitative research methods. A promising start has been made. AAS has already increased its research capacity in this area and developed new partnerships to address this topic. AAS has also established a link with A4NH, especially for the purpose of testing the Nutrition Sensitive Landscape approach. This work also involves Columbia University and the University of Wageningen.

3.5.7 Knowledge Sharing and Learning

This theme was introduced in the original proposal with the justification that the CRP "must embrace a culture of knowledge sharing and learning that sustains productive relationships, partnerships and networks. To support this, strengthen the performance of program participants, and better achieve program outcomes, we will design and adapt innovative knowledge-sharing and learning practices".⁶⁰ The research questions in the 2015-2016 extension proposal regarding this theme suggest that its main purpose is to conduct research on RinD.⁶¹ Specifically, the theme has two purposes: one is to promote a process of knowledge sharing and learning within AAS, and the other to conduct research on this process. As the theme has a research agenda of its own, it is

⁶⁰ AAS Proposal (2011), p. 38.

⁶¹ AAS Extension Proposal (2014), p. 29.

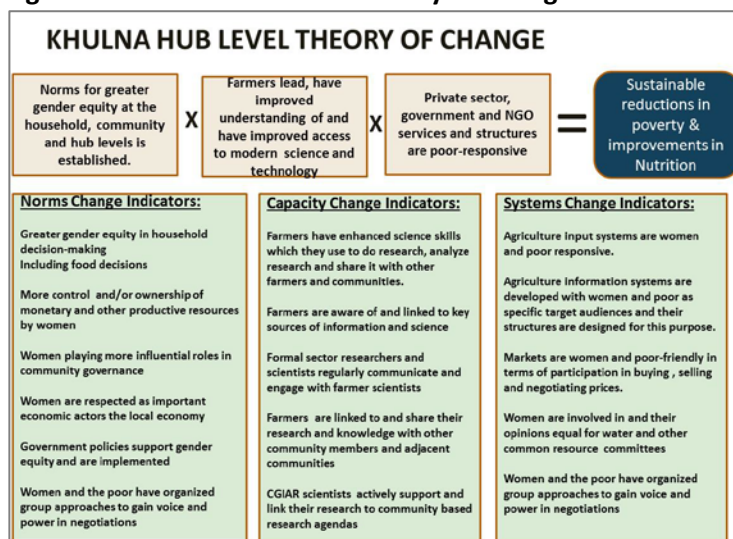
evaluated here not only with regard to its role in promoting knowledge sharing and learning, which contributes to the effectiveness and impact of the program, but also with regard to quality of science.

This theme accounts for approximately 16 percent of the program budget. The staff resources for the theme are relatively evenly distributed across the hubs, with a somewhat larger share in Bangladesh. In view of the centrality of this theme to AAS, the Science Handbook has several chapters related to it: PAR, which is pursued under the KS&L theme, monitoring and evaluation, development communication and scaling pathways. The team in charge of the theme has produced a number of guidance notes on RinD, including most recently the notes on research design in the hubs. Documents such as the Science Handbook and the Roll-out Handbook can also be seen as tools to foster knowledge sharing and learning within AAS.

In the roll-out case studies, the evaluation team observed the use of theory of change, outcome evidencing and after-action reflection. The hub-level theory of change for Bangladesh is shown in Figure 3-3, which indicates that a combination of greater equity at household, community and hub level; improved farmers' understanding; and access to modern science and a more poor-responsive service provision by government, NGOs and private sector should lead to sustainable poverty reduction and nutrition improvement. The figure also contains a set of norms, capacity and system change indicators, which are formulated as generic statements rather than expressions of changes (e.g. "agriculture input systems are women and poor responsive").

From a research perspective, the value of such a theory is doubtful. There are numerous theories that address technology adoption (e.g., sociological theories of diffusion of innovations, the economic theory of induced innovation, the systems of innovation theories, etc.). Compared with these the theory of change from the Bangladesh hub is very simplistic. AAS argues that the main purpose of this theory of change is to facilitate participatory planning and after action reviews, and to generate buy-in and understanding. The evaluation team acknowledges this difference, but suggests that theories of change that are grounded in the relevant bodies of theory would be both more compelling and more effective in facilitating PAR and contributing to global knowledge.

Figure 3-3: Khulna Hub Level Theory of Change



Source: Presentation by project staff

As part of the publications review, the evaluation team reviewed seven publications relating to this theme, including three selected by AAS management. Five of these were working papers and two were program briefs. The main purpose of these documents was to provide guidance to program researchers and partners on topics such as using theory of change, using PAR, applying outcome mapping, and learning from implementation of community mapping. The evaluation team could not identify clear linkages between these outputs and relevant fields of literature and methodology, which might, for example, include organizational learning and knowledge management, epistemology and ontology, and adult learning. In addition, the team reviewed a number of draft publications under preparation by the theme. These drafts clearly show potential to develop such linkages, but they were not yet developed to an extent to make a final assessment possible.

In summary, the knowledge sharing and learning theme has played a role in establishing a culture of self-reflection and learning within AAS, including learning from mistakes. This is clearly an important achievement. The evaluation team also acknowledges the positive role of the mechanisms for knowledge sharing and learning established at the community and hub-level, such as after action reviews. It appears to the evaluation team that, so far, the theme has focused primarily on learning from the program's own experience, while neglecting the wider experience and accumulated knowledge relevant to the research problems.

SUGGESTION 6. The knowledge sharing and learning team is encouraged to develop a much more clearly articulated set of research questions.

3.6 Partnerships and capacity building

Partnerships and capacity development play an important role in enhancing the relevance, quality of science and effectiveness of the program, as well as its eventual impact. The analysis in the sections below is based primarily on review of program documentation, the roll-out case studies and interviews with management, staff and partners.

3.6.1 Partnerships

The AAS proposal was explicit about the program's intention to integrate partnerships into all aspects of program design, implementation and governance, and it contained a substantial chapter called "Partnership Strategy". Three types of partners were identified: "core institutions", "key implementing partners" and "general partners." As presented, core institutions included government and national agricultural research institutions, while the key implementing partners included national and international NGOs and universities, amongst others. General partners were defined as those that "contribute additional expertise, skills and experience that are important for the success of the program but can be secured from alternative sources." By way of illustration, the proposal articulates some aspects of engagement with selected partners in Bangladesh, and the skills and achievements of some global partners, but remains otherwise at a generic level.

Instead of using the categories core institutions and key implementing partners, the evaluation team distinguishes here between research partnerships and development partnerships, considering that they contribute different types of expertise to the program. Both of these categories include national as well as international partners. Other CGIAR centers, components of the national agricultural research systems and universities are obviously research partners; government extension agencies, local and international NGOs and donors are considered as development partners.

Research partners

Partnerships with research organizations have two functions. First they allow AAS to draw on a wider array of expertise and competence than is available in-house – e.g. from other CGIAR centers, other CRPs and from research centers and universities both nationally and internationally. Second, they provide an avenue for capacity development, often understood as AAS building the capacity of others, primarily national organizations. It is important to remember that capacity development also flows in the other direction, with the University of East Anglia's training of the program's gender staff being a prime example.

In principle, the most important research partnership for AAS is the one between the three collaborating CG centers – WorldFish, IWMI and Bioversity. Given that a very low share of funding is allocated to them, and the fact that they do not map any of their bi-lateral projects to AAS, the evaluation team questions whether AAS is a multi-center, collaborative research program. AAS did make efforts to foster an equitable partnership with the other centers, e.g. through the joint leadership of the research themes by staff from different centers and the posting of focal staff from other centers at WorldFish Headquarters. There was also an effort to establish a profile for AAS that is independent from WorldFish.

There has been some engagement with centers other than Bioversity and IMWI, including ILRI, CIMMYT and IIRRI, and with some other CRPs (including A4NH, CCAFS and L&H). AAS has, for example, collaborated with IIRRI and CIMMYT in the context of the Cereal Systems Initiative for South Asia (CSISA). Interviews and field observations indicated that this collaboration did not lead to an

integrated research agenda: the centers tried to implement their activities in the same villages, but worked with different, partly overlapping groups (see more details in the Bangladesh Roll-out Case Study in Volume II, Annex D).

Formal partnership agreements have also been established with universities including the University of East Anglia (UK), Johns Hopkins University (USA) and James Cook University (Australia). The publications review indicates that some of these partnerships have resulted in joint journal publications. However, no specific collaborative arrangements have been established with universities or research institutions that have specific expertise in action research or PAR (e.g., Wageningen University, Open University or The Swedish University of Agriculture). The partnership with Constellation, although focused on PAR, is not a research partnership. Likewise, the evaluation team did not identify any new partnerships formed to strengthen capacity in the areas of agricultural productivity and farming systems research.

The evaluation team also observed that there was a lack of engagement with universities and research institutions in the South, even though the AAS partnership strategy identified them as core partners. While some university-based individuals are involved in the program, the evaluation team did not learn of any formal partnership arrangements with universities. This is a missed opportunity, because AAS could both make a contribution to capacity development through these kinds of partnerships, and at the same time benefit from having more MA/MSc and PhD students associated with it. The program could also benefit from the local expertise and networks, which are particularly relevant for a PAR approach. The lack of trained AAS research staff in the hubs who could provide quality supervision may be one factor that constrains movement in this direction.

Development partners

Considering the nature of the RinD approach, collaboration with development organizations is of particular importance. These organizations can contribute to effectiveness and impact through engagement in the hubs. In addition, they can contribute to achieving impact through the creation of learning alliances and impact networks at regional, national and global levels.

One aspect of the partnership with development organizations is the fact that representatives of CARE and CRS are part of the Program Leadership Team. The goals of this partnership include learning from their expertise and networks, and working to develop scaling strategies beyond the locations where the program is currently working.

The roll-out case studies showed that AAS was able to establish collaboration with a wide range government and non-government organizations at the national and hub levels. The evaluation team found that the roll-out process was an effective way to foster partnership and engage in joint planning and priority setting. In some hubs NGOs were intensively involved in the community-level activities. The roll-out and bilateral project case studies also showed that there were important limitations associated with the program's dependence on development partners.

Collaboration with government organizations varied across hubs. In Zambia, there was close collaboration with the ministries of agriculture and fisheries and the national agriculture research

organization (ZARI), which were involved in the implementation of PAR activities. As discussed above, the program was not yet able to leverage the technical expertise of the CGIAR for these partnerships. As further detailed in the Zambia roll-out case study report, the evaluation team also found that AAS had not paid sufficient attention to how working with traditional authorities might reinforce unequal power relations.⁶² This points to the need to revisit the processes through which partners were identified and engaged.

In Bangladesh, government organizations did not seem to be the important development partners foreseen in the partnership strategy, and the fact that the evaluation team was not able to meet with government partners at the national level reinforces this conclusion. The case study of the bilaterally-funded AIN project showed that the program was largely implemented in parallel to government organizations. This is seen as problematic by the evaluation team, both with regard to the sustainability of the program, and with regard to CGIAR's mandate. The organization of the Rohu breeding program, which was not linked with any government organization, is a case in point. The root of this problem seems to be the desire of some donors to fund CGIAR centers to do technology dissemination, rather than using government organizations. It seems they believe the centers can deliver results more quickly. This short-term gain is potentially offset by (i) diverting the attention of the centers away from their primary research mission, and (ii) undermining the long-term sustainability of government services.

As indicated above, NGOs played a key role in the implementation of AAS. Constellation made an important contribution to the roll-out process. As discussed previously, in the evaluation team's view Constellation was not necessarily the best partner, principally because it lacked experience in agricultural and natural resource management.

Interviews conducted in the field suggested that some partners who were implementing roll-out activities and PAR see their role more as sub-contractors than as partners. The fact that some NGO partners are continuing to do more or less the same work as in the past, although now with modest financial support from AAS, may explain why some community members identify with the NGO as opposed to AAS (which is not necessarily a bad thing). As previously discussed, reliance on NGOs, combined with the limited time that AAS researchers in some hubs spend in the communities, has created a problematic gap between the research program and the field activities.

3.6.2 Capacity development

Capacity development is an essential component of all CRPs. A short chapter of the AAS proposal was devoted specifically to capacity development. This chapter makes reference to CIAT (which in 2011 was considered a partner in AAS) and its model of "learning alliances", defined as a concept that captures "the nonlinear, iterative nature of learning and the relationships and networks needed

⁶² This problem is well documented in the literature, see Ribot, J. (2001). "Integral local development: 'accommodating multiple interests' through entrustment and accountable representation". *International Journal of Agricultural Resources, Governance and Ecology* 1 (3-4): 327-350.

to support it.⁶³ The proposal advocates demand-driven capacity building and presents a list of possible areas for investment, which covers the range from technical skills and organizational capacity to action research.

The roll-out case studies indicated that, so far, capacity development activities have mostly related to the roll-out process, including training on AAS principles, the GTA and PAR. A paragraph in the 2013 AAS Annual Report states: “The innovative nature of the AAS approach highlights the importance of building capacity of staff, partners and other stakeholders. While this has been an area of focus since the start of the program, 2013 has highlighted the need for sustained investment in capacity development. This is planned for 2014.” In the November 2014 presentation to the evaluation team in Dhaka, capacity development was once more highlighted as an element of RinD, and the “RinD Capacity Enabler” was a priority area of work in 2013-2014. Capacity development priorities identified for the 2015-2016 period include: (i) leadership and management (ii) RinD, and (iii) science quality.

The evaluation team found that in the area of gender, capacity development activities were well thought through and coordinated.

A missed opportunity for capacity development related to the lack of involvement of senior researchers at the community level, which constrained joint “learning by doing” by less experienced staff and program partners.

3.6.3 Assessment

AAS was able to build on well-established research partnerships in the traditional areas of expertise of WorldFish, which positively contributed to quality of science. In contrast, the program has not been able to expand the range of its partnerships sufficiently to match the needs of the research program. Deficiencies in research partnerships were noted in the areas of agricultural productivity and PAR, and in partnering with universities, research institutes and think tanks in South. Addressing these deficiencies should help increase relevance as well as quality of science.

The evaluation team noted that the program placed strong emphasis on working with development organizations, as is indicated by the presence of two NGO representatives in the Program Leadership Team. NGOs were also found to be intensively involved at the village level. The potential contribution of these kinds of organizations to the program’s relevance, likely effectiveness and impact could be increased if the choice of partners was more strategic.

On capacity development the evaluation team found that there are some important achievements, such as in relation to GTA, but overall, the program’s approach is not sufficiently systematic. The narrative and strategy around capacity development remain poorly articulated. Despite the establishment of a working group on capacity development, there is little evidence of its impact. The

⁶³ AAS Proposal (2011), p. 46.

relative neglect of this area, and the lack of a strategic orientation regarding partnerships, may be due to the fact that no senior individual has clear responsibility for these important cross-cutting tasks.

RECOMMENDATION 5. Partnership and capacity building strategies

AAS management should undertake a strategic review of both the program's partnership and capacity development activities. Potential partners could be assessed more critically. More emphasis could be placed on partnering with research organizations in the South, including institutes and universities, as a cost-effective way of bringing expertise into the program, particularly where it has been difficult to recruit experienced staff. A senior staff member could be given responsibility for partnerships and capacity development.

3.7 Knowledge production and development outcomes

Like all CRPs, AAS is mandated and expected to deliver broadly relevant knowledge, including IPGs, and to contribute to positive development outcomes. The production of broadly relevant knowledge is an important aspect of the assessment of science quality. One important way that this knowledge can be disseminated is through publications (See Box 2-1) for an elaboration of the concept of IPGs in the context of this evaluation).

As indicated in the overview of the program, AAS has a three pathway scaling strategy. The first two refer to the hubs and seek to scale outcomes from AAS research through community-community learning and partner adoption (Pathway 1), and by transforming enabling conditions through innovations that address obstacles to positive change (Pathway 2). The third pathway focuses on wider national, regional and global scaling by encouraging other organizations to learn from AAS to advance agricultural research and development policy and practice.⁶⁴

3.7.1 Prospects for knowledge production from the Roll-out Cases

AAS has taken an explicitly place-based and context-specific approach to the dual mandate of producing broadly relevant knowledge and contributing to development outcomes. A fine grained understanding of local conditions developed through PAR is a central tenant of the place-based approach. As stated in the proposal,⁶⁵ this is expected to provide the learning, general principles and best practices from which "global learning" is to be distilled, developed and disseminated, by "scale[ing] out more widely by building on cross-program learning", which the program expects to happen primarily through Impact Pathway 3.

In Section 6.5 the proposal states that IPGs will be generated by "reflect[ing] on the commonalities and differences in development challenges to be addressed in the focal countries and hubs, together with their hypotheses of change and research questions [...] From this program of diagnosis and

⁶⁴ See AAS Extension Proposal (2014), p. 2.

⁶⁵ See AAS Proposal (2011), p.vii and p.40.

research, we will distil a body of comparative learning and general principles that can be drawn upon to pursue development interventions elsewhere in focal hubs and countries, other AAS, and, indeed, in other agricultural systems with similar challenges.”⁶⁶

The evaluation team readily accepts that there is no fundamental contradiction between micro-level, place-based research and the production of knowledge of wider relevance. This applies to technologies as well as institutional innovations and knowledge produced by socio-economic research. Indeed much of the understanding of development processes has arisen through place-based research – within development studies there is, for example, a very strong tradition of village studies.⁶⁷

In the evaluation team’s view, there is a need for clear strategies to ensure the place-based research does indeed contribute to broader knowledge about development processes. For technology development, a careful analysis of the geographic locations where the technologies could also be applied, is required. For socio-economic research, these strategies might include engaging with larger debates in the literature; identifying and addressing knowledge gaps; and challenging conventional wisdom. Empirical research must be guided by theory (deductive approaches) or used to develop theory (inductive approaches). Other strategies include selection of research sites so that they are in some important ways representative, or different, or provide compelling examples. Finally, other important strategies include the use of research designs that are comparative and/or long-term; and the use of research approaches that are methodologically innovative.

At the time that this evaluation report was written, because of the emergent nature of the program and the logic of staging, the process of developing detailed designs for hub-based research initiatives was still underway.⁶⁸ The evaluation team’s review of the documents that were developed to guide these design processes showed them to be potentially useful for ensuring coordination across hubs. But because they do not suggest any of the strategies listed in the previous paragraph, the evaluation team concludes that they do not provide sufficient guidance to ensure that broadly relevant knowledge (which is essential for Impact Pathway 3) will be produced.

Field observations in the roll-out cases indicated that, so far, few of the activities have been conducted with a view to producing knowledge of relevance beyond the individual communities. None of the strategies identified above were in use. For institutional interventions, such as the SILC+ groups in Zambia, the evaluation team could not identify any underlying research agenda that aimed to contribute to an existing body of international literature, such as that on microfinance. The fact that, so far, there have been limited efforts to link the PAR research in the hubs to the production of more widely relevant knowledge does not imply that there are no opportunities to do so.

⁶⁶ See AAS Proposal (2011), p. 40

⁶⁷ For a recent interesting critique of village studies see: Orr, A. 2012. “Why were so many social scientists wrong about the Green Revolution? Learning from Bangladesh.” *Journal of Development Studies* 48(11): 1565-1586.

⁶⁸ As discussed in the section on the roll-out process, the hub initiatives have replaced the Activity Plans that were used earlier to plan the use of W1/W2 funding.

Technologies for resource-poor farmers, such as shaded ponds in Bangladesh, may have more potential than “standard” technologies, but from a research perspective this work would need to be framed and contextualized more carefully, and interrogated more systematically.

RECOMMENDATION 6. Potential to generate broadly relevant knowledge

AAS research management should take more active steps to ensure that research activities in the hubs are conceived and planned in ways that will allow widely relevant knowledge, including IPGs, to be generated so as to ensure that Impact Pathway 3 can function. Specifically, stronger engagement with the relevant literature, comparative research designs, and more detailed analysis of the other contexts within which the research may be relevant are recommended.

3.7.2 Publications

The evaluation team conducted an extensive review of a sample of AAS publications and a bibliometric analysis of all journal publications, with a special focus on relevance and quality of science (Annex F). Given the relatively short time that the program has been running there was inevitably an important element of “legacy research” in the publications reviewed.

Table 3- 5 shows the collection of publications that was available to the evaluation team for the review. For the three years before AAS was initiated, over 400 publications were identified. These publications reflect the output of WorldFish and many could be considered “legacy research” in relation to AAS.⁶⁹ AAS as a research program produced approximately 190 publications between 2012 and 2014. This includes only completed publications (i.e. drafts, or publications that were under review or in press are not included).

In view of the time lag between the submission of a journal article and its publication, a number of the publications that appeared in the 2012-2014 period reflect work undertaken prior to AAS. Distribution among different types of publications has remained broadly similar except that AAS has been publishing a greater percentage of reports and fewer book chapters than WorldFish in the earlier years.

⁶⁹ See Pan, L. 2014. “CGIAR Research Output and Collaboration Study” 2014. Elsevier for a very detailed assessment of the published outputs of individual CGIAR centers.

Table 3- 5: Publications produced under AAS and by WorldFish in the three years before the initiation of AAS.

Publication Type	2009-2011		2012-2014	
	No.	%	No.	%
Journal Article	147	36%	67	36%
Working Paper	56	14%	21	11%
Book Chapter	55	13%	8	4%
Report	18	4%	20	11%
Conference Proceedings	20	5%	5	3%
Other	116	28%	66	35%
Total	412	100%	187	100%

Source: Evaluation bibliometrics study

Table 3- 6: Number of publications by year

Year	Number of publications
2009	155
2010	130
2011	127
2012	38
2013	64
2014	85

Source: Evaluation bibliometrics study

The evaluation team’s review of a sample of 83 publications and the bibliometric analysis showed that the overall quality was high, and in line with what should be expected from a CGIAR center. Overall, WorldFish/AAS researchers have clearly been successful in placing their work in international journals such as *Fish and Fisheries*, *Marine Policy*, *Biological Conservation*, *Global Environmental Change*, *Journal of Environmental Management*, *Environmental Research Letters*, *Sustainability Science*, *Ecology and Society*, *Food Policy* and *World Development*. Some papers were also published in top general journals such as *Science*, *PNAS* and *PLoS ONE*.

The review of sample publications indicated that the publications were based on quantitative and qualitative research methods, and in some cases combined both. The sample contained almost equal shares of empirical and review (or synthesis) publications. Amongst the qualitative research reviewed, there was some focus on developing conceptual tools and frameworks, although much was essentially descriptive. The use of advanced analytical methods was not prominent in either the qualitative or the quantitative publications.

In terms of links between the publications and the key program concerns such as poverty, systems, gender and the use of PAR, a mixed picture emerged from the review of sample publications. The share of papers that focused specifically on poverty was higher in 2009-2011 than 2012-2014, but in the latter period there was an increase in the proportion of publications that mention poverty, even though their primary focus was on other topics. During the 2012-2014 period the sample contained papers that were specifically focused on gender, which was not the case for 2009-2011. Some papers that used the principles of a GTA were also identified in the sample. There was a scarcity of papers that used methodologies commonly associated with farming systems research (including the use of typologies to group and characterize different types of farming systems) or in agro-ecosystems research (including the use of systems theory to identify linkages between different components of aquatic agricultural systems).

The bibliometric analysis showed that 67 articles were published in international journals during 2012-2014, of which 60 percent appeared in journals primarily focused on fisheries, marine or aquaculture issues, or on environmental science or management (Table 3-7). This reflects what the evaluation team understands to be the historic research strengths of WorldFish.

Table 3- 7: Journal articles published 2012-2014.

Main thrust of journal	Published articles	
	Number	%
Fisheries / Marine / Aquaculture	21	31%
Envir. Sci / Envir. Studies / Envir. Mgt	19	28%
Development / Food / Dev. Policy	10	15%
Multidisciplinary	5	7%
Biological conservation	3	4%
Ecology	3	4%
Agriculture / Animal Science	2	3%
Geography	2	3%
Economics	1	1%
Zoology	1	1%
Total	67	100%

Source: Evaluation bibliometrics study

It is too early for a meaningful citation analysis of the program's publications, but a review of the most cited publications during the period 2009-2014 indicates that WorldFish researchers have engaged very effectively with, and in some cases provided leadership to, important global debates related to fisheries and its role in pro-poor development. It remains to be seen whether the work now taking place under AAS will result in similar levels of engagement and intellectual leadership. Given the scope and ambition of the program, there is the added challenge that AAS needs to establish intellectual leadership in fields that are outside the WorldFish core areas of expertise.

3.7.3 Contributions to development outcomes and impacts

The 2015-2016 extension proposal identified three material IDOs (income, nutrition and future options/resilience) and four enabling IDOs (productivity, gender and empowerment, capacity to innovate and capacity to adapt). The original proposal did not use the language of IDOs, but formulated similar objectives. Access to markets and services and improved policies and institutions were also identified as objectives,⁷⁰ but these were not in the list of IDOs specified in the extension proposal.

As indicated at the outset, because AAS has been in existence only since mid-2011, it is unrealistic to expect it to have contributed to development outcomes on the ground. This is particularly so given the complex settings in which it operates, and in the light the program's emergent nature.

It was not surprising therefore that the evaluation team was not provided with any data from the roll-out activities that established or pointed to contributions to development outcomes. The program's outcome evidencing activities hint at changes linked to program activities, but as discussed in more detail in section 3.8.2.2 (Research management, monitoring and evaluation), the evaluation team had reservations about the quality of the information gathered through these activities.

The program has published a number of claims about its contributions to outcomes and impacts (see Table 3-8). The evaluation team recognizes that there are strong incentives for programs like AAS to make claims about positive impacts. Nevertheless, claims like those in Table 3-8 are problematic because (i) these achievements are implicitly attributed to the RinD approach, but would appear to be linked to productivity-oriented bilateral research that has been going on for some time and (2) little if any information is provided as to how they were compiled.⁷¹ This concern was also raised by the ISPC.⁷²

Taken at face value, these claims appear to show that past research approaches and efforts have indeed been effective in contributing to positive development incomes, despite being questioned in the AAS proposal. Based on the available information, the evaluation team is not able to assess their credibility.⁷³ Neither was the evaluation team in a position to undertake a detailed evaluation of the

⁷⁰ AAS Proposal (2011), p. 1-2.

⁷¹ In the case study of AIN, the available documentation was reviewed in-depth. However, only a baseline survey was found. No impact assessment study was available that would justify the claims in the table above on impact/outcome claims. Moreover, it is important to note that the claims made in the reports of the AIN project are also an order of magnitude smaller than the ones in the table in the text above (see Annex E, Report on the AIN).

⁷² ISPC comments on the first version of the AAS 2015-2106 extension proposal

⁷³ The statement in the first row of the table may serve to illustrate the situation. The figure of more than 500,000 farmers is taken from a project report of the AIN project. This project report states that that the project benefitted 537,581 farmers. The only information on how this number was calculated is the following: "The calculation is based on target number of quality seed stocked by out of project direct touch but seed supported. The target people were not directly controlled by project" This indicated that the number may be

contributions to development outcomes associated with WorldFish research in the years prior to AAS.

Table 3- 8: AAS impact / outcome claims.

Impact / outcome claim	Source
"An important highlight here in 2013 has been Bangladesh where our research has brought benefits to over 500,000 farmers, increased total annual income by US\$92m, generated US\$300 in profit for each homestead pond and raised household income by 20%, US\$6000 per hectare from commercial fish ponds, and US\$2000 per hectare from commercial shrimp ponds."	AAS 2013 Annual Report
"In 2012 improved technologies enhanced productivity of Bangladesh fish ponds and generated: \$92m increase in combined annual income \$300 per household income from homestead ponds \$6000 more income per hectare from commercial fish ponds \$2000 more income per hectare from commercial shrimp ponds	"Making a Difference", Jan 2014 Factsheet
"During the first phase of the program from 2011-2014 we have [...] delivered early outcomes benefitting approximately 2.5 million people"	2015-2016 Extension Proposal v1, (p.1)
"our research on farming systems productivity contributed to raising income in one group of targeted communities by US\$92m in 2013, with an average of US\$300 in profit generated for each homestead pond and raising household income by 20%, US\$6000 per hectare from commercial fish ponds, and US\$2000 per hectare from commercial shrimp ponds."	2015-2016 Extension Proposal v1, (p.30)

Overall the evaluation team's assessment of the program's likely contribution to positive development outcomes for poor people dependent on aquatic agricultural systems is mixed. Some potential is seen in some of the technologies that are being promoted in Bangladesh -- especially those that require little space and/or are not dependent on high capital inputs, and that are, therefore, particularly suited for poor and marginalized people. Otherwise, priority-setting techniques, especially for productivity-related research, and the focus on poor and marginalized people needs to be strengthened to fully realize the program's potential to contribute to development outcomes.

With regard to Impact Pathway 2 (removing obstacles to positive change), the findings are also mixed. On the positive side, this pathway is strongly supported by the strategies developed in the

an estimate, which is based on certain assumptions of technology adoption by non-project farmers. On what basis the estimate was made, remains unclear. The team was able to get one baseline survey report (dated 2013) for this project, but no other information of any analyses done on the basis of this baseline report.

roll-out process to integrate the AAS research agenda into the local development context and build strong partnerships at the hub-level. The challenges that still need to be addressed to use this pathway more effectively include (as identified above) paying more attention to local power structures, and engaging more effectively with government agencies at the national level.

SUGGESTION 7. To help ensure that it contributes as expected to positive development outcomes, the program might consider addressing the problems identified by the evaluation team regarding the implementation of the RinD approach, in particular with respect to the focus on poor and marginalized groups and the need to avoid elite capture; the lack of focus on the productivity research; and the need for stronger systems and interdisciplinary orientations. This suggestion is in line with Recommendation 1.

3.8 Governance and management

3.8.1 Governance

The governance arrangements of AAS are comparable to those of other CRPs⁷⁴ and can be grouped in two categories: contractual/external and internal.

The major contractual arrangements include a Joint Agreement between the Fund Council and the CGIAR Consortium in 2011 that sets out the umbrella terms governing the submission and approval of CRP proposals and the transfer to and use of W1/W2 funds by CRPs. Through a Consortium Performance Agreement the CGIAR Consortium assumed overall financial and programmatic responsibility for the implementation of AAS. Through a Program Implementation Agreement between Consortium and WorldFish, the latter assumed responsibility for the use of W1/W2 funds transferred to it by the Consortium, and for the satisfactory performance of AAS. WorldFish signed Program Participant Agreements with IWMI and Bioversity, with which the latter two centers accepted responsibility for the use of W1/W2 funds transferred to them by WorldFish, and for the satisfactory performance of program activities.

Internal governance arrangements revolve around a Program Oversight Panel (POP), and for this reason the evaluation team paid particular attention to its organization and operation. The terms of reference for the POP were approved by the WorldFish board in August 2011 and identified its main responsibilities as:

- Strategic Planning, Oversight and Monitoring
- (Assessment of) Science Quality
- (Assessment of) Partnerships
- Networking

⁷⁴ “Review of CGIAR Research Programs Governance and Management”, Final Report, March 2014

- Performance Review (including the annual performance appraisal of the program leader through the chair, jointly with the lead center's DG)
- Resource allocation and performance contract
- Reporting to WorldFish Board of Trustees

In November 2011 the board appointed six members to the POP, including a chair. WorldFish management reported that science expertise in a development context and gender expertise were important criteria in the selection of these members. The initial composition included the six independent members plus the DG of WorldFish and a Board member of IWMI as a collaborating center. The independent members included two individuals with specific gender expertise, a representative of a major WorldFish funder (ACIAR), an individual who engages in advocacy around fish-related issues, and a consultant with a long association with CGIAR. The chair was a respected individual from the world of international development. Since the beginning the POP has been gender-balanced and had good regional representation. In 2014 the WorldFish board decided to increase the size of the POP from six to eight independent members in order to better cover the required areas of competence, and to get around the problem of low attendance at meetings. POP members were appointed for three year terms.

The first meeting of the POP took place in February 2012 and there have been six subsequent meetings (one of which was virtual). Meetings held in July 2012 and July 2014 allowed POP members to visit hub-based activities in Zambia and Bangladesh respectively. Between meetings, exchanges between the AAS management and the POP, particularly the POP chair, were reported by AAS management and POP members to be frequent.

As the TOR make explicit the POP has an oversight function: fiduciary responsibility for the program remains with the WorldFish board. Given that approximately 95 percent of AAS budget is managed by WorldFish, and that AAS constitutes 70 percent of the WorldFish budget, the POP can also be seen to have a center-wide role. Indeed, with the creation of the POP, the WorldFish Science Advisory Committee was abolished. There are also important cross-overs between the WorldFish board and the POP: the board chair participated in various POP meetings, and on at least one occasion the POP chair attended a board meeting.

Board members interviewed by the evaluation team were by-and-large satisfied with these governance arrangements and consider themselves sufficiently informed about AAS, even though some reported that they would welcome more regular reporting by the POP chair to the board.

POP members were generally satisfied with the information received from AAS management. They reported that the interactions with management were constructive, the right questions are asked and important issues discussed. AAS management exercises some significant control over these interactions by setting the agenda for POP meetings. Formal decisions are rarely made or approvals given. Some members felt that management does not heed their advice but that there is little they

can do about this.

There was a stated intention to establish governance structures at the level of AAS focal countries,⁷⁵ but these have not been systematically established. In some countries such as Cambodia, informal platforms for AAS partners have been created but their governance role appears to be limited.

While not a part of the formal governance arrangements, the evaluation teams feels it is important to comment on the role of the ISPC vis-à-vis the program. As part of its aim to “strengthen the quality, relevance, and impact of science in the CGIAR”⁷⁶, the ISPC reviewed and provided detailed comments to the FC on key documents including the AAS proposal, the six-month extension proposal to synchronize with other CRPs (submitted to the CO as the 2014 Program of Work and Budget, POWB) and two versions of the 2015-2016 extension proposal. ISPC plays a purely advisory role. In its comments to the FC since 2011 the ISPC has consistently emphasized that the program should:

- Be realistic; and hedge its bets in relation to the choice of difficult / vulnerable hubs
- Be more specific about its research plans and activities
- Put greater emphasis on technology, technological change and its interactions with other CRPs and CG centers (the CGIAR "comparative advantage")
- Be more specific / articulate about its research questions, and more broadly about its identity (i.e. primarily as a research or a development enterprise)
- Treat the "AAS approach" as something to be tested; take a "proof of concept" approach toward it as an "experiment in development"
- Place more focus on the generation of IPGs

AAS has responded to these concerns to only a limited degree. One example of a positive response is in the revised 2015-2016 extension proposal where one of the overarching research questions now explicitly addresses the concern about the need to examine the AAS approach.

Assessment and recommendation

While assessing governance arrangements and performance, the following criteria should be considered: legitimacy and participation, accountability, fairness and equity, transparency, efficiency, effectiveness, management oversight, stakeholder participation and risk management. In what follows it is important to note that in the final stages of this evaluation new guidance was issued from the CO concerning CRP governance and the role of bodies such as the AAS POP.⁷⁷

The 2014 CRP Governance and Management Review concluded that compared to other centers,

⁷⁵ BoT meeting November 2011; note to BoT of December 2012

⁷⁶ <http://www.sciencecouncil.cgiar.org/>

⁷⁷ Ref: recent CO guidance note on CRP governance.

structure and procedures at WorldFish were above average in terms of independence and inclusiveness. In relation to AAS more specifically, the evaluation team concluded that there is an important lacuna in the governance of the program. This is because (i) between 2012 and 2014 the POP played only an advisory role and not the oversight role foreseen in the ToR; (ii) although the POP is independent, its agenda is controlled largely by AAS management; and (iii) the WorldFish board does not itself provide independent oversight. As a result, the governance of AAS has essentially been left in the hands of WorldFish and AAS management (which in any case overlap to a significant degree).

This finding raises important concerns about legitimacy, accountability, management and strategic direction, concerns that in the eyes of the evaluation team are reflected in some of the weaker aspects of AAS that have been highlighted in other parts of this report. The rejection of the original 2015-2016 extension proposal by the Consortium Office somewhat reflects this lack of strong oversight.

The evaluation team also notes that the very high interdependence between AAS and WorldFish implies that any decision taken by or about AAS immediately affects WorldFish, and *vice versa*.

RECOMMENDATION 7. Strengthened governance

In order to fulfil its oversight role, and thus provide AAS with a more robust governance structure, the position of the POP must be significantly strengthened in relation to both the program management and WorldFish. Its links to the BoT of WorldFish need to be reinforced. Given the ongoing discussions about CRP governance, it is not for the evaluation team to detail how this should happen, but stronger and more independent oversight is essential.

3.8.2 Management

Overall Management

The AAS Program Director is also Deputy Director General of WorldFish. He played a central role in the development of the proposal in 2010 and was then appointed to lead the program. He dedicates around 75 percent of his time to AAS. The Program Director is supported by a small Program Support Unit (PSU) consisting of four professional staff (reinforced by consultants) and operating out of Penang. The PSU is responsible for program finances (except bilateral projects), communications and program priorities. The head of the PSU, also called the Head of Operations, is also responsible for partnerships.

In each country there is a Country Program Leader. Some of these individuals come from a development and/or management background (e.g. Bangladesh, Zambia until early 2014), others have a research background (e.g. Solomon Islands, Cambodia, and now Zambia). They are responsible for coordinating research activities, assuring conducive working conditions and the appropriate allocation of staff and financial resources, and maintaining contact with program director and research theme leaders. Formally they report to the country or Regional Director of WorldFish and not the AAS Director.

Soon after AAS was initiated a 17-member Program Leadership Team (PLT) was established. The PLT was chaired by the Program Director and included the head of operations; six Penang-based senior scientists; five country leaders (all from WorldFish); representatives of IWMI and Bioversity; and representatives of the international NGO partners CARE and CRS. The PLT had both strategic and operational functions. Meetings took a workshop format. No formal minutes were kept but key products of the meetings were reportedly captured in notes. Under the PLT several working groups were created, e.g. on roll-out, gender, and science.

By early 2014, following advice from a consultant, the PLT was converted into the Strategic Leadership Group (SLG), and a new Management Team (MT), comprised of five HQ-staff with responsibility for core functions, was created. The purpose of the SLG is to support the AAS Director in making decisions and to share responsibility for spearheading the implementation of these decisions. It meets twice yearly and includes science and country leaders, and representatives from other centers and non-CGIAR partners. The MT meets monthly for 2-3 hours to review progress, disseminate learning and identify obstacles. Decisions taken at SLG and MT meetings are formally minuted.

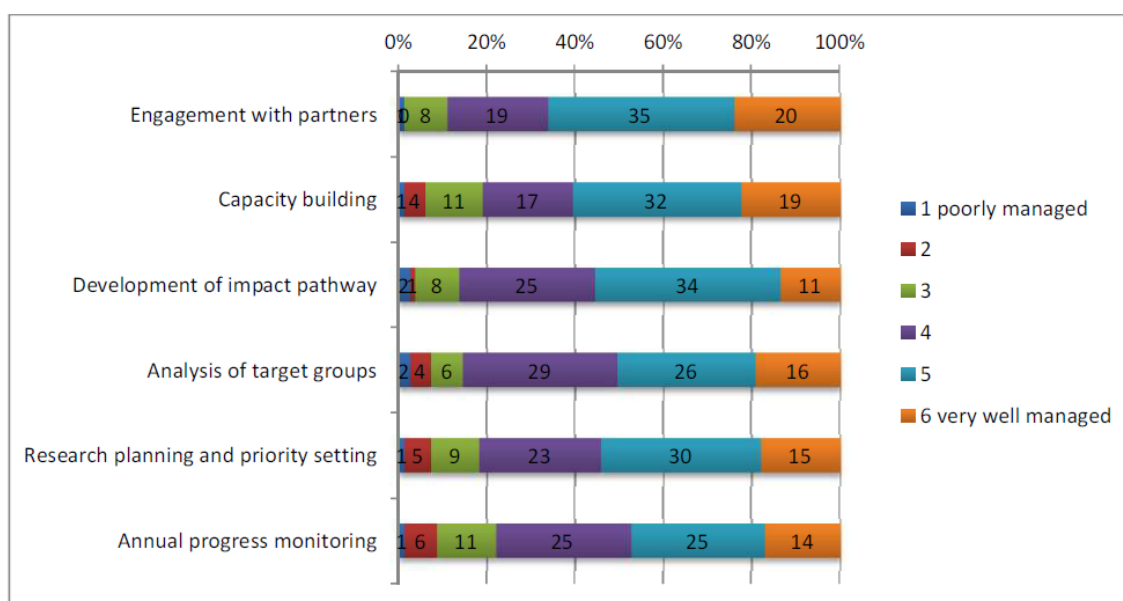
The documents outlining the purpose and ToR of the SLG and MT that were shared with the evaluation team lack the quality and formality that would have been expected.

In 2014 a new position of AAS Science Director was created. The division of responsibility between this new position and that of the newly created Research Director at WorldFish is not clear to the evaluation team. Due to the large share of the WorldFish budget that comes from AAS, both the Science Director and the Research Director will work with essentially the same staff members.

The management style of the Program Director of AAS is reported to be participative, inclusive and consensus-oriented. This is widely appreciated among program staff. On the downside there is reported to be lack of clarity about how decisions are made. The large number of papers without any indication of author and/or date is a symptom of this management fluidity. There were also concerns expressed by staff at hub level that they were not always adequately involved in decisions made at HQ.

Results from the staff survey indicated that that the majority of staff think that major aspects of the AAS program are well managed. As shown in Figure 3-4 taken together the share of response in the categories “very well managed” and “well managed” ranged from 55 percent to 40 percent across the six areas.

Figure 3-4: Perception of quality of management of different aspects of AAS



Total responses: 87

Note: The respondents were asked the following questions: “In your view, how well are the following aspects for enhancing the effectiveness of AAS managed?”

In summary, the evaluation team acknowledges the appreciation amongst staff of the overall program management. The program’s management system and structure is still evolving. The separation of the PLT into a Strategic Leadership Group and a small Management Team appears to have been a positive step. The evaluation team also considers the appointment of a Science Director as a potentially important move, which may help to address problems regarding quality of science identified by this evaluation.

RECOMMENDATION 8. Clarification of roles

The management of AAS and WorldFish should clarify the roles, responsibilities and reporting relations of WorldFish staff relative to AAS staff, and in particular as they relate to scientific management. The proposed AAS Science Director should be encouraged to spend considerable time in the hubs.

Research management, monitoring and evaluation

Research management is an important factor influencing science quality and likely effectiveness. Each research theme has a designated leader (in some cases co-leaders). Five of the six theme leaders are based in Penang and are WorldFish staff. A co-leader of the productivity theme is from IWMI and is based in Cambodia; the leader of the access to markets theme is based in the Netherlands.

The Consortium Office introduced a results-based management (RBM) approach and AAS was

among the CRPs which tested it. The original AAS proposal included a paragraph and an annex on RBM, and the Extension Proposal refers to it in relation to partnerships. Some program documents such as The AAS Handbook (Version 30. June 2014) refer to RBM as a concept that is still being introduced. This suggests that RBM is still in an early phase, which may be due to the fact that using RBM in research is challenging and, as experience elsewhere shows, requires effort to assure buy-in from researchers. This evaluation shows that AAS management faced challenges in pursuing in a systematic way the basic elements of RBM including functional systems for planning, monitoring and evaluation.

Following the 2012 roll-out activities in Zambia, Bangladesh and Solomon Islands, and those in Philippines and Cambodia a year later, a system of bottom-up research planning and monitoring was established. Templates were formulated for activity planning, six-monthly reporting, annual reporting and activity evaluation. A paper dated November 2013 summarizes policies and procedures associated with this system.⁷⁸

Altogether 75 research activity plans were developed in 2013-2014. Most of these plans that were examined by the evaluation team were incomplete, missing key sections or still in draft form. Research objectives are not clearly described, and the human resources and budget sections of many plans were empty. As has been pointed out above, in 2014-2015 the planning system was changed. The science initiatives became a major planning tool, which are being integrated into the hubs. More emphasis is placed on research design. These initiatives were first formulated as two-year concept notes (without HR plan and budget) and went through a formal process of approval in autumn 2014 (as of the evaluation team's field visit in November, those for Cambodia had not yet been approved). A series of "design workshops" took place in early 2015 to flesh out actual research designs based on the approved concept notes.

In parallel to the bottom-up formulation of activity plans and science initiatives, AAS management is required to prepare an annual POWB to be submitted to the CO after passing through the POP. The POWB follows a prescribed template and is structured according to flagships and within the flagships, clusters (themes) for which annual budget figures are disaggregated by W1/W2 and bilateral. The POWB is expected to show what specific contributions AAS makes to the achievement of the system-wide IDOs. Two sets of guidelines have been prepared by AAS that in principle help to make the link between planning and monitoring.⁷⁹

The emergent nature of the AAS program, combined with the diversity and complexity of the issues it works on and the contexts it work in, pose important challenges in terms of planning, monitoring, evaluation and impact assessment. In broad terms these challenges fall into two groups: monitoring progress and performance in terms of program activities and outputs; and identifying, demonstrating and understanding associated outcomes and impacts.

⁷⁸ "Guidelines for planning, reporting and learning in the Aquatic Agriculture Systems CGIAR Research Program", November 2013

⁷⁹ "AAS Mid-year performance reporting", June 2014

In relation to monitoring progress and performance, it has already been noted that the Activity Plans failed to provide a basis for a functional M&E system. It remains to be seen whether the new Research Initiative format will be any more successful. There are two questions: is the format useful; and is it then used? No matter how good the new Initiative format is, if it is not completed and used consistently it will be of little value.

Throughout the course of the evaluation, the team encountered a number of other examples where it appeared that systems were lacking that would allow AAS management to answer relatively simple questions: How are research FTEs distributed by hub, by research theme or by funding source? What publications have been produced or are in the pipeline by hub or research theme? Thus, despite the production of a number of papers on M&E⁸⁰ even at the level of tracking effort, activities and accomplishments, a functional management information system is not yet in place.

On the other hand the program has devoted considerable time and resources reflecting on how its contributions to development outcomes and impacts can be demonstrated. The 2013 paper by Mayne and Stern⁸¹, which promoted the use of theory-based approaches to evaluation, provided much of intellectual background for these reflections. Theory of change is now a central component of program planning and evaluation and permeates all levels of program activity, including at the community level.⁸²

The evaluation team accepts that for the reasons identified by Mayne and Stern, a theory-based approach to evaluation may be appropriate to assess whether a program like AAS contributes to development outcomes. At the same time, to address concerns about efficiency, AAS would also need to show that its particular approach is more efficient than other interventions that pursue similar research and development goals (e.g. the conventional approaches critiques in the proposal). This concern was addressed by the Evaluation Design presented in the 2015-2016 extension proposal and further specified in a guidance note.⁸³

The 2015-2016 extension proposal also specifies a set of IDO indicators.⁸⁴ From a project management perspective, this is an important step. Likewise, the provision of guidance notes on

⁸⁰ Douthwaite, B., Apgar, M., Crissman, C. 2014. "Monitoring and Evaluation Strategy Brief". CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Program Brief: AAS-2014-04.

⁸¹ Mayne, J. and Stern, E. 2013. "Impact Evaluation of Natural Resource Management Research Programs: A Broader View". ACIAR Impact Assessment Series Report No. 84. Australian Center for International Agricultural Research: Canberra, 70 pp.

⁸² Douthwaite, B., Kamp, K., Longley, C., Kruijssen, F., Puskur, R., Chiuta, T., Apgar, M., Dugan, P. 2013. "Using theory of change to achieve impact in AAS". CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Working Paper;

⁸³ See Extension Proposal Annex 2, Evaluation Design for AAS, and "RinD Initiatives: function and structure" Document provided to the evaluation team, March 2015.

⁸⁴ AAS Extension Proposal (2014), p. 19.

specific indicators, e.g., the indicator “capacity to innovate”⁸⁵ is also useful. Given the conceptual complexity of capacity to innovate, much more work is required to make this into a viable indicator.

Monitoring, evaluation and impact assessment are closely linked to the research theme Knowledge Sharing and Learning, which was discussed as a thematic research area in Section 3.5.7 above. As indicated there, the program has put considerable emphasis on the use of outcome evidencing.⁸⁶ In Zambia one example of the use of outcome evidencing found (according to staff interviews) that resource-poor households were negatively affected by restrictions on fishing that were part of agreed co-management arrangements. While this outcome is highly relevant for the actors involved, its discovery does not add to the existing knowledge on fisheries co-management, as this problem is already well-known in the respective literature.⁸⁷ A review of outcome evidencing stories from Cambodia indicated a common narrative: before the AAS activities, the villages and their institutions were not very functional; people did not talk or work together; there was no collective action; authorities did not care about the people. In addition, these stories consistently refer to “the community” as if it is a homogeneous, united body without dissention or politics. There is no indication that within the community, there might be differential levels of interest, participation and benefit vis-à-vis project activities. As a result the stories come across as very general, not particularly reflective, and bordering on naïve.

The evaluation team appreciates the efforts of AAS to experiment with different innovative methods foster reflection and learning. But, based on the evidence available, the evaluation team has serious reservations about the potential value of the outcome evidencing approach in helping the program to document and analyze the contributions of its research to development outcomes.

Overall the evaluation team finds that in the first three years of the program, research management, especially the management of W1/W2 funds, has been hampered by the lack of functional systems that could help ensure interdisciplinary coordination, quality of science and subsequent effectiveness. The recent move to the planning of hub initiatives is positive, but it is too early to assess to what extent this will overcome the problems observed around inconsistent use of the Activity Plans, and whether the research initiative model will provide the basis for monitoring progress across hubs and themes. With regard to assessing the program’s contribution to development outcomes and impacts, reference has already been made to the positive steps taken

⁸⁵ Leeuwis C, Schut M, Waters-Bayer A, Mur R, Atta-Krah K and Douthwaite B. 2014. “Capacity to innovate from a system CGIAR research program perspective”. Penang, Malaysia: CGIAR Research Program on Aquatic Agricultural Systems. Program Brief: AAS-2014-29.

⁸⁶ This concept draws on outcome harvesting, which was originally developed by R. Wilson Grau, an evaluator and organizational development consultant. See Wilson-Grau, R. and H. Britt (2012): Outcome Harvesting. Ford Foundation.

⁸⁷ See, e.g., the review by Berkes (2009) “Evolution of co-management: Role of knowledge generation, bridging organizations and social learning.” *Journal of Environmental Management*, 90, pp. 692–1702, which states: “Co-management, and decentralization in general, often lead to reinforcement of local elite power or to strengthening of state control. Regarding the former, the exclusion of marginal stakeholders who are poor and politically weak may have negative impacts on equity and community welfare, as seen in fishery cases in Bangladesh, Cambodia, Indonesia, and Philippines.”

with the revised 2015-2016 extension proposal. An implementation plan is now required.

RECOMMENDATION 9. Management information

A functional research management information system should be established. This system should make it possible for AAS management to monitor and assess key program indicators such as the distribution of resources and the research outputs produced by hubs and themes.

Financial Management

The financial resources available to AAS and their allocation has been presented in Section 1.5. This section focuses on the management of the financial resources in AAS.

W1/W2 funds flow from the CO to WorldFish, which then distributes them to the collaborating centers and the hubs according to the approved POWB. CO keeps a service charge of 2 percent to cover central costs. W3 and bilateral funds are governed by contracts between WorldFish and individual funders. Structures and procedures in WorldFish had to be adjusted between 2012 and 2014 to deal with the fast growing budget and the number of associated transactions. A specialized grant and contracts office was established.

W1/W2 budgets are in principle approved by the CO in autumn for the following calendar year. Although the FC assures at least 80 percent of the previous year's expenditure, definitive commitments and payments are delayed for two reasons. First, some donors are slow in realizing their pledges. Second, the FC receives the expenditure statements of the various CRPs only between May and June. The delay in payments can create cash-flow problems. The uncertainty of funding and changing rules regarding booking and carrying forward are a major problem for the AAS (as for other CRPs) which had to be cautious in programme planning, and for WorldFish which bears the fiduciary risk.

In 2013/14 "One Common System" (OCS), was introduced in WorldFish, and it is also used in Bioversity (but not IWMI). OCS is a project management system used for Enterprise Resource Planning: it is configurable and flexible, and provides a platform for producing common reports. The quality and timeliness of financial information has improved in AAS since the introduction of OCS. The hubs can input their data and access real time reports. So far OCS is only used for financial management and procurement and not for project management and payroll. OCS requires the introduction of Basic Units of Science (BUS), the lowest level of aggregation of activities and associated costs. BUS codes are created in the system to define the relationship with contracts, projects, project outputs and CRP outputs. The BUS of bilateral projects have to fit the original, donor-agreed outcomes as well as the outcomes of the CRP against which these projects are mapped.⁸⁸

⁸⁸ Examples of BUS-definitions of three projects are given in Bangladesh Country Case-Study, Annex D, Volume 2.

WorldFish deducts an overhead of 15.5 percent from all W1/W2 funds, and if possible from other project funds, to cover central costs. This overhead is not uniform across the CGIAR centers. Additionally the units (at HQ or in the countries) have to pay different types of service charges: for IT support and for research support; only country units pay also for regional support. The service charges are negotiated for a year between WorldFish finance and the units based on the projected number of FTEs in the unit. The service charges are established in compliance with the CGIAR guidelines.⁸⁹

Three types of audits are applied in AAS:

1. the yearly audit of the Center; this not only includes HQ activities but also hub activities through associated firms of the WorldFish lead auditor (Grant Thornton)
2. audits requested by bilateral donors -- in the case of the EU these are quarterly
3. audits by the Independent Audit Unit (IAU) of CGIAR. In 2015 the IAU will focus specifically on CRPs.

No audit reports were scrutinized for this evaluation.

Overall, AAS benefits from the well-established finance management systems of WorldFish and a wide range of internal policies and regulations. The introduction of OCS has improved financial management, but better use could be made of BUS codes. The evaluation team observed challenges in managing the financial resources allocated to the hubs that are due to the centralized nature of the financial system. However, the problems observed are similar to those observed in most complex program with activities in many locations.

Human Resource Management

Overall WorldFish employs approximately 480 staff, of which only 70 are based in Penang. About 44 percent of the international personnel working on AAS are women. The picture is less balanced for all staff taken together, mainly because of the low percentage of women working for the program in Bangladesh. The evaluation team notes a lack of ethnic diversity among the program's management.

For international personnel AAS has to be competitive in the global market of agricultural and related scientists. In order to attract good people, WorldFish pays slightly more than the CGIAR median. Gender specialists are particularly hard to recruit. Many international staff have been with AAS since the start of the program. A number of Interns appear on the WorldFish and AAS staff lists. There is however no program of PhD study supported by AAS. In the Annual Report 2013 nine long-term trainees are reported to be associated to AAS, all of them male. As has been pointed out in Section 3.2, a high concentration of international staff and PhDs is found in Penang. In the hubs almost all international staff are based in the capital cities.

WorldFish has a standard Job Description (JD) format. The AAS Country Leader in Cambodia, for

⁸⁹ CGIAR cost-allocation guideline, Financial Guideline No. 5

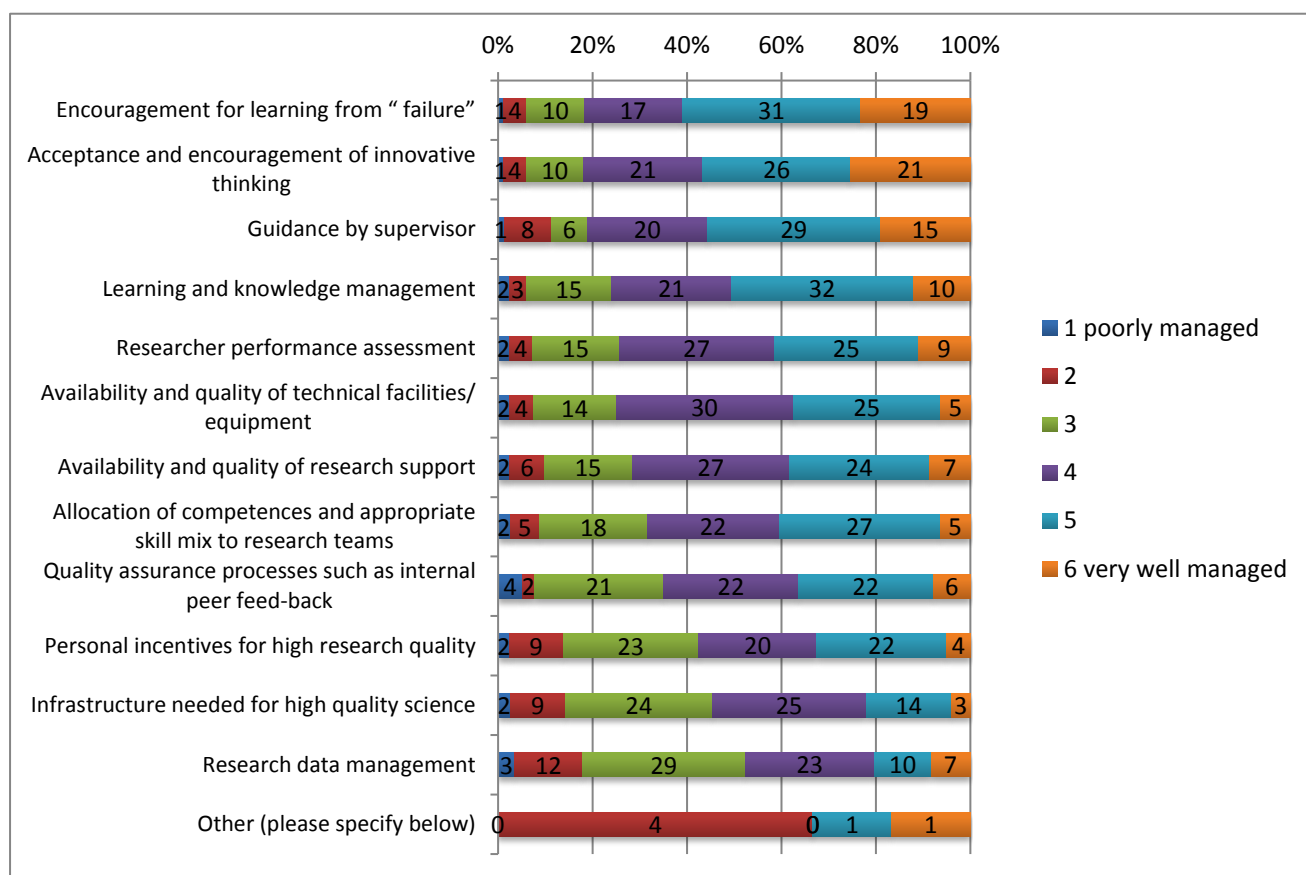
example, has a well-elaborated JD following this format. The Country Leader Bangladesh on the other hand still has only a very cursory JD, which dates from September 2011 and relates to his function as Deputy Regional Director of WorldFish. In the case of a bilateral project leader and scientist in Bangladesh, his specific role for AAS is not precisely described in his JD. It appears that many job descriptions, particularly of staff paid with W1/W2 funds and working exclusively for AAS, are still pending.

For AAS staff hired by WorldFish, the WorldFish HR regulations apply. JDs of all regular staff go to HQ for clearance and HQ formally approves all employment decisions. The payroll for all the staff is signed off by HQ. Many research staff are funded by projects and have annual renewable contracts. Central finance and administration personnel and the international staff have three-year renewable contracts.

WorldFish has an elaborate performance management system which requires the definition of “Must Wins” and “Key Performance Goals” at the institutional, unit and individual levels. Twice a year a Performance Management Plan (PMP) is agreed between staff members and their supervisors. PMPs appear to be used quite systematically and they come into play when setting performance-related salary.

The results from the staff survey provide insights on the links between human resource management and quality of science (Figure 3-5). On the positive side, half of the respondents considered “acceptance and encouragement of innovative thinking”, “encouragement for learning from failures” and “guidance by supervisor” very well or well managed. Respondents were more critical with regard to data management, the infrastructure needed for high quality research, personal incentives for high research quality and quality assurance processes, such as internal peer feedback.

Figure 3-5: Answers to the question: “In your view, how well are the measures listed below managed in AAS?”



Source: AAS Staff survey

Getting the incentives right for the quality of research is an important aspect of management. Two questions in the survey addressed this issue. The first was “What are the most important incentives used in the AAS for enhancing high quality of science?” The results suggest that the incentives as perceived by the survey respondents are mostly linked to leadership and the nature of the program, rather to institutional incentives. This can be seen as a positive result of the program.

The second question was: “Do you have quiet time for writing?”. Ten percent of respondents indicated that they have enough time, and 46 percent that they have some time but would like to have more time. Setting aside time for writing is a challenge in every research organization. Hence, the critical tone of some of the comments associated with this question are not surprising (see Annex G).

In summary, as in case of financial management, AAS benefits from the well-established human resource management system of WorldFish. A performance management system for staff is in place. Positive staff perceptions on key aspects of human resource management were documented through the staff survey.

Internal and External Communication

The program uses Google Docs to share documents. Otherwise the program uses no specific web-based platforms to facilitate internal communication among staff and/or partners. Internal communication is a challenge in any multi-location program. AAS addresses this challenge through phone- and video-conferences, planning workshops, thematic meetings etc. The survey contained a number of comments about too many and unproductive meetings. There may be opportunities to make better use of internet-based communications, sharing and exchange tools.

Until now a specialized unit of WorldFish has been responsible for AAS external communication. Intentionally AAS has used its website, publications, brochures and visiting cards to build an identity that is distinct from WorldFish. However, the high degree of congruence between WorldFish and AAS leads to challenges in external communication.

In those hubs where WorldFish was active prior to AAS, WorldFish is a well-known brand, appreciated for its competences in fisheries. Indeed in some hubs the programme is known as WorldFish. AAS is too abstract to be easily explained to a non-research audience.

4. OVERALL CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the evaluation team's overall assessment of the AAS program in relation to three main evaluation criteria: relevance, quality of science, and likely effectiveness. The guideline questions developed in the Inception Report form the basis of the assessment. The program has not been in operation long enough for a meaningful assessment of contributions to development outcomes and impact. The evaluation team's assessment of expected contributions along different impact pathways was presented in Chapter 3 above. The assessments for the cross-cutting topics gender, partnerships, capacity development, governance and management and M&E were also presented in Chapter 3 and are not repeated here.

4.1 Conclusions

AAS is an ambitious program that is different from other CGIAR research programs in some important ways – specifically it places an emancipatory version of PAR, gender equality and social transformation at center stage. Despite some very strong elements of continuity with pre-AAS work, the establishment of AAS as a new and productive CRP has not been straightforward. Some of the challenges faced by the program over the last three years should have been foreseen – and indeed some were, e.g. by the ISPC; others were inherent to the emergent nature of the program; still others were linked to specific design, implementation and staffing decisions.

4.1.1 Achievements

The evaluation team concludes that in the 3.5 years since its initiation AAS can point to a number of important achievements

It introduced a concept of aquatic agricultural systems within the CGIAR. The evaluation team considers aquatic agricultural systems to be highly relevant for achieving the CGIAR system-level objectives of reduced poverty; improved food and nutrition security for health; and improved natural resource systems and ecosystem services. AAS has provided an estimate of the substantial number of poor people whose livelihoods depend on aquatic agricultural systems, which underlines the role of investing in these systems for poverty reduction. Moreover, the program has contributed to further increasing awareness within the CGIAR about the role of aquatic resources for achieving nutrition security for health.

As the publications review indicated, the program built upon World Fish's intellectual leadership in important global debates related to fisheries and its role in pro-poor development. Co-management is an example. AAS was able to draw on this prior expertise and generate important insights on governance challenges in different types of aquatic agricultural systems, which have been published in international journals.

The program assembled a highly committed team of researchers, who identify strongly with the AAS program. As the staff survey showed, staff members appreciate there is a high level of "acceptance and encouragement of innovative thinking" as well as "encouragement for learning from failures" in

the program. This is particularly important in a program that aims to promote innovative approaches.

In its roll-out process, AAS developed and consistently applied a procedure for establishing a framework for collaborative research at regional (hub) level. This framework should ensure that the upcoming research is integrated with regional development initiatives and places strong emphasis on establishing partnerships.

Even though AAS operates in environments where some research and development organizations hand out free inputs to promote technologies, the program stayed away from these unsustainable practices.

In Bangladesh, the program focused attention on the development of innovative technologies that are particularly suitable for resource-poor farm families, such as “challenged” ponds, eco-ponds, vegetable towers, floating garden and small indigenous fish, options that have been neglected and that underline the potential of AAS to contribute to the development of innovative pro-poor technologies.

Another important achievement of AAS is the systematic application of the GTA across the different aquatic agricultural systems and the program’s ability to strongly link GTA to PAR. Additionally, the RinD and PAR elements of the programme add important dimensions to the GTA. Overall, the work being done on GTA within AAS is conceptually well-grounded. It has the potential to make an important contribution to understanding changes in gender norms, perceptions and relations. Moreover, AAS has been diligent in recording processes of self-reflection and learning. In the long run, the gender work has the potential to have impact beyond the boundaries of the program.

The program has shown its willingness to engage in critical discussions on impact assessment within the CGIAR and to make innovative methodological contributions to currently used impact assessment practices, as documented by the work with Mayne and Stern on theory-based approaches to impact evaluation. This discussion is likely to have a positive impact on the range of impact assessment approaches used within the CGIAR.

4.1.2 Relevance

The test for AAS is its relevance to the mission of the CGIAR. This can be assessed by considering the relevance of key program design elements including:

- The conception of aquatic agricultural systems
- The paradox of high biological productivity and low agricultural productivity
- The systems perspective
- The strong focus on gender and social transformation
- The choice of PAR as the key methodology

The conception of aquatic agricultural systems was introduced by the program, it was not a category of farming systems that the CGIAR (or others) had used before. The evaluation team finds that a

systems program that deals specifically with the development potential and problems of aquatic agricultural systems is highly relevant to the SLOs. To ensure the relevance of the program, the conception of aquatic agricultural systems needs to be sharpened and nuanced and the program's systems perspective needs to be significantly strengthened. The evaluation team finds that the paradox of high biological and low agricultural productivity in aquatic agricultural systems provides a potentially powerful research frame that could be used to a much greater effect by the program.

The GTA is highly relevant at a number of level. Placing PAR at the center is an innovative feature of the program, but the evaluation team finds that the choice of PAR as the key research methodology is not justified. PAR should be systematically integrated with other research approaches to address complex research questions and development challenges in dynamic social-ecological systems.

Assessing the 2015-2016 extension proposal with regard to relevance, the evaluation team finds that the proposed IDOs are relevant to the SLOs in the draft SRF. The relevance of the program could be further increased, if the IDOs would include institutional and policy changes. With regard to productivity, the evaluation team notes that indicators should capture systems productivity and take ecosystem services into account. The evaluation team also notes that the capacity indicators (capacity to innovate and adapt) need considerably more development in order to become operational.

4.1.3 Quality of science

The analysis of legacy research shows that the program inherited a strong base of high-quality research on which to build. AAS has drawn on this in some areas, most notably in regard to Policies and Institutions. AAS researchers have been successful in placing their work in highly ranked international journals in the fields of fisheries, environmental sciences and development studies. Some papers were also published in top general journals, including Science and PNAS. The publications review indicated a shift towards a greater recognition of gender and poverty in the publications' portfolio. Even though AAS is a systems CRP, there was a scarcity of papers that used methodologies commonly associated with farming systems research or in agro-ecosystems research. The evaluation team acknowledges that, at this stage of the implementation of the program, it is too early to expect that international journal publications have already appeared from research activities started under the roll-out process, especially PAR.

The evaluation team identified a number of problems that would need to be addressed in order to ensure that high quality science can be produced under the program. The most important of these is the fact that PhD-level researchers are spread far too thinly across hubs and themes, particularly given the high degree of staff with only an undergraduate degree. A realistic priority setting exercise is required to better align ambition with capability. A related issue is that senior researchers are not closely enough engaged in the community research activities to ensure quality of science.

A second area of concern affecting quality of science is the intellectual isolation of some important parts of the program. This is reflected in a lack of critical engagement with the literature and past experience; and the appropriateness and quality of the research designs and data collection associated with the PAR activities.

The evaluation team also finds that quality of science has been affected by the fact that the program has not sufficiently leveraged expertise from within the CGIAR and/or from further afield. This is particularly the case for the research theme on Systems Productivity, which includes research topics for which WorldFish does not have traditional expertise, such as crop and livestock production. The other areas of the program's research would also benefit from a broader network of active partners.

Finally, the governance of the program, and particularly that the POP has not exercised a sufficiently strong independent oversight role as was originally anticipated, which has limited its ability to adequately address issues related to program design and quality of science.

4.1.4 Likely effectiveness

The question here is whether the program, working largely but not exclusively through RinD, is likely to be effective in generating broadly relevant knowledge and contributing to the development outcomes identified in the proposal and the 2015-2016 extension.

Given that the proposal presented the program in contrast to conventional agricultural research, an aspect of the question of likely effectiveness is whether AAS is likely to be more effective than other, alternative approaches to development-oriented agricultural research. The evaluation finds that the likely effectiveness of the AAS (especially through Impact Pathway 3) could be improved by specifying more explicitly those types of research within the broad research portfolio of the CGIAR where the RinD approach is likely to be more effective than other research approaches. The bilateral aquaculture projects implemented under AAS indicate that for less complex situations, conventional approaches of research and extension may be more cost-effective in achieving large-scale impacts.

The evaluation team notes that the likely effectiveness of the RinD approach compared to other approaches has received increasing attention with the extension proposal. To do this important question justice will require serious commitment, clearer specification of the alternatives, strong research designs and a measured sense of what is realistic.

The issues identified above in relation to relevance and quality of science have obvious implications for likely effectiveness.

Through the GTA work, there are signs that the program and its partners can be effective in stimulating the beginnings of potentially transformational social processes on the ground. It is critical that these processes are progressively linked the program's central concern – productivity enhancement – and that effectiveness at larger scales is clearly demonstrated.

4.1.5 Overall conclusion

Overall the evaluation team concludes that:

- Aquatic agricultural systems present issues of sufficient importance and relevance to justify further investment by the CGIAR;
- AAS has a number of important achievements, where the potential for progress can be demonstrated; and

- The program faces a range of obstacles and challenges, which affect quality of science, relevance and effectiveness, and to be overcome will require substantial changes in key areas including program design, staffing and implementation.

4.2 Recommendation on the way forward

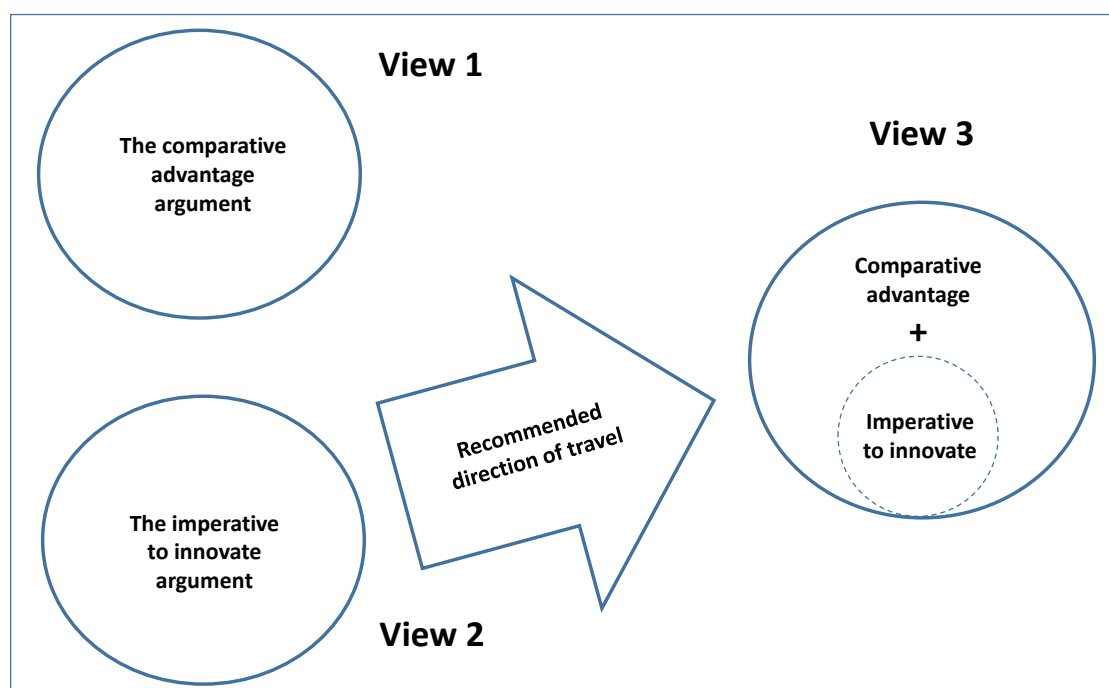
There are at least three ways to look at AAS or any other future CGIAR investment in aquatic agricultural systems (Figure 4-1).

The first is to see it as a program that builds on previous CGIAR research, which resulted in the development of particular skill sets, competences, technologies, relationships etc in the areas of aquaculture, integrated agriculture-aquaculture systems and fisheries. Seen in this way, there is a strong comparative advantage argument for why additional investment by the CGIAR might be warranted.

The second way is to see AAS as a vehicle through which the CGIAR can build new competences, in relation, for example, to new methodologies and research areas like PAR, gender and social transformation, systems and sustainability science, which can be of value beyond the worlds of aquaculture, fish and aquatic agriculture systems. Here, the argument for additional investment hinges on the opportunity to innovate and move beyond “business as usual”.

The third way to see the program is as bringing these two views together, with the CGIAR’s existing competences around fish and aquaculture providing an important and possibly unique platform from which to generate broadly relevant knowledge, explore methodological innovation, including more integrated and contextual research approaches, and contribute to positive development outcomes.

Figure 4-1: Three ways to view AAS, and recommended direction of travel.



The evaluation team suggests that to date, AAS has been led and managed primarily from the second perspective – i.e. to use AAS as a way to establish and legitimize new skills and competences. As a result or a reflection of this, insufficient attention has been given to the historic competences of WorldFish and other CGIAR centers, in relation e.g. to aquaculture technology and agricultural technology development. Instead of minimizing the value of these competences and experiences, it would make more sense to use them as an invaluable springboard.

RECOMMENDATION 10. It is the Primary Recommendation of the evaluation team that bold steps should be taken by the CGIAR and AAS to move in the direction of View 3. The CGIAR should justify further investment in aquatic agricultural systems more on the grounds of comparative advantage, and to do this the focus needs to be much more about fish.

This recommendation has a number of implications, including the need to:

1. Strengthen and nuance the conceptualization of aquatic agricultural systems so that there is a more coherent and compelling justification for a reduced number of geographic hubs. One option would be to have a strong programmatic focus on integrated aquaculture-agriculture systems where the linkages between aquaculture and agriculture are clearly specified and central to the research agenda;
2. Use the AAS paradox to strengthen the strategic aspects of the research program;
3. Shift the focus away from PAR as the core research methodology, implemented largely in parallel with other approaches as it now is, towards an interdisciplinary, mixed-methods approach. Continuing work around PAR should then take an explicit research stance, and ask

if, where, when, with whom, in relation to what kind of problems or technologies, and why, it is or can be useful;

4. Significantly increase the proportion of experienced, senior researchers working at field level, and re-invigorate an ethos of field-based research among senior scientists;
5. Significantly strengthen the systems research capabilities; and
6. Mover toward a truly collaborative, multi-center research program.

4.3 Compilation of suggestions

SUGGESTION 1. The evaluation team suggests that the program becomes much more explicit and aggressive in exploring and demonstrating the added value of PAR through deliberate and critical analysis of “the approach as espoused” versus “the approach in use”. An important element of this could be within and between hub comparisons, which will need to be a carefully considered element of the program’s research designs.

SUGGESTION 2. The theme leaders might be asked to develop a clear strategy for the program’s productivity research. This strategy could make the conceptual foundations of the research explicit, and identify the research methodologies to be used, the types of data to be collected, and the analytical methods to be used. The evaluation team believes that an agro-ecosystems perspective could be a useful framework. The strategy should engage with current debates around productivity, including yield gaps, sustainable intensification, agro-ecology, and eco-system services, and build on ideas presented by the theme leaders at the Ibadan conference in March 2015. A focus on the productivity-relevant linkages between the aquatic and the agricultural components of aquatic agricultural systems is of central importance as it would appear to be one of the big opportunities created by AAS. Through this strategy system productivity could be addressed in an interdisciplinary way, which will require intensified collaboration across the participating centers and partners, and the formation of teams who directly interact with the communities.

SUGGESTION 3. As part of the strategy development process a senior researcher might be tasked with reviewing existing methods for community-based problem identification and priority setting, and critically assessing their relevance to the productivity theme. Based on this review the program might decide to experiment with different methods with the objective of both improving implementation and contributing to methodological development.

SUGGESTION 4. The evaluation suggests that AAS use its expertise on resilience related to fisheries to shed much needed light on resilience issues in the wider context of aquatic agricultural systems. The collaboration with IMWI and Bioversity in the area of resilience should be continued. It is suggested that the work on resilience could be much more closely linked with that on system productivity, not only conceptually, but also through PAR activities

in the field.

SUGGESTION 5. The evaluation team suggests that it may now be time to shift the focus so that work under this theme contributes more directly to efforts to evaluate productivity enhancing innovations and processes and dynamics of technological change. This would be very much in line with the program’s stated ambition to “marry ‘technical’ interventions delivering better access to assets, markets or new technologies, with those directly targeting the norms, values and attitudes identified as underlying gender and wider social inequalities.”

SUGGESTION 6. If Institutions and Policies is to remain a priority research theme the evaluation team strongly suggests that additional staff should be allocated to it. It would also be highly desirable to have researchers with expertise in this field based in the hubs and directly involved in PAR activities in the communities, where they could contribute to addressing governance issues that are relevant for the success of PAR, such as local power relations.

SUGGESTION 7. The knowledge sharing and learning team is encouraged to develop a much more clearly articulated set of research questions.

SUGGESTION 8. To help ensure that it contributes as expected to positive development outcomes, the program might consider addressing the problems identified by the evaluation team regarding the implementation of the RinD approach, in particular with respect to the focus on poor and marginalized groups and the need to avoid elite capture; the lack of focus on the productivity research; and the need for stronger systems and interdisciplinary orientations. This suggestion is in line with Recommendation 1.

4.4 Compilation of recommendations

RECOMMENDATION 1. Strengthen research strategy and design

AAS should strengthen its research strategy and design by:

- Taking an explicit research stance vis-à-vis RinD, comparing and contrasting it with other approaches and collecting data that will make it possible identify its comparative advantages.
- Re-focus research questions on the AAS paradox;
- More effectively engaging with, benefitting from and contributing to existing bodies of experience and scholarship around agricultural systems and the methods used to study and improving them.

RECOMMENDATION 2. Strengthening research capacity

AAS management should re-think its approach to staffing and to the allocation of human resources by:

- Basing more experienced senior researchers in the hubs. This would allow them to take the

lead in designing and implementing research.

- Undertaking a detailed analysis of the factors that constrain the hiring and retention of qualified research staff, particularly in the hubs. If these factors cannot be overcome directly, alternative models, including shared staff, partnerships, should be explored. There is already some important experience with these models within the program.
- Ensuring a critical mass of research capacity to a level that would justify expenditure in relation to any given hub – theme combination. If the program faces resource limitations, consolidation and prioritization over hubs and themes will be essential.

Until these concerns are addressed, the evaluation team recommends that no expansion into new hubs or research themes should be contemplated.

RECOMMENDATION 3. Revising the roll-out process

The evaluation team suggests that any continuation or extension of the roll-out process would benefit from: (1) allowing for experimenting with different approaches to community engagement and priority setting in ways that allow results to be compared; (2) ensuring that adequate time and resources are available to conduct in-depth, critical reviews of the relevant research-based literature and experience; (3) ensuring a much greater level of direct involvement by senior researchers; and (4) striving toward the development of an explicit and robust systems perspective using an interdisciplinary research approach.

RECOMMENDATION 4. Increasing alignment of AAS activities

The decision to associate bilateral projects with AAS should be based primarily on their potential to further the AAS research agenda. In the design and implementation of all bilateral projects, maximum synergies with W1/W2 funded work should be sought. In particular, AAS management should seek to use bilaterally-funded projects to experiment with different approaches to community involvement and participatory technology development on a larger scale than is currently possible.

RECOMMENDATION 5. Partnership and capacity building strategies

AAS management should undertake a strategic review of both the program's partnership and capacity development activities. Potential partners could be assessed more critically. More emphasis could be placed on partnering with research organizations in the South, including institutes and universities, as a cost-effective way of bringing expertise into the program, particularly where it has been difficult to recruit experienced staff. A senior staff member could be given responsibility for partnerships and capacity development.

RECOMMENDATION 6. Potential to generate broadly relevant knowledge

AAS research management should take more active steps to ensure that research activities in the hubs are conceived and planned in ways that will allow widely relevant knowledge, including IPGs, to be generated so as to ensure that Impact Pathway 3 can function. Specifically, stronger engagement

with the relevant literature, comparative research designs, and more detailed analysis of the other contexts within which the research may be relevant are recommended.

RECOMMENDATION 7. Strengthened governance

In order to fulfil its oversight role, and thus provide AAS with a more robust governance structure, the position of the POP must be significantly strengthened in relation to both the program management and WorldFish. Its links to the BoT of WorldFish need to be reinforced. Given the ongoing discussions about CRP governance, it is not for the evaluation team to detail how this should happen, but stronger and more independent oversight is essential.

RECOMMENDATION 8. Clarification of roles

The management of AAS and WorldFish should clarify the roles, responsibilities and reporting relations of WorldFish staff relative to AAS staff, and in particular as they relate to scientific management. The proposed AAS Science Director should be encouraged to spend considerable time in the hubs.

RECOMMENDATION 9. Management information

A functional research management information system should be established. This system should make it possible for AAS management to monitor and assess key program indicators such as the distribution of resources and the research outputs produced by hubs and themes.

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