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

Volume 2 – Annexes

April 2015

Regina Birner (Co-Team Leader)
Ram Bhujel
Eva M. Rathgeber
Nadarajah Sriskandarajah
James Sumberg (Co-Team Leader)
Felix von Sury

CGIAR | Independent Evaluation Arrangement

This evaluation has been commissioned by the Independent Evaluation Arrangement (IEA) of CGIAR.

Correct citation: CGIAR-IEA (2015), Evaluation of CGIAR Research Program on Aquatic Agricultural Systems, Vol 2. Annexes. Rome, Italy: Independent Evaluation Arrangement (IEA) of CGIAR
http://iea.cgiar.org/

Table of contents

ANNEX A. Evaluation process and schedule 1
ANNEX B. Profiles of evaluation team members 3
ANNEX C. Evaluation reference group....6
ANNEX D. Roll-Out Case Studies 8
D.1 Methods 8
D.2 Zambia 9
D.3 Bangladesh 33
D.4 Solomon Islands....64
D.5 Cambodia....79
ANNEX E. Bilateral project Case Studies 93
E.1 Methods 93
E.2 Zambia – NOTHERN PROVINCE 95
E.3 Bangladesh – FTF AIN 101
E.4 Solomon islands – COMMUNITY BASED FISHERIES 111
E.5 Cambodia – RFF ENHANCEMENT PROJECT 118
ANNEX F. Publications assessment 126
F.1 Publications review by evaluation team 126
F.2 Bibliometric Analysis 148
ANNEX G. Staff Survey 165
G.1 Methods....165
G.2 Results....165
G.3 Further analysis 179
ANNEX H. List of people interviewed....181
ANNEX I. AAS Research questions....187

Figures

Figure D-1: ZAM - Distribution of staff (FTE) according to theme, by level 15
Figure D-2: ZAM - AAS Program Design 16
Figure D-3: BAN - Time line of key events and activities in the Khulna Hub 34
Figure D-4: BAN - Distribution of staff (FTE) according to theme, by level 38
Figure D-5: BAN - Program Structure 40
Figure D-6: BAN - Khulna Hub Level Theory of Change 43
Figure D-7: SOL - Distribution of research effort by theme and degree level (FTE) 67
Figure D-8: SOL - Proportion of research FTE by degree level and theme. 68
Figure D-9: SOL – Program design for Malaita Hub 69
Figure D-10: CAM - Distribution of research effort by theme and degree level (FTE) 81
Figure D-11: CAM - Proportion of research FTE by degree level and theme 82
Figure D-12: CAM - Tonle Sap hub strategic framework 83
Figure F-1: Classification of reviewed publications by AAS theme 129
Figure F-2: Classification of reviewed publications by AAS hub country 130
Figure F-3: Classification of reviewed publications by type 131
Figure F-4: Overall assessment by type of publication 133
Figure F-5: Overall rating by AAS theme 134
Figure F-6: Classification of reviewed publications by type of data 136
Figure G-1: SURVEY – Q 3: Research area? 167
Figure G-2: SURVEY – Q 4: Home institution 167
Figure G-3: SURVEY– Q 5: Time with current organization 168
Figure G-4: SURVEY- Q 7: Time devoted to AAS 168
Figure G-5: SURVEY- Q 8: Contribution to research themes 169
Figure G-6: SURVEY- Q 9: Contribution to Hubs/Flagships 169
Figure G-7: SURVEY- Q 10: Days spent in communities 170
Figure G-8: SURVEY- Q 11: Knowledge of program 170
Figure G-9: SURVEY Q12: Influence on choice of research topics 171
Figure G-10: SURVEY Q 13: Enhancing effectiveness 171
Figure G-11: SURVEY Q 14: AAS management 172
Figure G-12: SURVEY Q 15: Quiet time for writing 172

Figure G-13: SURVEY Q 17: Involvement in activities funded by W1/2 173
Figure G-14: SURVEY Q 18: Use of W1/2 funds 173
Figure G-15: SURVEY Q19: Types of partners 174
Figure G-16: SURVEY Q20: Effectivness of partnerships 174
Figure G-17: SURVEY Q 21: Involvement of partners 175
Figure G-18: SURVEY Q 22: Mainstreaming of gender 175
Figure G-19: SURVEY Q 24: Capacity development 176
Figure G-20: SURVEY Q 26: Satisfaction with working conditions 176
Figure G-21: SURVEY Q 27: Did you work in the CGIAR system before the CRPs were introduced? 177
Figure G-22: SURVEY Q 28: Value added of AAS (for people who joined before) 177
Figure G-23: SURVEY Q 29: Value added of AAS (for people who joined after) 178

Boxes

Box D-1: ZAM - Development Challenge of the Barotse Hub 10
Box D-2: BAN – Development challenge of Khulna Hub 33
Box D-3: SOL – Development challenges for Malaita and Western Hub 68
Box D-4: SOL - AAS research questions 71
Box D-5: CAM – Development challenge of Tonle Sap Hub 82
Box D-6: CAM – AAS selection of villages 84

Tables

Table A-1: AAS Evaluation process and main events 1
Table C-1: Evaluation Reference Group members 6
Table D-1: Schedule for the field visits for roll-out case studies 8
Table D-2: ZAM - Key information about the Barotse Floodplain 10
Table D-3: ZAM - Time line of key events and activities in the Barotse Hub 11
Table D-4: ZAM - Yearly budgets per cluster of activities and funding source 12
Table D-5: ZAM - Bilateral projects 12
Table D-6: ZAM – AAS staff composition 14
Table D-7: ZAM – Schedule of visit 29
Table D-8: BAN - Key information about the AAS Southern Bangladesh Polder Zone (SBPZ) 33

Table D-9: BAN – Bilateral projects....35
Table D-10: BAN - selection of villages for case study....36
Table D-11: BAN - AAS staff composition....37
Table D-12: BAN – Schedule of visit....57
Table D-13: BAN – publications....60
Table D-14: SOL - Timeline of key AAS events....64
Table D-15: SOL - Major bilateral projects associated with AAS....65
Table D-16: SOL - Individuals interviewed during evaluation visit....66
Table D-17: SOL - Distribution of FTE research effort by base and degree level....66
Table D-18: SOL - Schedule of visit,....74
Table D-19: CAM - Timeline of key AAS events....79
Table D-20: CAM - Bilateral projects in Cambodia and 2014 budgets in USD....79
Table D-21: CAM - Categorisation of individuals interviewed during evaluation visit....80
Table D-22: CAM - Distribution of FTE research effort by job title....81
Table D-23: CAM - Distribution of FTE research effort by degree level....81
Table D-24: CAM – Schedule of visit....90
Table E-1: Bilateral projects selected as case study....93
Table E-2: Zambia project overview....95
Table E-3: FTF AIN Overview....101
Table E-4: Components and Objectives of the Project....101
Table E-5: FTF AIN staffing....102
Table E-6: FTF AIN Component-1: Key targets and achievements of seed production and distribution....104
Table E-7: FTF AIN Component-2: Key targets and achievements of household fish farming....104
Table E-8: FTF AIN Component-3: Key targets and achievements....105
Table E-9: FTF AIN - Adoption rate of improved fish and shrimp farming technologies by project farmers....106
Table E-10: FTF AIN publications....109
Table E-11: CBFM....111
Table E-12: RFF Enhancement overview....118
Table E-13: RFF Enhancement - Average catch per gill net per set....121

Table E-14: RFF Enhancement - Biodiversity index in various category of rice fisheries sites 121
Table E-15: RFF Enhancement – capacity building 122
Table E-16: RFF Enhancement – workshop participants 122
Table F-1: AAS Publications by type and year....127
Table F-2: Number of reviewed publications by type and time period....127
Table F-3: Classification of reviewed publications by discipline group and time period 129
Table F-4: Co-authorship from developing countries....131
Table F-5: Impact factors of reviewed journal publications, by time period 132
Table F-6: Assessment of originality of reviewed publications 135
Table F-7: Type of analysis of qualitative papers....136
Table F-8: Level of quantitative analysis....137
Table F-9: Poverty link of reviewed publications....138
Table F-10: Gender link of reviewed publications 139
Table F-11: Systems link of reviewed publications....140
Table F-12: PAR link of reviewed publications....141
Table F-13: Focus on implications for policy and practice....142
Table F-14: Types of publications produced under the AAS CRP 149
Table F-15: Number of publications by year and publishing period 149
Table F-16: Number of citations for articles published in 2012 and 2013 150
Table F-17: The ten most cited articles since 2009 151
Table F-18: Journals in which articles were published 153
Table F-19: Affiliation of co-authors 154
Table G-1: Survey overview 165
Table G-2: Survey respondents by position and gender 165
Table G-3: Survey respondents by country base and gender....166
Table G-4: Staff perceptions about personal incentives for quality research. 179
Table G-5: Staff perceptions relating to the share of time for research compared to administration....179
Table G-6: Staff perceptions about availability of quiet time for writing....180
Table G-7: Staff responses to statement: I am familiar with and fully understand the AAS gender strategy 180

ANNEX A. EVALUATION PROCESS AND SCHEDULE

Table A-1: AAS Evaluation process and main events

MAIN EVENTS	PERIOD/DATE	ACTIVITIES	PEOPLE INVOLVED
PREPERATORY and INCEPTON PHASE	**Feb- Oct 2014**		
Preparatory Phase	Feb 2013 – May 2014	• Finalizing ToR • Recruitment of Evaluation Team • Establishment of Reference Group	IEA
1st RG meeting	15 May 2014	• Feedback on draft ToR	RG + IEA
Inception meeting	25-28 Jun 2014	• Work on evaluation methodology • Start preparing the Inception Report	ET + IEA
Briefing by AAS management	26 Jun 2014	• Give an overview of the program and	AAS
2nd RG meeting	30 Sep 2014	• Feedback on draft Inception Report	RG + TL + IEA
Final inception report	29 Oct 2014	• Final inception report shared with AAS and RG	
INQUIRY PHASE	**Oct 2014 – Dec 2014**		
Visit to WF Headquarters	1-3 Nov 2014	• Meetings with AAS management and staff	Regina Birner, Felix von Sury
Field visits			
• Zambia	1 – 10 Oct 2014	• Meetings with AAS staff in Lusaka Regional office and Mongu Hub office • Visit 3 communities in Barotse Flood Plain • Interviews with partners and stakeholders	Regina Birner, Eva Rathgeber, Sophie Zimm (IEA)
• Bangladesh	7 Nov 2014	• Global AAS Program Discussion	AAS + ET
• Bangladesh	8 – 14 Nov 2014	• Meetings with AAS staff in Kulna research hub • Visit 10 communities (AAS sites as well as bilateral project sites) • Interviews with partners and stakeholders in Dhaka	Regina Birner, Ram Bhujel, Eva Rathgeber, Nadarajah Sriskandarajah , Felix von Sury,
• Solomon Islands	10 – 18 Nov 2014	• Meetings with AAS team • Meetings with partners and stakeholders in Malaita • Visit Western Province hub communities • Meeting with national partners In Honiara	Jim Sumberg

• Cambodia	19-23 Nov 2014	• Attendance of ToC Workshop in Siam Reap • Meetings with AAS staff in Siam Reap hub office • Visit of 3 communities in Tonle Sap • Meetings with partners and stakeholders	Ram Bhujel, Jim Sumberg, Sophie Zimm (IEA)
Publication review	Dec 2014 – Jan 2015	• Qualitative assessment of sample publications	ET
MAIN EVENTS	**PERIOD/DATE**	**ACTIVITIES**	**PEOPLE INVOLVED**
Research staff survey	Nov – Dec 2014	• Design and piloting of survey • Conduct of survey	ET + IEA
Other inquiry phase activities	Oct – Dec 2014	• Interviews with partners and stakeholders and external experts • Documentation review	ET
REPORTING PHASE	**Jan- Mar 2015**		
Analysis, synthesis	Jan 2015	• Survey analysis • Drafting of roll out case study reports and research case study reports • Synthesis of publications review	ET + IEA
3rd RG meeting	2 Feb 2015	• Presentation of emerging findings and feedback	RG+TL+IEA
Presentation to AAS management	10 Feb 2015	• Presentation of emerging findings and feedback	AAS+TL+IEA
Drafting of report	Jan 2015– Feb 2015	• Drafting of evaluation report	ET
Writing meeting	9-13 Feb 2015	• Review findings and sections prepared by team members • Discuss and agree on conclusions and recommendations	ET + IEA
Feedback and comments	2 Mar – 23 Mar 2015	• AAS management and RG provide feedback and comments • AAS management to start working on management response	AAS+RG
Incorporation of comments	23 Mar – 28 Mar 2015	• Review and revisions of draft report	TL +IEA
Final Evaluation Report	7 Apr 2015	• Final Evaluation Report incl. AAS management response submitted to CGIAR Fund Council	IEA
Dissemination phase	Apr- May 2015	• Communications products	AAS + TL + IEA

ANNEX B. PROFILES OF EVALUATION TEAM MEMBERS

TEAM LEADERS

Regina Birner has been the Chair of Social and Institutional Change in Agricultural Development at the University of Hohenheim (Germany) since 2010. She has more than 20 years of experience in development-oriented agricultural research and has led numerous research projects in Asia and Africa. From 2004 to 2010, she was the leader of IFPRI's Research Program on "Governance for Agricultural and Rural Development". In 2008 she served in the core author team of the World Development Report on "Agriculture for Development." Dr. Birner has acted as advisor to international organizations, including the World Bank, FAO and USAID and participated in various evaluations. Her research focuses on socio-economic issues in the context of agricultural development, including topics such as participatory research, institutions, knowledge and innovation, and gender. Dr Birner has extensive experience in evaluation – she led and participated in major evaluations of major programs of FAO, World Bank and IFAD. Dr. Birner has a PhD in Socio-Economics of Agricultural Development from University of Göttingen.

James Sumberg is a Research Fellow at the Knowledge, Technology and Society Team, Institute of Development Studies (IDS) at University of Sussex. He is an agriculturalist by training, with PhD from Cornell University on Plant Breeding and Animal Nutrition, and has over 25 years of experience of research on small-scale agriculture, natural resource management, agricultural research policy, and food and rural development in tropical regions, with a particular emphasis on sub-Saharan Africa. He has participated in evaluation of agriculture and natural resource management projects. His past work experience includes, among other, The New Economics Foundation in London, University of East Anglia (Senior Lecturer in NRM) and CARE, and brief periods in WARDA and CIAT. He has published in change in agricultural systems, innovation and policy.

TEAM MEMBERS

Ram Bhujel is currently Senior Scientist and Affiliated Faculty Coordinator for the EU-Aqua-Internship Program in Aquaculture and Aquatic Resources Management at Asian Institute of Technology (AIT). He has long standing experience in the field of small—scale and commercial aquaculture and integrated farming with vegetables and livestock. He has been working as project coordinator for several aquaculture development projects in Asia and is currently coordinating the Agricultural Learning Experience for Asian Regional Networking (AgLEARN) project funded by USAID/RDMA and the Development Rural Aquaculture through Entrepreneurship in Women in Myanmar (eWomen) funded by the Foreign Ministry of Italy. He also served in several community and industry engagement projects. Mr. Bhujel has a PhD in aquaculture.

Sri Nadarajah has been Professor in Environmental Communication at the Swedish University of Agricultural Sciences in Uppsala, Department of Urban and Rural Development since March 2007. Sri has held university positions in Sri Lanka, Australia, Papua New Guinea and Denmark and worked on projects in a number of countries in Asia, Africa, Latin-America and Europe. His research deals with the challenge of complexity at the human-nature interface, taking a systemic, inter-disciplinary and learning-oriented/action research approach. He has published widely in the field of action research, learning and farming systems. He has a PhD in Anumal Husbandry from University of Sydney, Australia.

Eva M. Rathgeber is a consultant in international development. From 2002-2006 she held the Joint Chair of Women's Studies at the University of Ottawa/ Carleton University in Ottawa, Canada and she continues to serve as an adjunct professor at both universities. She spent many years with the International Development Research Centre (IDRC), starting as a program officer in science and technology, and later became founder and director of IDRC's Gender and Development Program. From 1992-2001, she was IDRC Regional Director for Eastern and Southern Africa, based in Nairobi, Kenya. She continues to work closely with many international organizations, including FAO, IAEA, UNESCO, the African Virtual University, and the CGIAR system. She has published widely on science and technology policy, knowledge production, gender and development, and gender and natural resource management. She currently serves on the Gender Institutions and Participation panel of the CGIAR Challenge Program on Water and Food, and on the Steering Committee of the Gender and Water Alliance.

Felix von Sury is a pasture agronomist by training and has a PhD in Agricultural Science from ETH Zurich. Dr von Sury has extensive experience in international and development cooperation. He served for 13 years in the SDC, Swiss Agency for Development and Cooperation, Swiss Foreign Ministry. In the 1990 he was Programme Officer in the SDC Agricultural Service looking after a variety of research programmes, also of the CGIAR. Later he became SDC's Country Director for Nepal and Division Head for Eastern Europe. From 2000 until 2011 he was Executive Director of Intercoope-ration, a major Swiss development NGO active mainly in the fields of renewable natural resources, agriculture, forestry and climate change. Long-term assignments have taken Dr von Sury to Peru, Australia, India and Nepal. Since 2012 he has been a freelance consultant and led and participated in several evaluations and reviews, among others of the Bolivian Agricultural Innovation and Services Programme, PISA. Dr von Sury is an independent expert for the Research for Development Programme of the Swiss Science Foundation; he sits on the Stakeholder Committee of the Swiss Aquatic Research Institute and is a member of the Board of the International Institute for Sustainable Development, IISD.

Summary of team expertise

In summary, within the evaluation team there was specific expertise in:

- Action research (Rathgeber, Sriskandarajah)
- Participation and participatory research (**Rathgeber, Sriskandarajah**, **Sumberg**)
- Farming systems research (**Sriskandarajah**, **Sumberg**)
- Aquaculture and fisheries development (**Bhujel**)
- Agriculture and rural development (Birner, Bhujel, Sriskandarajah, Rathgeber, Sumberg, von Sury)
- Gender relations in rural and agricultural development (**Rathgeber**, **Birner**, **Sumberg**)
- Institutions and the governance of natural resource use (**Birner, Rathgeber**)
- Systems of innovation and agricultural research policy (**Birner**, **Sumberg)**
- Capacity building for development (Birner, Sriskandarajah, Rathgeber, Sumberg, von Sury)

Team members also brought experience in:

- Working in the CGIAR (a total of 12 years over 4CG centres) (JS – 6 years, 3 centres; Regina – 6 years, 1 centre)
- Commissioning, leading and doing evaluations of development programmes (**von Sury**, **Rathgeber**, **Birner**, **Sumberg**)

- The leadership and management of large development organisations (**von Sury**), and large research programmes (**Birner, Rathgeberm Sumberg**)
- Working within development-oriented NGOs (**Rathgeber**, **Sumberg**, **von Sury**)

Finally, four members of the evaluation team are currently research active in areas that relate directly to AAS (**Birner**, **Sriskandarajah**, **Sumberg**, **Bhujel**).

ANNEX C. EVALUATION REFERENCE GROUP

An Evaluation Reference Group (RG) was established by the IEA prior to the initiation of the inception phase. Members of the Reference Group are identified

The RG's role was to provide feed-back to the IEA and the evaluation team leaders at key moments in the evaluation process including the planning and reporting phases. The RG met virtually on three occasions:

- Discussion of the draft evaluation Terms of Reference (15 May 2014)
- Discussion of the draft Inception Report (30 September 2014)
- Discussion of the emerging findings (02 February 2015)

Over the course of the evaluation the team interacted with AAS leadership and management on several occasions including:

- A virtual introductory discussion during the evaluation team's inception meeting in Rome (26 June 2014)
- A visit to Penang by two team members (3-4 November 2014)
- A one-day briefing of the full evaluation team in Dhaka prior to field visits in Bangladesh, Solomon Islands and Cambodia (07 November 2014)
- A discussion of emerging findings with the evaluation team leaders and IEA staff (10 February 2015)

Table C-1: Evaluation Reference Group members

Name	Position/role
Patrick Dugan	CRP Director
John Lynam	Member of the AAS POP and Chair of the ICRAF Board. He has over 30 years' experience in tropical agricultural research in Latin America, sub-Saharan Africa and Asia specialized on smallholder-led agricultural development in the tropics. Previously he has worked for the Kilimo Trust in Uganda; the Food Security Division of the Rockefeller Foundation in Kenya; the CIAT Cassava Program. He has a Ph.D. and an M.A. from Stanford University Food Research Institute.
Barbara Schreiner	Member of the AAS POP and IWMI Board member. She is Director, Water Resources & Management Consultant Pegasys Strategy and Development South Africa. She is a manager and consultant with expertise in research; policy; strategy; institutional, economic and technical regulation in developing countries; financial governance and institutional issues; particularly in the water sector.
John Mayne	Independent advisor on public sector performance. He has worked for 30 years in the federal government of Canada in evaluation, RBM and auditing.
Rieky Stuart	Senior associate of Gender at Work and consultant in international development, and promotes gender equality through evaluations, strategies and programmes. She has worked and lived in Africa, Asia and Canada as a teacher, development programmer, consultant and manager. She was Executive Director of Oxfam Canada from 1999 to 2005 and served previously as Deputy Director for the Canadian Council for International Cooperation.

Name	Position/role
Jürgen Anthofer	Represents donors. Executive Secretary of EIARD, the European Initiative for Agricultural Research for Development. He was previously Advisor on Agricultural Research for Development at GIZ, Germany and the Senior Agricultural Specialists at the World Bank and has also worked for the International Horticulture Initiative and at ICARDA.
Philip Chiverton	Represents donors. Currently full-time with the Swedish International Development Agency, previously International advisor and Associate Professor at Swedish University of Agricultural Sciences (SLU).
Ann Waters-Bayer	Represents research partners. She is an agricultural sociologist and senior advisor with the ETC Foundation (Netherlands) and also engaged in the International Support Team for the action-research programme PROLINNOVA (PROmoting Local INNOVAtion in ecologically oriented agriculture and natural resource management). She has worked for ILC and IITA, and was member of the CGIAR NGO-committee.
Remo Gautschi	Remo Gautschi is Chair of the WorldFish Center Board. He is Deputy Director-General of the Swiss Agency for Development and Cooperation (SDC) of the Department of Foreign Affairs. He has Master's Degree in Civil Engineering, followed by a post-graduate diploma on Structural and Spatial Planning. He has held posts with the cooperation office in Nepal and South East Asia and has experience on the private sector. Remo Gautschi served in the Board of ICIMOD and 2003 - 2005 as chairperson of the IWMI board.

ANNEX D. ROLL-OUT CASE STUDIES

D.1 Methods

A roll-out case refers to hub-based efforts to formally implement the AAS approach. Primarily funded with W1/W2 resources, roll-out cases are of interest because that allow an exploration of the AAS approach in its purest form (i.e. not encumbered by bilateral projects). The first generation of hub roll-out activities took place in Bangladesh, Zambia and Solomon Islands starting in 2012, while second generation roll-out started in Cambodia and Philippines in 2013).

After an initial engagement with the AAS documentation, discussions with AAS management and a consideration of logistical implications, four hub cases were selected (Table D-1). These cases represented three first generation and one second generation hub, and covered all three of the aquatic agricultural systems identified by the programme.

Table D-1: Schedule for the field visits for roll-out case studies

Research hub[1]	Generation	Rationale	Dates of field visit	Evaluation team members	Number of communities visited
Bangladesh	First	Many legacy bilateral projects	7 Nov – 14 Nov 2014[1]	Regina Birner, Ram Bhujel, Eva Rathgeber, Felix von Sury, Sri Nadarajah	10 communities
Solomon Islands	First	Some legacy bilateral projects	10 Nov – 18 Nov	James Sumberg	2 communities
Zambia	First	The largest amount of W1/2 funding, particularly pronounced gender focus	1 Oct – 10 Oct 2014	Regina Birner, Eva Rathgeber + Sophie Zimm (IEA)	3 communities
Cambodia	Second	High share of productivity related research	16 Nov – 23 Nov 2014[2]	Ram Bhujel, James Sumberg + Sophie Zimm (IEA)	3 communities

In response to local conditions, circumstances, constraints and opportunities, the details of each of the four roll-out case studies were somewhat different. However, they shared a number of important elements including:

- Study of available hub-level documentation, including “activity plans” and reports
- Individual and group interviews with AAS management, researchers and staff, and implementation and research partners and stakeholders
- In Zambia, a “netmap” exercise was conducted”

[1] Included one day overall programme briefing in Dhaka

[2] Ram Bhujel arrived on 18 November and Jim Sumberg arrived on 19 November.

- Community visits and group and individual discussions with community members
- Feedback sessions with AAS management and staff

As far as possible translators who were not otherwise associated with the hub activities were used. Similarly, the case study teams sought to conduct as many of the interviews and discussions without the participation of AAS staff.

In total across the four cases, 18 communities were visited and around 140 interviews conducted. Through all these activities the case study teams sought to gain more detailed understanding of the following areas:

- Coherence of roll-out activities with the principles of the AAS RinD approach
- Methodology and methods employed in the field (to be compared with the principles outlined in the AAS approach)
- Inclusion of gender and equity approaches
- Integration of AAS approach with bi-lateral projects (legacy and more recent)
- Emerging understanding of knowledge gap(s) and research questions
- Staffing and partnerships
- Management processes
- Progress to date and project outputs (to date and anticipated)
- Outcomes (to date and anticipated) and their relationship with the AAS IDOs
- Contribution to international public goods (to date and anticipated)

The team members took detailed notes of the community visits and of the interviews with partners and staff, which were used by the team for the analysis of the roll-out case studies. To ensure confidentiality vis-à-vis the respondents, the following description of the roll-out case studies presents the findings from the interviews and community interaction in form of summaries

D.2 Zambia

Time of country visit:	October 2-10, 2014
Evaluation team members:	Regina Birner, Eva Rathgeber, Sophie Zimm

D.2.1. Overview of AAS activities in Zambia

According to the AAS Research Proposal (2011), the choice of Zambia as one of the focus countries was based on several considerations, including the importance of aquatic agricultural systems to the rural economy, the degree of commitment to implementing the program and the quality of partnerships for scaling out. Furthermore, it was decided to start in those countries where WorldFish already had ongoing activities and strong capacity through its Regional Office in Lusaka.

Zambia contains 40 percent of Southern Africa's surface freshwater which seasonally almost covers 20 percent of the country (150,000 km²). Zambia's rivers, lakes and wetlands support extensive

agriculture, fisheries and livestock production, and contribute to the livelihoods of about 3 million people, almost 25% of the country's population.[3]

Initially, it was envisaged to work in three different research hubs (Barotse Floodplain, Kafue Flats and Luapula-Chambeshi) in Zambia, but in order to better concentrate resources, AAS activities have so far only started in the Barotse Floodplain, which was selected because it has the highest incidence of poverty. Among the three focal aquatic agricultural systems covered by AAS, the Barotse Floodplain represents the African freshwater systems. Table D-2 presents key information about the Barotse Floodplain. The "hub development challenge" is presented in Box D-1.

Table D-2: ZAM - Key information about the Barotse Floodplain

Key Facts	• approximately 550,000 hectares • occupied mainly by the Lozi people • falls under a dual administration – Barotse Royal Establishment under the rule of the King and the Government of Zambia • 83 percent living below the poverty line
Key challenges identified by AAS	• Low productivity of crops; • low livestock and dairy productivity; • declining fisheries resources; • declining productivity of common pastures; • depletion of forestry resources; • high market transaction costs; • HIV/AIDS.
Opportunities identified by AAS	• Productive fisheries sector. • Expanding markets for fish, rice and livestock. • Prominent role of women as household heads. • Strong presence of traditional leadership. • Abundance of surface water.
AAS targets	• 150,000 poor people

Source: AAS Proposal and Zambia Factsheet.

As of today, AAS operates in 10 different communities located in four different Districts in the Barotse Floodplain in Western Province.[4] These involve activities in productivity, value chains, flood risk management (resilience), gender and knowledge sharing and learning. The main AAS partners in Zambia are the Ministry of Agriculture and Livestock, the Barotse Royal Establishment (BRE), Peoples' Participation Services (PPS), Catholic Relief Services/Caritas and Concern Worldwide.

Box D-1: ZAM - Development Challenge of the Barotse Hub

To make more effective use of the seasonal flooding and natural resources in the Barotse Floodplain System through more productive and diversified aquatic agricultural management practices and technologies that improve lives and livelihoods of the poor.

Source: Stakeholder Consultation Workshop Report, 2012.

[3] AAS Zambia Factsheet (2011)

[4] Kabula, Kapanda, Lealui, Mapungu, Mwandi lower, Mwandi upper, Nalitoya, Nanikelako, Nembwele, Sifuna, Situlu

In 2012, AAS was mostly engaged in the identification of research priorities through a participatory process in the selected communities (scoping, diagnosis and design) and in the establishment of partnerships. A timeline of the AAS key events is displayed below.

Table D-3: ZAM - Time line of key events and activities in the Barotse Hub

Date	Event
April 2012	• Scoping Report published
May 2012	• Zambia Diagnosis and Design Team Orientation Workshop, Mongu
June 2012	• Stakeholder Consultation Workshop, Mongu
June/July 2012	• Community Selection, Community Vision and Action Planning
July-Sept. 2012	• Analyses conducted on gender relations, governance, nutrition and partners
October 2012	• Program Design Workshop
Since Dec. 2012	• Introduction of SALT approach in communities;; implementation of activity plans
Sept. 2013	• Series of community-based sensitization meetings with DoF and BRE on co-management of fishery resources
2013/2014	• Studies conducted on value chains, agro-biodiversity, consumption and flood risk management; Gender and Social Analysis (Benchmarking); • Establishment of Fish Value Chain Development Platform with three Interest Groups • Assessment and development of AAS staff's, partners', and community facilitators' capacities to implement the RinD approach; Strengthening of partnerships
January 2014	• Formation of village savings groups (SILC)
August 2014	• GTA training for SILC facilitators (to promote the formation of SILC+ /gender transformative village savings groups)

Source: Interview with staff members in Mongu, presentation by AAS team in Lusaka, workshop reports

The main research outputs which had been produced up to the time of the country visits were initiated in 2013 and 2014. Table D-4 below outlines the main W1/2 funded activities and planned outputs for 2014.

AAS operates through two different offices: (1) the WorldFish Regional Office in Lusaka where the six AAS cluster leaders and bilateral project staff are based, and (2) the AAS Hub Office in Mongu where research assistants are based. At the time of the evaluation, in early October 2014, the leader for the Value Chain cluster was acting as Interim Country Program Leader and the leader for the Gender cluster was also designated Interim Hub Research Manager.

Table D-4: ZAM - Yearly budgets per cluster of activities and funding source

Cluster	Cluster Title	W1/2	Bilateral	Total
5.1.	Increased farm productivity and diversification	701,873	230,000	931,873
5.2.	Improved agricultural and NRM value chains	678,220	270,000	948,220
5.3.	Flood risk management	694,476	0	694,476
5.4.	Gender transformative approach	694,476	0	694,476
5.5.	Knowledge sharing and learning	340,770	300,000	640,770
5.6.	Scaling AAS learning in Zambia[5]	971,000	0	971,000
	TOTAL	**4,080,815**	**800,000**	**4,880,815**

Source: AAS project database.

At the time of the evaluation, there were two active bilateral projects. An Irish Aid-funded project in the Northern Province works to identify new agricultural technologies and improve farm, fish and forestry products for nutrition security. An OFID project in Luapula Province aims to assess *chisense* value chains, nutritional values for *chisense* fish and to produce evidence-based policy recommendations and management guidelines.

Table D-5: ZAM - Bilateral projects

Title	Donor	Start Date	End Date	Yearly Budget	Location
Harnessing Aquatic Agricultural Systems for Livelihoods and Nutrition Security in Northern Province Zambia	Irish Aid	1-Sep-13	31-Aug-18	USD 650,000	Northern Province
Enhancing the resilience of Chisense Fishery food and Nutrition Security in Zambia (Phase II)	OFID	1-Dec-13	30-Nov-14	USD 150,000	Luapula Province

Source: AAS project database.

The roll-out process of the AAS approach in the Barotse Floodplain was financed through W1/W2 funding. Based on the activity plans prepared in 2013, the activities ongoing in 2014 were:

- Ecosystem Services Assessment in the Barotse Floodplain Hub, Western Province, Zambia (Cluster 5.1.)
- Analysis of process of uptake of previous agricultural knowledge by communities in the Barotse Floodplain System (Cluster 5.1.)
- Seed selection and conservation in the Borotse Floodplain, Western Province, Zambia. (Cluster 5.1.)
- Improved Fish and Rice Value Chains in Barotse (Cluster 5.2.)
- Flood risk management and canal management (Cluster 5.3.)
- Gender Transformative Approach (Cluster 5.4.)
- Monitoring and Evaluation Enabler (Cluster 5.5.)
- Promoting knowledge sharing, learning and innovation in Barotse Cluster 5.5.)

[5] No activity plan was found for Cluster 5.6.

- Improved dietary diversity through increased nutrient-dense food production, food processing and behavior change communication (Cluster 5.7.)[6]

D.2.2. Organization of country visit

The schedule for the visit is presented in the Annex. The following activities were carried out for the evaluation:

- **Meetings with AAS staff in Lusaka and Mongu**
  - These included group meetings and individual meetings. In Mongu, a participator process mapping was conducted as a basis for the discussion of the roll-out process.
- **Meetings with partner organizations in Lusaka and Mongu**
  - A list of all partners that were met is provided in Annex H of the evaluation report. An initial list of partners was compiled by the team, based on partners that had been indicated in the AAS Activity Plans for W1/W2 funding. It turned out that not all the partnerships mentioned there had already been established. The visits focused on those partners who had actually interacted with AAS.
- **Visits to three communities**

AAS works in four Districts, of which one district was excluded due to the extensive traveling time of six hours. Lealui in Mongu district, was suggested by the AAS project team and the other two communities were randomly selected from two remaining districts (Mwandi for Kalabo District and Sifuna for Senanga District).

The community visits were organized as follows:

- After a courtesy call to the village authorities, which included a discussion about AAS, a meeting was held with assembled community members. The evaluation team explained the purpose of the visit and an initial discussion was held.
- The community members then formed two separate groups based on sex, and two parallel group discussions were held with men and women. Overall, 72 people participated, including 32 men and 40 women. Similar questions were discussed in both groups. Topics included daily activities, household assets, participation in AAS activities, new information that has been acquired, extent to which "dreams" or aspirations identified early on in a community exercise undertaken by AAS are being fulfilled, areas which need improvement, etc. To a considerable extent, opinions varied in the three villages because different types of activities were underway.
- After the group discussions the evaluation team conducted separate walks through the village, accompanied by a few community members. Based on the available village maps, attempts were made to visit more remote parts of the villages. Conversations with community members who did not participate in AAS were held during these walks and field trials conducted under AAS were visited.

- The team hired two independent interpreters (a male and a female student from the local university), who were familiar with the rural situation. One had translated for AAS researchers before.
- The interim hub research manager accompanied the team during the community visits.

[6] This cluster was not included in the general AAS project database received by the evaluation team at the beginning of the evaluation

He took part in some but not all group meetings. The community facilitators were also present during the visits and helped establish rapport with the community members.

D.2.3. Findings

Staff

The staff composition is shown in Table D-6. Overall, there were 14 full time equivalent (FTE) staff time allocated to the Barotse Hub. In 2014, AAS had less than 14 FTE's because the Regional Director for Sub-Saharan Africa (0.5 FTE) left in March 2014, and the Hub Research Manager (1.0 FTE) left in April 2014. Two Research Assistants working on nutrition joined only in September 2014. Overall, 88 percent of the staff time was contributed by World Fish and 12 percent by other CGIAR centers. Interns are not included in the table although in 2014, there were five interns (all Masters students), who contributed an additional 1.7 FTE. Calculated on an FTE basis, 43 percent of the research capacity was based in the Mongu office.

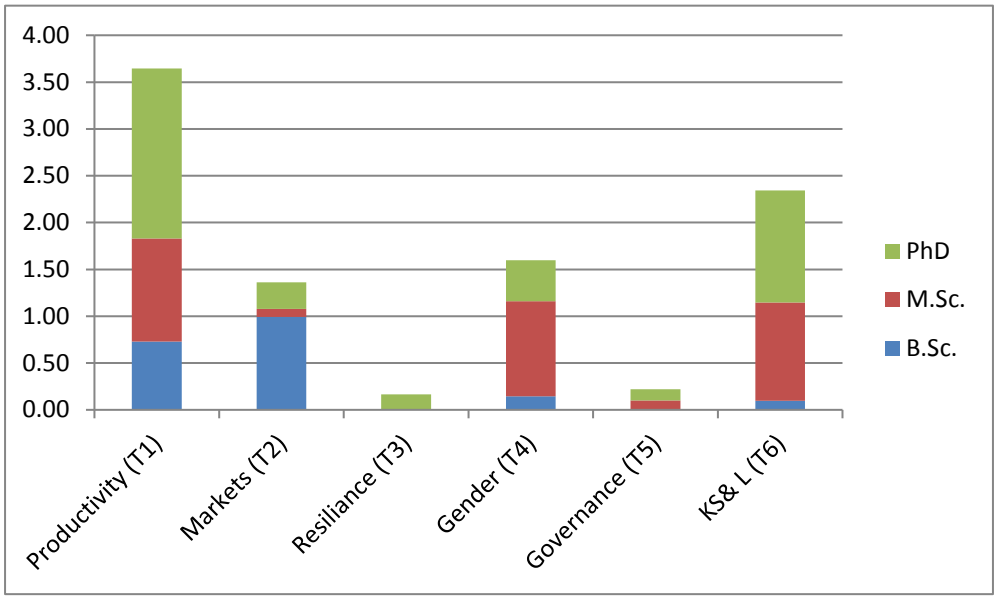
Table D-6: ZAM – AAS staff composition

Type of position	No. of persons	FTE	% of total FTE	Remarks
Management total		2.42	17	Includes all persons with management functions at country and hub level
PhD level	3	1.02	7	Includes Interim Hub Research Manager
M.Sc. level	4	1.40	10	Includes Regional Director and Hub Research Manager who both left in 2014
Research total		11.58	83	
PhD level	13	4.12	30	*Disciplines*: Crop Protection; Natural Resources Management; Biosystems Engineering; Irrigation Water Management; Veterinary Sciences; Nutrition; Rural Sociology, Social Anthropology, Agricultural and Economic Development
M.Sc. level	7	3.50	25	*Disciplines*: Natural Resource Management; Ecology, Public Health, Veterinary Sciences; Gender Studies; Social Sciences
B.Sc. or diploma level	4	3.96	28%	*Disciplines*: Agricultural sciences; development studies; nutrition
Total research and management		14.00	100	
Staff based in Mongu		6.00	43	No PhD-level and no female research staff based in Mongu
Staff from other centers than World Fish		1.66	12	Bioversity, IWMI and ILRI

Source: Calculated based on staff information provided by AAS

The distribution of staff according to theme is presented in Figure D-1. Productivity has the highest level. However, this figure includes two research analysts who joined recently and will work on nutrition.

Figure D-1: ZAM - Distribution of staff (FTE) according to theme, by level



Source: Calculated based on staff information provided by AAS

It should be stressed that with the exception of an M.Sc. level researcher (working on gender) based at WorldFish headquarters in Penang these figures do not include the involvement of the several other Penang-based AAS researchers who have played an essential role in the roll-out process and in providing support to ongoing research activities.

➢ Key observations

- Staff members both in Lusaka and Mongu are very motivated and show a high level of commitment to the AAS program.
- A review of the research staff CVs showed that they have experience in applied research and/or development that is relevant for the AAS program. The Ph.D. level researchers mostly have international publication records that are consistent with what is expected from CGIAR researchers. There is expertise among the team members in the use of participatory research methods, and one team member has specific experience in participatory action research. Expertise in farming systems research could not be identified in the staff profiles.
- The research managers at country and hub-level (who left) were M.Sc. level staff. The hub research coordinator had a master's degree in public health. This management structure is unusual since in research organizations, management positions are typically allocated to senior researchers with core competences in the research areas for which they will have responsibility.
- No female research staff is based in the Mongu Office. The evaluation team was told that it was difficult to recruit professional female staff who would be willing to be located in a remote area (often because of lack of spousal employment opportunities.)
- No Ph.D.-level researcher is based full-time in the Mongu Office. The gender specialist (Ph.D. level) spent substantial time at the Mongu Office in 2014 due to his role as interim hub research manager.
- Although the research staff based in Mongu believes that senior staff in Lusaka is committed to providing regular support and supervision, in reality this does not always occur. The heavy

workload of the Lusaka staff is perceived to be the reason.

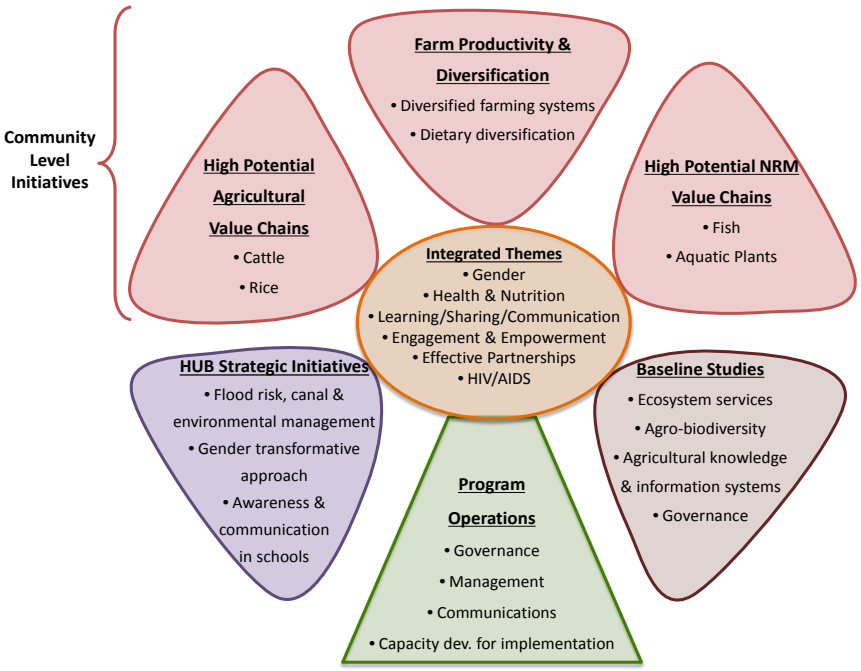
- Several staff members in Mongu expressed a desire for more career development opportunities.

Process of implementing AAS

The review of the documents produced during the roll-out process (e.g., the Scoping Report and various workshop reports) and the Process Net-map exercise conducted by the evaluation team confirmed that the roll-out occurred as envisaged in the Rollout Handbook and was well documented in form of reports. The timing of the different steps is displayed in Table D-3 above.

An essential output produced during the roll-out process was the program design, which is displayed Figure D-2.

Figure D-2: ZAM - AAS Program Design



Source: Presentation by project staff

The community action plans were a main output from the first phase of the roll-out process. Most communities identified the following activities:

- Crop production: improved access to inputs, good farming practices, crop diversification
- Livestock production: livestock management training
- Canal management: clearing of canals
- Natural resource management: restrictions of illegal fishing practices; restocking of ponds
- Access to markets: improved road network.

Few communities identified activities in the area of gender and nutrition in their action plans. Since the process did not focus specifically on agriculture or aquaculture, communities expectedly also

identified activities in the fields of health, education, water and sanitation and housing. The Community Action Plans produced in 2014 still focus on the same issues.[7].

As can be seen from the above diagram, the AAS program identified four research themes to be linked with community-level activities. These include four value chains (cattle, rice, fish, aquatic plants) and the theme "Farm productivity and diversification", under which "diversified farming systems" and "dietary diversification" are mentioned. In addition, the program design identified four baselines studies and three hub strategic initiatives to be pursued.

➢ Key observations

- The roll-out process places strong emphasis on creating an understanding of the local context in which the RinD activities are going to be implemented. The Scoping Report provides a useful overview of the situation in the hub. It is based on a review of documents and stakeholder consultations. It is comparable to what is usually done in the project appraisal phase of larger development projects.

- The Process Net-map exercise revealed the perceived influence of different actors on the success of AAS in meeting the Hub Development Challenge The exercise showed that the Ministry of Agriculture and Caritas are of critical importance since they are implementing the ongoing activities in the AAS communities.

- The Barotse region is characterized by a dual governance structure comprising the Barotse Royal Establishment (BRE) on the one hand and the institutions of the state, which features a decentralized governance structure on the other. The relations between the two are marked by some tensions, especially with respect to the control over natural resources, including the fish resources. Both authorities have competing claims to regulate the use of these resources. AAS had to make a choice to position itself vis-à-vis these two governance structures. The evaluation team observed that AAS staff work very closely with the BRE at all levels. The relations with government institutions mostly focus on the Ministry of Agriculture and its units (especially the extension service). Otherwise, relations with the regional and local governments and their elected governance bodies are rather limited. There is no question that a close relation with the BRE is helpful to the AAS program, not least to establish rapport in the communities and to scale up project work. At the same time, it must be questioned whether transformative change and the GTA could be pursued more effectively if a more neutral position were taken vis-à-vis the BRE and equal partnerships were established with elected local government representatives. The potential problem of reinforcing unequal power structures by working with traditional authorities rather than elected local governments is well documented in the literature (e.g. Ribot 2001).[8] Hence, one would have expected AAS to make a strong justification for working with the BRE and to take measures to avoid "elite capture," both regarding the selection of villages and the selection of community members. The team could not find evidence that this potential problem received sufficient attention from the AAS research team. It is addressed in none of the documents produced during the roll-out process and the community engagement activities.

[7] See 2014 Report on action planning in 10 AAS focal communities in the Barotse Hub.

[8] See Ribot, J. (2001): Integral local development: "accommodating multiple interests" through entrustment and accountable representation. International Journal of Agricultural Resources, Governance and Ecology, Vol. 1, Nos.3-4, p. 327-350.

- Substantial thought and effort on the part of the design team went into the selection of the ten AAS communities.[9] It was first decided to use the *silalo,* which is part of the social organization under BRE, as the administrative unit for sampling of communities. The following criteria were considered in the selection of *silalos*: (a) impacts of flooding (and drought); (b) crop, fish, livestock, and natural resources bases, and scope for growth; (c) market and service access; (d) people (density, ethnicity, mobility), and (e) geographical spread. Since there are many ways in which these criteria can be combined, it remains unclear how the selection was actually done.

- The available documentation and interview information did not shed further light on how the 10 communities were selected. Some criteria were mentioned, but many villages would meet these criteria. It seems that the villages were proposed by DD Team members or other stakeholders, such as the *silaho* indunas. The evaluation team noted that two of the three villages visited by the evaluation team were the seats of high-ranking members of the BRE royal family.

- The evaluation team could not identify any efforts made by AAS to assess bias in the choice of villages, e.g., in favor of the preferences of the BRE. At the time of the evaluation, AAS had conducted a village survey that specified the number of male and female community members, but apparently no other socioeconomic information was collected. Another document, available in form of a draft, had qualitative descriptions of village profiles, which included the same descriptions of key aspects apparently copy-pasted for several communities. No information was collected from non-AAS communities for comparative purposes.

- AAS's community approach is based on a methodology developed by Constellation, a Belgium NGO. Constellation's approaches include the "Community Life Competence Process" and the "SALT" method (Stimulating, Appreciating, Learning and Transfer). Their main expertise is in supporting development projects in the health sector (not in research or in agricultural or aquatic systems).

- Activities at the community level are implemented by local partners, including government field staff (such as agricultural extension agents, and NGOs who work with community facilitators. In the Zambian case, the local NGO partner was PPS (People's Participation Services). Their community facilitators were also used to implement other activities unrelated to AAS. Under the SALT method, AAS field staff based in Mongu visit communities every six months to provide support.

- Constellation follows the principles of what it calls "appreciative enquiry". Unlike many other approaches widely used in development project management, such as the logframe method, Constellation starts with a community visioning process rather than with problem analysis. Their approach focuses on avoiding the "dependence syndrome" by not providing any physical inputs, but rather assisting the communities in developing and using their own strengths. To make things happen, communities are expected to lobby organizations whose mandate it is to provide support and to form saving clubs to create resources that can be used to realize the planned activities. In the case of the Barotse Hub, the savings groups were supported by Caritas.

- The Constellation approach does not appear to be based on an analysis of social differentiation within villages or to include efforts to target specific disadvantaged groups. It seems that villages

[9] The process is described in the Evaluation and Learning Series Paper AAS-2013-24).

are approached through opinion leaders and that community participation is on a self-selection basis. In reflections on the roll-out process AAS staff considered it to be a shortcoming that no community characterization took place before the visioning processes started.[10] In their feedback meeting with the evaluation team, AAS staff acknowledged that they do not have information about the position of the participants of the community engagement process within the social hierarchies of their respective communities.

- Constellation uses methods for community interaction that are similar to the tools in the "Participatory Rural Appraisal" toolbox, such as visualization through drawing maps. For priority setting of activities, voting boxes were used. Such a process looks democratic at first glance,however it is unclear whether the participants represent particularly poor and marginalized groups. If those groups are not involved, they do not have a vote, and the activities that are selected in the voting process may not address their specific needs. As can be seen from Activities identified in the initial Community Visioning and Action Planning, the activities identified are very generic. The use of other approaches that are widely used in the planning of rural development projects, such as the classic PRA (participatory rural analysis) approach, would probably lead to similar results.

- The link between the community engagement process and the AAS research team is indirect since the researchers were not present when the community visioning and activity planning process took place. For planning their own work, they mainly used information derived from the community visioning and action planning in the project design workshop. At the time of the evaluation in October 2014, some senior researchers based in Lusaka, e.g., staff responsible for value chains and for productivity, had not yet visited the AAS communities. The frequency of community visits by the researchers based in Mongu is also rather low (in some cases, only a few times per year). The evaluation team was informed that the regional director (who had left on extended sick leave at the time of the evaluation) had explicitly discouraged research staff from becoming engaged at the community level. This apparently was seen to be the exclusive task of the partner NGOs.

- The participatory farming systems and development approaches of the 1980s involved a thorough agronomic and economic analysis of different technological options for improving farming systems, involving community members and experts, and a planning of on-farm trials based on these inputs.[11] There was no evidence that a similar or alternative process took place in the AAS communities as part of the roll-out process. The selection of the crops for the field trials seemed to be based on the recommendations of the Ministry of Agriculture and Livestock and the ongoing rice breeding program of ZARI. It is unclear why some activities identified by the communities were taken up (e.g., crop diversification) but not others (e.g. measures to increase crop yields, livestock production). It is also not clear how future productivity plans of AAS staff, such as promotion of mushrooms, are linked to the community engagement process or any

[10] See "After Action Review of Zambia Roll-Out" (2012), which states (bold in the original): "There was an unease that we are designing a program based on community need without community characterization." See: https://docs.google.com/a/cgxchange.org/document/d/1OPx43ebiyx1d6_4N5JZuj71CVpJakYS5yBXwnvsG0vQ/edit?pli=1

[11] See FAO (1990): Farming Systems Development: Guidelines for the Conduct of a Training Course in Farming Systems Development. FAO, Rome.

other analysis of the current situation. Thus it would appear that there is a disconnect between the community visioning exercise and the actual work that has been taken up by AAS. At one level this is not surprising, given the lack of AAS team presence in the visioning sessions.

- Gender and nutrition are two themes that are less likely to be given high importance in community priority setting exercises, which was also the case in the exercise conducted by AAS. Nonetheless, activities on gender and nutrition were pursued under AAS, which can be justified by the importance of those activities for meeting development goals. A similar observation can be made for the work that was started on food safety issues by the ILRI. Food safety also was not identified or prioritized by the communities.

- AAS's nutrition work has progressed well. An intern spent considerable time in the field and developed an agricultural calendar indicating which foods should be eaten at different times of the year and a recipe book suggesting different ways of preparing nutritious foods. In October 2014 the program had hired two human nutrition graduates to return to the communities to find out if the recipe books have been used and what improvements could be made. During the evaluation team's visit to Lealui, the agricultural calendar and recipe books were identified as being useful but they were not mentioned in the other two communities.

- According to the project design, four baseline studies and three hub strategic initiatives were planned, which are not linked to the community-level initiatives. To some extent, data for these studies were collected in the AAS communities (as in case of the Gender and Social Assessment). Some themes seem to reflect the interests of the participating centers (e.g., Bioversity on agrobiodiversity). Apparently, these studies were conducted independently of each other. At least two research activities were reported to have used household surveys (the agro-biodiversity assessment and the nutrition assessment) but there does not seem to have been a joint effort, such as a combined household survey.

- The study on the uptake of conservation agriculture was assigned to two interns, both highly motivated and committed to the task. However, they faced bureaucratic obstacles to set up meetings with organizations for interviews (including MAL and Concern, who had commissioned the study) and apparently received little guidance on possible approaches to conduct such a study or on the agronomic issues to be considered (such as the challenge to establish conservation agriculture on very sandy soils).

- Only the literature review done as part of the agro-biodiversity assessment has been published. It provides a useful description of the plants and animals of agronomic relevance in the area, but is based on very few sources (not a thorough review of the relevant research literature). At the time of the evaluation, project staff was not aware of any basic indicators of agricultural productivity in the area (such as approximate yields of major crops), although productivity was a predominant theme identified by the communities and the highest proportion of staff resources were allocated to the productivity theme (see figure above).

- The fish value chain study had not been published at the time of the evaluation visit, but was presented to stakeholders, who were very appreciative. The following two initiatives followed from this study:

    - an effort to establish a fishery co-management approach in an action research mode. Reduction of illegal fishing was a priority of the communities. There was a perception among stakeholders that the fish stock is declining, but data were not available.

According to project staff, the last scientific fish stock assessment in the area was conducted decades ago. It is now planned to conduct such an assessment through a partnership with a NNF-EU Community Fisheries Conservation project.

- an effort to conduct participatory action research on salted fish to reduce post-harvest losses.

Activities at community level

The evaluation team visited a total of three communities, in which it conducted focus group discussions (female and male community members seperated) as well as an activity mapping in Lealui. Activities with regard to increasing agricultural productivity and fish farming varied (rice in Lealui, preservation of fish and improved fishing techniques in Mwandi, crop diversification in Nembwele). All communities talked about the introduction of SILC women saving groups, which have been facilitated by Caritas and the positive effect it had on their livelihoods. Furthermore, the AAS program seemed to have been very active in implementing activities regarding gender transformation and many community members talked positively about changing gender roles. Another AAS activity which was mentioned a lot was the AAS nutrition program which was introduced in October 2014 and involved the design of seasonal calendars for a more diverse diet.

Partnerships

In this section, the results from the meetings with research and development partners are summarized. The list of all persons interviewed is provided in Annex H. To ensure confidentiality, the information derived from the interviews is presented here in form of a summary. The contents of the individual interviews were shared among the team members to inform the assessment.

In Mongu, interviews were held with representatives of five government organizations (Office of the Provincial Agricultural Coordinator; Department of Fisheries; Disaster Management and Mitigation Unit; Zambia Agricultural Research Institute; District Administration), the Barotse Royal Establishment, and three NGOs (People's Participation Services; Caritas and Concern Worldwide). In Lusaka, interviews were conducted with tow research organizations (University of Zambia, Dept. of Food Technology and Nutrition, and Indaba Agricultural Policy Research Institute) three NGOs (Catholic Relief Services, Namibia Nature Federation, Heifer International), and one donor (Irish Aid). Meetings were also scheduled with the World Bank and with the Ministry of Gender and Child Development, but they could not be realized.

The interviews indicate that the collaboration, so far, has mostly focused on the development rather the research dimension of AAS. The interviews indicate that at the hub level, the collaboration with the government organizations, especially with those engaged in agriculture and fisheries, was very intensive. The partners were well aware of the AAS approach, they were familiar with GTA and showed a high level of identification with the Hub Development Challenge. The work of AAS on the fish value chain was well known and highly appreciated. However, there were also some concerns. Partners observed "fatigue" in the communities, because there were many meetings and many experts came to ask the questions but not much has happened afterwards. Respondents expected more activities that deliver "more tangible results" at the level of the communities. It was also emphasized that AAS needs to pay more attention to the seasonal nature of agriculture. In view of delays due to administrative procedures, the problem occurred that inputs could not be delivered in time. To some extent, it appeared that AAS was seen more as a funding agency supporting ongoing activities, since technical expertise from within the CGIAR, e.g., on crop production, has not been

provided through AAS, so far. Moreover, the interviews suggest that that the relation of AAS with government organizations is mostly focused at the regional level. At the district level, the collaboration has been less intensive, so far, and at the national level, the relations with government organizations also seemed more limited.

The Barotse Royal Establishment (BRE) was very appreciative of AAS and the role it plays in the AAS approach. In line with the concerns expressed by government, there was, however, also an expectation that AAS would move more quickly to a larger number of villages, addresses a broader range of topics (including livestock), and delivers more tangible results.

The partnerships with the local NGOs were found to be extremely important, since the community engagement activities are mainly performed by NGOs. The NGOs expressed appreciation for the efforts of the AAS team be become familiarized with the AAS approach, including GTA. Some concerns were expressed, however, regarding administrative procedures (see below). In terms of exchange of experience, mutually beneficial relations could be identified. For example, AAS heavily relies on a micro-finance approach developed by Catholic Relief Services (Savings and Internal Lending Communities – SILC), but added the GTA component (resulting in SILC+), which was clearly seen as an added value. Overall, the interviews suggest that AAS benefitted from the local expertise of its partner NGOs in local development, while the NGOs benefitted from the experience with some elements of the RinD approach, such as GTA. There were also efforts by partner NGOs to leverage the research expertise of AAS, e.g., by commissioning a study on the uptake of Conservation Farming practices, yet it turned out that AAS faced challenges in leveraging this type of expertise. Overall, however, the interviews with partners clearly indicate that AAS was able to establish itself as a respected partner within the regional development community.

Gender Transformative Approach

The AAS team in Zambia has taken a systematic approach to GTA. The GTA aims to address both the symptoms and causes of gender inequalities—which include unequal power relations, inequitable policies and structures, and retrogressive social norms at the household, community and national levels.[12] The approach gained momentum in Barotse Hub in mid-2013 and they now try to bring gender discussions into all their activities. A few team members had two weeks of training on GTA design at the University of East Anglia, but others are still learning. All AAS scientists are expected to include gender in their work and the team has set itself the goal of making gender inequalities in the communities disappear within a decade. The emphasis on gender is not uniformly shared by the communities: in their Action Plans only seven of 10 considered it to be an important issue.

Application of the GTA in Zambia has been multi-faceted. Gender analysis has been part of the workshops and scoping exercises carried out by or commissioned by the team. In September 2012 a gender situational analysis was done by two staff members of the US-based program partner ICRW (International Center for Research on Women), who visited four of the 10 communities and produced a manual or guidelines that were used to train the research teams for the data collection. A comprehensive Social and Gender Analysis survey was carried out in November 2013 with a research team of five visiting each of the 10 communities. They organized separate focus group

[12] Pushkar, Ranjitha. Chapter 6: Gender. AAS Science Handbook. 2013.

discussions with men and women and asked questions on mobility, village timelines, gender trends (norms and practices and changes over time), seasonal calendars, social resources, etc. [13]

AAS has tried to implement GTA in the Barotse Floodplains in several ways. First, partners have been familiarized with the GTA concepts and methodology. Secondly, partners have discussed gender equality in villages where they are working, stressing the fact that when men and women work together they are likely to reap greater benefits. Thirdly, AAS activities have tried to include both sexes on an equal basis. For example, women have been included in canal cleaning activities which formerly was considered exclusively a male domaine. Researchers are analysing the different impact of flooding on men and women and using this information for improved land use planning. At the same time, they are organizing focus groups among local residents to analyse the existing power relations and discuss with communities the benefits of working in more egalitarian structures. According to the Department of Fisheries, women comprise about 70 percent of fish traders in the BRE. They often walk 25 kilometres to buy fish to sell. Because of prevailing cultural beliefs and practices they cannot ride bikes or paddle canoes. The AAS program is addressing some of these beliefs, trying to change the mindsets of the communities.

Each of the 10 communities has two part-time facilitators, one female and one male, to implement AAS activities. After almost three years of experience, female facilitators have proved to be slightly more productive. While the staff in Mongu think that the facilitators work only about four hours a week on AAS, facilitators themselves estimated the commitment to be more like 10 hours per week.

Several government officials in the Barotse Hub, including the District Administrative Officer, have attended GTA workshops organized by AAS. They were uniformly positive about the approach and said that they had been able to push forward their own understanding of gender issues both from theoretical and practical perspectives.

AAS has hired a consultant to work with the Barotse Royal Establishment to help it to become more gender sensitive and to promote gender equity but it in October 2014 it was too early to evaluate the impact of this action.

Nonetheless there has been little actual gender research to date. Strategic research is a key component of AAS's gender strategy but by October 2014 no strategic gender research projects had been completed and written up. A fish marketing study was undertaken by an American intern who interviewed both men and women but did not analyse his results by gender or apparently even keep track of whether he was speaking with a man or a woman.[14] A comprehensive fish value chain study which included gender analysis was done in August 2013 but by October 2014 still had not been written up. An agro-biodiversity study done in August 2013 examined access to seeds and the destruction of cultivars but did not include gender analysis.[15] IWMI and WorldFish conducted a joint field visit to the Barotse Hub in December 2013 to examine how the GTA approach could be

[13] The report was not yet completed when the Evaluation Team visited in October 2014 although it was expected to be available shortly thereafter.

[14] Sotó, R. A. (2014): Rapid Assessment of Safety of Informal Fish Value Chains in the Western Province of Zuambia, June-August 2014. Unpublished Report. AAS, ANH, Columbia University, School of International and Public Affairs.

[15] Baidu-Forson, J.J. et al. (2014): Assessment of Agrobiodiversity Resources in the Barotse Food Plain, Zambia, AAS Working Paper, AAS-2014-12.

integrated into gendered agricultural water management in service delivery, early flood warning and canal management. The findings were described in a trip report.[16] Some of these findings will be utilized in the design of gender specific canal and flood management strategies.

Documents and publications produced by the program

The documents produced by the program, which were provided by the Zambia AAS team, are listed in the Annex.

- Overall, 32 outputs were available at the time of the evaluation. Sixteen were documents about the process of implementing AAS, such as workshop reports.
- One is a contribution published in the IDS bulletin.
- The draft report from the fish value chain analysis was provided after the visit. The report presents a description of the research process as well as descriptive findings. The report shows that the fish value chain analysis was done in a process of continuous interaction with stakeholders and included a massive data collection effort (qualitative methods and a survey of approximately 1,600 actors in the value chain).
- There are three draft manuscripts focusing on gender that are intended for submission to international journals. They are in various stages, but will need some revision before being submitted. All three are well written and interesting, but have a descriptive rather than a strong analytical focus.
- There is a draft report of a participatory ecosystem services assessment conducted by a research team from Bioversity. This report uses an innovative participatory approach to assess ecosystem services from a landscape perspective, which includes a focus on the gender dimension.
- The remaining ten documents discuss findings of the program. One is a website that features the role of canal cleaning, another is a brief. Some of the remaining documents have been published by AAS (e.g., Ecosystems Assessment, Governance Assessment). Others are available as internal documents (e.g., the AAS community profiles). The governance analysis contributed to a high-ranking journal publication that covers several hubs.

➢ Key observations

- More than half of the outputs are documents about the implementation of AAS. These are useful as a record of the process and some include critical reflections, which can be seen as indication of learning. However, substantial time of senior research staff went into their production , which limited their ability to work on journal publications or other outputs that would qualify as international public goods.
- In the context of a research project, it is not unusual for the publication of journal articles to be sparse in the first three years..

[16] Barbara van Koppen, Vincent Akamandisa, Steve Cole and Festus Zulu. Field visit to the Aquatic Agricultural Systems Barotse Hub, International Water Management Institute and WorldFish. December 6-9. 2013.

- What is of concern, however, is that apart from three draft papers on gender, there was no evidence of journal publications being prepared or in the pipeline. The value chain study and the other baseline studies will probably lead to journal publications at a later stage. The participatory assessment of ecosystem services also has such potential. However, little additional data collection was observed that could lead to research outputs, especially in the 10 AAS communities. There was no evidence of a systematic data collection effort about the on-farm trials, for example, that eventually could lead to international public goods. This was despite the fact Penang-based staff said this was planned. Considering the large staff share allocated to productivity, it is difficult to understand why more outputs have not been produced in this area especially since the hub development challenge explicitly focuses on diversification and productivity improvement.

- The outputs that have been published by AAS, such as the governance assessment and the agro-biodiversity assessment are interesting and informative, but mainly descriptive with little analytical content.

- The activity plans prepared for 2014 had foreseen a long list of different outputs. However, many of these had not been produced at the time of the evaluation Some may have been in the pipeline; others were apparently dropped. This questions the utility of activity plans as a tool for research management. The activity plans were replaced by hub initiative research plan summaries in 2015, which do not list the publications or other outputs that will be produced. It appears that the focus on organizing processes within AAS has left the team with little time to develop a publications strategy aimed at transforming results achieved on the ground into international public goods.

Management

From a management perspective the WorldFish office in Lusaka suffered several losses in 2014. The country director, who had carried a heavy administrative load departed on long term sick leave (and passed away a few months later). The hub manager who was in charge of operations in Mongu resigned and the regional finance manager and business manager in Lusaka also left. All this placed considerable strain on AAS's scientific staff who had to take on administrative work and consequently were left with less time for their own research and writing activities.

In addition to these problems there are numerous other weak points in the day to day operations in Zambia. Some of them are due to inadequate coordination with WorldFish headquarters in Penang.

MOUs

MOUs have to be approved by the Grants and Contracts Unit in Penang. They do not necessarily receive priority attention, sometimes causing lengthy delays in project start-ups. MOUs are often for very short periods, i.e. two to six months, and have to be re-approved in Penang when they are renewed. Again this can cause considerable delay (and frustration on the part of scientists and partners).

Budget Structure

WorldFish headquarters in Penang translate the budgets sent from Lusaka into a format that is compatible with their corporate information system (OCS). Consequently project leaders often do not have an accurate idea of their expenditures in on-going projects. No one in Lusaka has been

trained to use the OCS so all information has to be sent to Penang for input into the system. Moreover there is no online budget preparation guide that could be consulted by scientists and budget officers alike.

Payments to Partners

Several partners mentioned that payments from AAS were often late, in some cases causing important delays in their work. This seems to be at least partly due to the fact that payments to partners are made directly from Penang rather than through the Lusaka office of WorldFish. Payment requests from Lusaka are not necessarily given priority. However, Penang makes payments only twice monthly and in some cases project leaders have not requested payments in time.

Communications

Communications between Penang and Lusaka are not always timely. For example, when the contract template was changed the Lusaka office was not informed immediately.

Staffing

One reason for the high turnover among locally recruited staff is the relatively low salaries paid by WorldFish. Human resource management in the office is ad hoc. Many job descriptions are inaccurate and the employee manual developed in Penang does not include Zambian labour laws or social policy requirements. Important issues like HIV-AIDS or sexual harassment are not addressed.

D.2.4. Overall assessment

Since the roll-out process only started in 2012, the timeframe for the evaluation is limited, considering the amount of time necessary for the type of research activities envisaged by AAS. Nonetheless, the evaluation has identified a number of strengths and challenges. The evaluation team discussed these with AAS staff both in Mongu and in Lusake in form of debriefing meetings.

Strengths

- AAS has a very motivated team that is hard working and highly committed to the program. The team members have diverse backgrounds in research and development. They have a mix of disciplinary backgrounds that is appropriate for the AAS program although the team should also include a member with fisheries/aquaculture expertise. The researchers from Bioversity, IWMI and ILRI, who have participated in research activities in Barotse, have provided valuable expertise and innovative research approaches.

- The documents produced during the roll-out process, such as the scoping report, the governance assessment and the various workshop reports indicate that a significant effort was made to obtain a thorough understanding of the development context in which the AAS research is being implemented. Such efforts are standard good practice in large-scale development projects, but they are not usually pursued in a similar way in “conventional” research projects.

- Considering that the participating CGIAR centers have not previously been active in the Barotse region, the achievement of AAS in establishing partnerships in this region is remarkable. In a relatively short time, AAS has managed to become a valuable partner in the development community of the Western Province. A common understanding of the hub development

challenge has been achieved with key partners, such as the Provincial Agricultural Coordination Office. This is certainly an indication of success and reflects well on the AAS principle of "commitment to place."

- The evidence collected by the evaluation at the community level indicates that the activities promoted under AAS are highly appreciated by the participating community members. There are also indications that the focus on the GTA is promoting awareness among the participants regarding gender relations and change in practices and attitudes are beginning to occur. The fish value chain study, a major research activity conducted in the Hub, is a promising example of implementation of the RinD approach. The study featured strong participation of stakeholders during the entire research process, starting with community visioning in fishing camps, joint design of the research with stakeholders, regular sharing of intermediate results with stakeholders and adjustment of the research process based on feedback. The research, which comprised qualitative as well as quantitative methods, led to actions based on the research, specifically in the area of fishery co-management and fish processing (salted fish). The study can be seen as the first phase of an action research cycle approach. The need for a better management of the fishing stocks was already known (e.g. it has been indicated in AAS's governance analysis), but the interactive research process was helpful in promoting action on the issue.

- The participatory assessment of ecosystem services conducted by Bioversity shows that the program offers scope for innovative research approaches.

Challenges

- Even though the roll-out process has many positive features, the mode of interaction between researchers and the selected AAS communities seems to be rather problematic. The interaction was strikingly indirect and may best be described as an "outsourcing" of community engagement to NGO partners. It was surprising to learn that researchers were discouraged from interacting directly with the AAS community members, and it is not clear how this is consistent with the AAS principle of "commitment to people and place." As a consequence, researchers were not able to work directly with the community members to identify researchable problems and develop a participatory action research process to find solutions.

- The result of this indirect interaction was a disconnected implementation of some activities such as demonstration plots and SILC groups by partners on the one hand, and a range of different studies being conducted by AAS researchers on the other. Apart from the "outcome harvesting" efforts, there was no evidence of any systematic data collection on the activities pursued in the communities, participatory or otherwise. Moreover there was no coordination among the different baseline studies, which were pursued by different teams at different times. All involved some type of data collection in AAS villages and non-AAS villages. As a result, there were reports of "research fatigue" among community members, who felt that they had to ask many questions by researchers coming from outside without seeing tangible benefits (which is a typical problem of the "conventional research" that AAS promised to avoid).

- While the GTA approach is being successfully implemented in the AAS communities, there is little indication as to how progress made in changing attitudes and norms will be sustained over the long term. It was quite striking to note that attitudes varied between women and men in several of the focus groups with respect to identification of key problems and activities. The

evaluation team was of the opinion that more systematic sustainability mechanisms should be built into the work. These might include collecting data specifically about the gender norms and attitudes of men, working with men to discuss rationale for and ways of changing attitudes and norms, and identifying male "gender champions" in each village (as is being done by AAS in Bangladesh) to lead discussion groups or gender sensitization activities.

- Considering the strong commitment of AAS to marginalized and poor people, it is surprising that no effort seems to have been made to identify and target these groups. The evaluation team certainly recognized that there is a socio-economic differentiation within the communities. The report on AAS Community Profiles recognizes that there is a "well-being ladder", but the program does not seem to have any information on where in that ladder participating households are located. The evaluation team is of the opinion that it would be critical to include households in the lower part of the "ladder" since their options to improve their livelihoods, including the type of agricultural technologies that they can use, may be rather different from those of households on the middle and upper levels of the ladder (who, for example, may have livestock).

- While the work on the fish value chain is very promising, the research conducted so far on on productivity is rather limited and seems to lack a clear vision. This is surprising considering that the hub development challenge explicitly focuses on increasing productivity and diversification and that the largest share of staff resources are allocated to this theme. The ongoing activities in the AAS villages (demonstration plots) are implemented by the agricultural extension service and the planned activities for rice are implemented by ZARI. It seems that the major contribution of AAS was to provide funding to partners for such activities, and it is not clear how the activities benefitted from technical expertise provided by AAS or by the CGIAR system. The knowledge of Mongo-based team members about agricultural productivity issues in the region seemed limited, and the senior researcher in charge, who is based in Lusaka, has had limited opportunity to visit the area. The work of Biodiversity on agro-biodiversity resources and ecosystem services seemed promising, but the link to the ongoing activities in the AAS villages was unclear. The planned study on the uptake of past efforts to promote conservation agriculture could provide valuable insights, but was left to two interns who would have clearly benefitted from more support in conducting this study.

- The Barotse Hub, which is a very complex socio-ecological system, would offer numerous opportunities to conduct research that contributes, on the one hand to the solution of local problems (as identified by the community members) in a PAR mode, and on the other hand to the production of international public goods, such as publications in leading journals. The evaluation team is not concerned that those publications have not yet been produced, because of the short duration of the program to date. However, the team is concerned that in the design and implementation of the AAS program, there seems to be no strategic focus on how these international public goods would eventually be produced from the on-going research. Potential publications should be considered from the design stage of a research activity onwards, and researchers who know the international literature, the state of the methodologies being used, and the knowledge gaps to be addressed, need to be involved directly in all stages. The goal of producing international public goods is by no means incompatible with the goals of RinD, but the Barotse experience suggests that the AAS research processes and organization need to be adjusted to reach this goal.

D.2.5. Annexes for case study

Table D-7: ZAM – Schedule of visit

THURSDAY, 2 October 2014 2014		
10:00	Meeting with AAS team in Lusaka	Introductions, Presentation, Q&A on the AAS Program in Zambia -
12:00	One-on-one discussions with:	▪ Everisto Mapedza (IWMI) – Leader, Flood Risk & Canal Management ▪ Mwansa Songe (ILRI/WorldFish) – Leader, Nutrition & Food Safety Initiative ▪ Kate Longley – AAS Country Leader; Leader of Value Chain/Market Initiative; and Project Leader for OFID Chisense Project ▪ Steve Cole - Gender Specialist; Interim Hub Research Manager – Steve will be traveling to Mongu with the Evaluation Team, so it's probably more time-efficient to discuss in the car.
14:00-17:00	Meetings with partners	Indaba Agricultural Policy Research Institute Concern Worldwide
FRIDAY, 3 October 2014		
06:00	Depart for Mongu by 06.00 hrs	discussion with hub research manager
13:00	Lunch at the Mongu office	
14:00 – 18:00	process-net mapping exercise	With hub research team
SATURDAY 4 October 2014		
08:00 – 15:00	Lealui visit	Acivity mapping Focus groups Village walks
SUNDAY 5 October 2014		
	Team discussions and planning	
MONDAY 6 October 2014		
8:00 – 15:00	Mwandi visit	Acivity mapping Focus groups Village walks
15:00 – 17:00	Meetings with partners	Ministry of Agriculture and Livestock (MAL) Disaster Management and Mitigation Unit (DMMU) People's Participation Services
TUESDAY, 7 October 2014		
8:00 – 15:00	Nembwele visit	Acivity mapping Focus groups Village walks
15:00 – 17:00	Meetings with partners	Zambia Agricultural Research Institute /

		National Seed Certification and Control Institute (SCCI) Barotse Royal Establishment
WEDNESDAY, 8 October 2014		
08:00	Debriefing meeting with staff	
11:00	Travel back to Lusaka	discussion with hub research manager
	DEPARTURE REGINA BIRNER	
Thursday, 9 October 2014		
8:00	Kate Longley AAS Country Program Leader; Initiative Leader for Market Access/Value Chain Development	AAS staff
9:00	Simbotwe Mwiya Regional Manager for Africa; Project Leader for Irish Aid-funded Northern Province project	AAS staff
10:00	Mwansa Songe (ILRI/WorldFish) Initiative leader for Nutrition & Food Safety	AAS staff
11:30	James Kasongo Heifer International	AAS national partner
FRIDAY, 10 October 2014		
9:30	Andy Ward Advisor to the Regional Director; Initiative Leader for Productivity	AAS staff
10:30	Feedback session	Overall feedback from country visit on observed strengths and challenges
	LUNCH	
	DEPARTURE TO AIRPORT	

Outputs (as of December 2014)

Roll-out (2012)

1. Chiuta et al. Barotse Floodplain, Zambia Scoping Report April 2012.
2. Design Workshop Report
3. Zambia Diagnosis and Design Team Orientation
4. AAS CRP Barotse Flood Plain Stakeholder Consultation Workshop, Western Hub, Zambia.

Research in Development Approach

2015-2016 Initiative science plan

Gender Transformative Approach:

1. Cole, SM, P Kantor, S Sarapura, & S Rajaratnam (draft). A gender transformative research in development approach to address inequalities in food, nutrition, and economic outcomes in aquatic agricultural systems in low-income countries (unpublished draft)
2. Cole, SM, R Puskur, S Rajaratnam, & F Zulu. Exploring the relationship between poverty and gender inequality: A case study from an aquatic agricultural system in Zambia (unpublished draft).
3. Cole, SM, B van Koppen, R Puskur, N Estrada, F DeClerck, JJ Baidu-Forson, R Remans, E Mapedza, C

Longley, C Muyaule, & F Zulu. From concept to action: A CGIAR collaborative effort to operationalize the Gender Transformative Approach in the Aquatic Agricultural Systems Research Program in the Barotse Floodplain, Zambia (unpublished draft).

Monitoring and Evaluation

1. Dierksmeier, B & SM Cole. AAS Focal Community Profiles, Zambia, Western Province, Barotse Hub.
2. Mutimukuru-Maravanyika and Cole Steven, 2014. Barotse Mid-Year AAS Hub Learning Report: January to May 2014.
3. Hub learning report 2013: AAS Barotse.
4. Mutimukuru-Maravanyika T., Apgar A., Madzudzo E., Longley K., Mapedza E., Kwashimbisa M., Murungweni C., and Mwiya S., (2013). Proceedings of the Zambia AAS Annual Reflection Workshop at Senanga Safari Lodge, Zambia, 4-7 Nov 2013.

Community Engagement:

1. Lunda, .JK, (2013), Annual Report On Community Engagement.
2. Action planning in 10 AAS focal communities in the Barotse Hub.
3. Household Survey from 10 AAS Focal Communities in Barotse Floodplain – Map.
4. Apgar, M. et al. (2013). Learning from implementation of community selection in Zambia, Solomon Islands, and Bangladesh AAS hubs. Evaluation and Learning Series Paper: AAS-2013-24.
5. Lunda, J., Cole, SM., Apgar,. M, Mutimukuru,. T, Chisonga, N., Muyaule,.C, Zulu,.F. (2013) Action planning in 10 AAS focal communities in the Barotse Hub.
6. Barotse Hub Community Visioning Report (Draft) 2013 December.

Access to Markets & Value Chain Development

1. Hub Initiative Research Plan Summary (2015 – 2016)
2. Farnworth et al. (2013). Gender integration in value chains: Good practices from analysis to action. Submitted to IJARGE special issue on "Gender, Governance and Agriculture."
3. Douthwaite et al. – Using Theory of Change to Achieve Impact in AAS.
4. Longley et al. (2014): AAS Barotse Fish Value Chain Study Report (Draft)

Flood Risk & Canal Management

1. Canal Management story on AAS website: http://worldfishcenter.org/featured/reviving-traditional-land-management-zambia#.VCpwNCuSxIA
2. Van Koppen et al. (2013) Field visit to the Aquatic Agricultural Systems Barotse Hub International Water Management Institute and WorldFish.

Nutrition & Food Safety

1. Soto, RA., (2014), Rapid assessment of safety of informal fish value chains in the Western Province of Zambia.
2. Pasqualino, M., (2014). Participatory Action Research Contributing to the Identification of Sustainable Diet Options in the Barotse Floodplain, Zambia Final Report.
3. Longley, C. , Thilsted, SH., Beveridge,M.,Cole,SM., Nyirenda, DB., Heck,S. and Anne-Louise Hother.(2014) The Role of Fish in the First 1,000 Days in Zambia. IDS Bulletin.

Natural Resources Management and Governance: Fisheries Co-Management

1. Madzudzo, E., Mulanda, A., Nagoli, J., Lunda, J., Ratner, B.D. (2013). A Governance Analysis of the Barotse Floodplain System, Zambia: Identifying Obstacles and Opportunities. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2013-26.
2. CGIAR Research Program on Aquatic Agricultural Systems. (2013). Improved fisheries management in the Improved fisheries management in the Barotse Floodplain of Zambia - An urgent call for action. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia, Brief: AAS-2013-40.
3. Kazungu, M. (2014). Socio-Economic Determinants for Cooperation In The Barotse Floodplain Small-Scale Fishery Management System, Zambia.
4. Chomba, M. (2014). Property Rights and Benefit Sharing: A Case Study Of The Barotse Floodplain Of Zambia.

Agrobiodiversity and Ecosystem Services

1. Baidu-Forson et al. (2012): Assessment of Agrobiodiversity Resources in the Barotse Flood Plain, Zambia, Working Paper, AAS-2014-12
2. Estrada-Carmona, N. (2014): Report on Participatory Assessment of Ecosystem Services in Barotse (Draft)

D.3 Bangladesh

Time of country visit:	November 7-14, 2015
Evaluation team members:	Ram Bhujel, Regina Birner, Eva Rathgeber, Nadarajah Sriskandarajah, Felix von Sury

D.3.1. Overview of AAS activities in Bangladesh

The 2011 AAS proposal identified Bangladesh as the focal country for the Asian Mega Deltas, one of the three focal aquatic agricultural systems that AAS is working on globally. AAS could build on WorldFish's long history of working on aquaculture in Bangladesh. According to the 2011 AAS proposal, the original plan was to work in five hubs in Bangladesh. Eventually, the roll-out process was implemented in the Khulna Hub, which represents the Southern Polder Zone of Bangladesh. The hub is now officially referred to as "AAS Southern Bangladesh Polder Zone (SBPZ). In this report, the term "Khulna Hub" is still used for brevity. In Southern Bangladesh, about 1.2 million ha was poldered during the 1960s and 70s to prevent tidal surge and saline water intrusion. Table D-8 provides key information about the Southern Bangladesh Polder Zone.

Table D-8: BAN - Key information about the AAS Southern Bangladesh Polder Zone (SBPZ)

Key Facts	• defined by the polder areas situated along the coast of Southern Bangladesh • includes eight districts from three divisions along the coastal area. • clear distinctions in the aquatic agricultural farming systems in the coastal area related to the different levels of water and soil salinity
Key challenges identified by AAS	• Highly disaster prone • improving productivity and incomes in households coping with large fluctuations in salinity over the course of the annual farming cycle.
Opportunities identified by AAS	• Aquaculture (fish and shrimp) • High value horticulture (vegetables and fruit) Alternative field crops (maize, sunflowers)
AAS target villages	• 16 villages in three districts

Source: AAS Proposal and CGIAR Research Program on Aquatic Agricultural Systems. (2013). Learning from implementation of community selection in Zambia, Solomon Islands, and Bangladesh AAS hubs

In Bangladesh, AAS operates through two offices, an office in Dhaka, which is part of the Bangladesh Office of WorldFish, and a hub office based in Khulna. The AAS Country Program Leader is based in Dhaka.

The development challenge of the Khulna Hub which has been identified is:

Box D-2: BAN – Development challenge of Khulna Hub

The AAS development challenge is to achieve sustainable and continual improvements in agricultural productivity, livelihoods and nutrition of poor communities in the Southern Bangladesh Polder Zone in the face of increasing salinity, changing hydrology, climate change and within a context of complex and dynamic markets and social change.

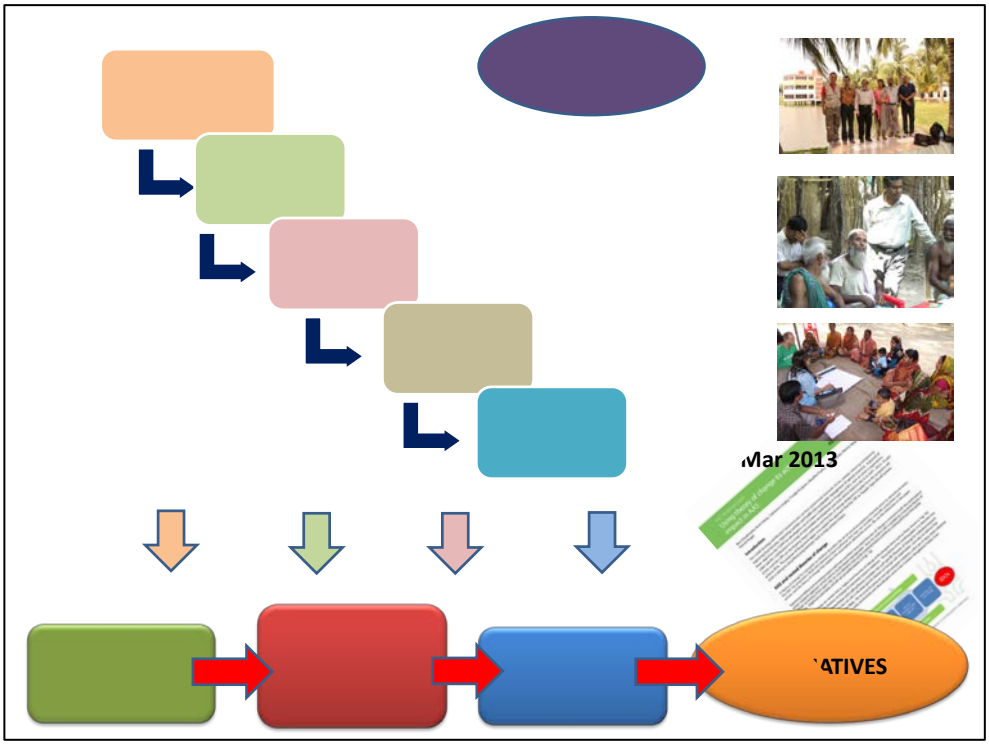
The roll-out process started in April 2012. A time line of the key events is presented in Figure D-3. There are 16 AAs focal communities, in which the program has been active at the time of the evaluation.

The activities funded through W1/W2 funding for the year 2014 were specified in nine Activity Plans, belonging to seven clusters. Most of these Activity Plans were available in drafts produced in 2013 at the time of the evaluation. The activities were:

- Institutionalization of the AAS productivity theme at Khulna hub in Bangladesh (Cluster 1.1.)
- Improved nutrition outcomes in AAS program activities (Cluster 1.2.)
- Improved value chains and markets program priority (Cluster 1.3.)
- Resilience and Adaptive Capacity Development (Cluster 1.4.)
- Community Water Management from a micro level perspective- IWMI (Cluster 1.4.)
- Gender Transformative Approach (Cluster 1.5.)
- Knowledge, sharing and learning (Cluster 1.6.)
- Operationalizing the AAS M&E system at Khulna hub in Bangladesh Cluster 1.6.)
- Capacity building on PAR approach and documentation system of the selected partner organizations in Southern Bangladesh Polder Zone (SBPZ) (Cluster 1.6.)

The bilateral projects in Bangladesh, which are mapped into AAS are listed in Table D-9. As can be seen from the table, the number of bilateral projects and the total amount of funding that is contributed to AAS under bilateral projects is larger than in any other of the AAS focal countries. By far the largest bilateral project is the USAID-funded "Aquaculture for Income and Nutrition" (AIN) project, which falls under the "Feed the Future" (FTF) imitative of the Obama administration.

Figure D-3: BAN - Time line of key events and activities in the Khulna Hub



Source: Presentation by Khulna Team

Table D-9: BAN – Bilateral projects

Title	Donor	Start Date	End Date	Yearly Budget	Cluster
BDC: Increasing the Resilience of Agricultural and Aquaculture Systems in the Coastal Areas of the Ganges Delta:G2 – Productive, profitable and resilient agriculture and aquaculture systems	IRRI	30-Apr-11	31-Dec-14	$70,014	1.1.
Expansion of Cereal Systems Initiative for South Asia (CSISA) in Bangladesh	IRRI	1-Oct-10	30-Sep-15	$556,993 $277,814 $113,287	1.1. 1.2. 1.6.
Technical Partnership to Improve Aquaculture Activity of SHOUHARDO II Program	CARE	1-Dec-12	30-Sep-14	$0 $49,426	1.1. 1.6.
FTF: Aquaculture for Income and Nutrition (AIN)	USAID	1-Oct-11	30-Sep-14	$4,083,844	1.1.
Nobo Jibon under USAID-PL-480 Multi Year Assistance Program (MYAP) with Save the Children, USA	SAVE	7-Dec-10	31-Aug-14	$30,572	1.2. 1.6.
Household based pond aquaculture – horticulture for family improved Nutrition, additional income and women empowerment (Mollahat)	DFID-UK	n/a	n/a	$116,250	1.2.
Promotion of 'ILO Core Labor Standards' and 'the Bangladesh Labor Act, 2006' in the Bangladesh Shrimp Processing Plants" Project	MoEF-Bangladesh	1-Jul-13	31-Dec-15	$69,667 $26,243 $22,942 $2,031 $20,789	1.1. 1.3. 1.4. 1.5. 1.6.
FTF: Aquaculture for Income and Nutrition (AIN)	USAID	1-Oct-11	30-Sep-14	$666,156	1.3.
Expansion of Cereal Systems Initiative for South Asia (CSISA) in Bangladesh	IRRI	1-Oct-10	30-Sep-15	$270,313	1.3.
PN35 RIU (Research into Use) Community Based Fish Culture in Irrigation Systems and Seasonal Floodplains -or Floodplain Fisheries and Aquaculture in Bangladesh	CPWF	1-Jan-12	28-Feb-14	$10,624 $10,624	1.4. 1.6.
BDC: Increasing the Resilience of Agricultural and Aquaculture Systems in the Coastal Areas of the Ganges Delta: Ganges Coordination and Change Enabling Project 5	CPWF	1-May-11	31-Dec-14	$192,370	1.4.
Fisheries Research Support Project	LGED	4-Oct-07	30-Apr-14	$3,124	1.6.

D.3.2. Overview of evaluation team visit

The evaluation visit on which this report is based was undertaken by Ram Bhujel, Regina Birner, Eva Rathgeber, Nadarajah Sriskandarajah, Felix von Sury between 6 November and 14 November. Jim Sumberg participated in the Global AAS Program Discussion on the first day.

The visit included a total of 37 interviews with WorldFish staff and partners as well as focus group discussions and individual interviews with numerous community members in 10 communities visited. The villages were selected in close collaboration with the Country Program Leader. The goal of the selection of the villages was to cover a combination of AAS, AIN and CSISA villages suggested by the respective programs and a number of villages selected through stratified random sampling according to a number of criteria.

Table D-10: BAN - selection of villages for case study

Type of village	Selection by	Muslim %*	Salinity	Distance	Size	
AAS					Total	
Fultola	AAS	Hindu dom.	medium	1h	1500	Selected by AAS
Sahos	Team	Hindu dom.	medium	1 h	450	Randomly selected among the small villages
Gojendra	Team	Muslim dom.	medium	1.3	5600	Purposely selected to include a Muslim dominated village
Akra	Team	45 %	medium	1.5	3044	Purposely selected to include a mixed village mixed
Ghonapara	AAS & Team	Muslim dom.	high	2.75	1150	Purposely selected to cover a village where Small Pond Aquaculture PAR is conducted
Borea	AAS & Team	40%	high	3.5	8500	Purposely selected to include a large village with mixed population
AIN						
Khornia**	AAS	80%	medium	1 h	2580	Selected by AAS
Borodanga**	Team	Hindu dom.	medium	1.25 h	550	Randomly selected among small villages
Mashni	Team	35%	low	1.75h	1585	Randomly selected
Arulia	Team	5%	low	1.5 h	1070	Randomly selected
CSISA						
Garakhula	AAS	na	medium	1 h	3242	Selected by AAS
Sunakandor	Team	100%	medium	1.5 h	2000	Randomly selected among shrimp farming villages

During the village visits, the following methods for collecting information were applied:

- An initial meeting was held with all community members who had assembled. The evaluation team explained the purpose of the visit and an initial discussion was held. In the AAS villages, the community members presented the drawings produced during the

visioning process and explained the ongoing activities.

- After the initial meeting, the evaluation team members continued with separate meetings. One team members held a focus group discussion with female community members. In some of those meetings, a participatory ranking of the activities promoted by AAS was conducted and used as a basis for further discussions. After the group discussion, a village walk was conducted to see some field trial sites.

- The other team member made a more extensive village walk with community members to visit the on-farm trial sites and collect information on the trials.

- The walks to the field sites were also used for casual conversations with villagers who are not involved in AAS, AIN or CSISA activities.

- The village visits were also used to hold informal interviews with the AAS community facilitators.

- One AAS team members accompanied each team. Since the team members held separate meetings, the AAS team member was not present during all interactions with the community members. This is standard procedure in evaluations since community members may have felt constrained to share critical comments in the presence of AAS staff.

A detailed schedule of the evaluation visit in Bangladesh is given in the Annex.

D.3.3. Findings

Staff

The staff list provided by AAS lists a total of 143 staff members. The breakdown of the staff members according to different criteria is displayed in Table D-11. The staff list provided by AAS did not indicate the percentage of time that is spent for management functions (all staff time was allocated to research). Therefore, the time share dedicated to management share could not be included into the table.

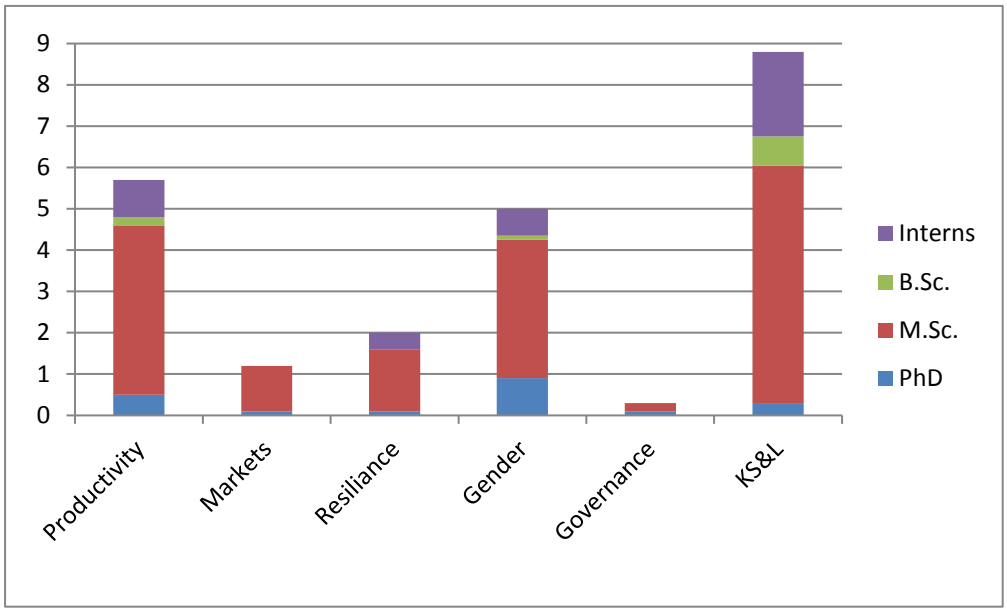
Table D-11: BAN - AAS staff composition

	W1/W2	AIN	CSISA	Other bilateral projects	Other CGIAR Centers
Total staff members	23	47	27	38	8
Total number of PhD level	2	3	2	6	4
Percent PhD level	9%	6%	7%	16%	50%
Percent M.Sc. level	70%	94%	93%	71%	50%
Percent B.Sc. / Diploma level	4%	-	-	8%	-
Percent interns	17%	-	-	5%	-
Percent of PhD/M.Sc. female	33%	4%	15%	30%	50%
Percent of B.Sc./interns female	80%	n.a.	n.a.	0%	n.a.
Percent of staff with degree in aquaculture/fisheries	35%	96%	78%	66%	0%

Percent of total staff time allocated to themes					
• Productivity	25%	76%	74%	31%	-
• Markets	5%	3%	2%	12%	X*
• Resilience	9%	0%	0%	28%	X
• Gender	22%	10%	12%	12%	-
• Governance	1%	0%	0%	5%	X
• KS&L	38%	11%	12%	11%	X

Percentage shares were not available for staff from other centers. Source: Calculated based on staff information provided by AAS

Figure D-4: BAN - Distribution of staff (FTE) according to theme, by level



Source: Calculated based on staff information provided by AAS

Figure D-4 displays the allocation of staff time by theme for the staff members who are financed from W1/W2 funding.

➢ Key observations

- The staff composition appears rather unusual for an international agricultural research program that aims at producing international public goods. The ratio of PhD level staff to M.Sc. level staff is extremely low. In bilateral projects, this may be explained by the fact that, to a large extent, these projects focus on the dissemination of technologies rather than research with a focus on international public goods. However, it is less clear why out of 23 staff members in W1/W2-funded activities only two held a PhD degree. According to the Country Program Leader, at the time of the evaluation, there were ten staff members among the entire AAS staff, who have the capacity to write papers for international journals. Some of them were, however, rather occupied with management functions.

- In the W1/W2-funded activities, a third of the PhD and M.Sc. level staff are female. Among the B.Sc.-level staff and the interns, 80% are female. In AIN, only two of the 47 staff members are female, one of whom is a labaratory assistant. This is surprising because one would expect more

field female staff in this project, considering that female field staff is usually better able to target female beneficiaries. In the other projects, the share of female staff ranges from 15% to 30%. There are eight researchers from Bioversity and IMWI involved in AAS research in Bangladesh. Half of them hold a PhD, and half of them are female.

- About one third of the staff members funded by W1/W2 have a degree in aquaculture and fisheries. The others cover a wide spectrum of disciplines, including economics and social sciences. One staff member has a degree in botany, but there are no staff members with degrees in crop production or horticulture, even though vegetable production is a major activity pursued with W1/W2 funding.

- In AIN, two out of the 47staff members have degrees that are not in aquaculture and fisheries. None of the staff members listed AIN has a background in nutrition. The staff sheet lists four bilaterally funded staff members with nutrition degrees (one at PhD level). These may provide nutritional expertise to different types of projects, including AIN.

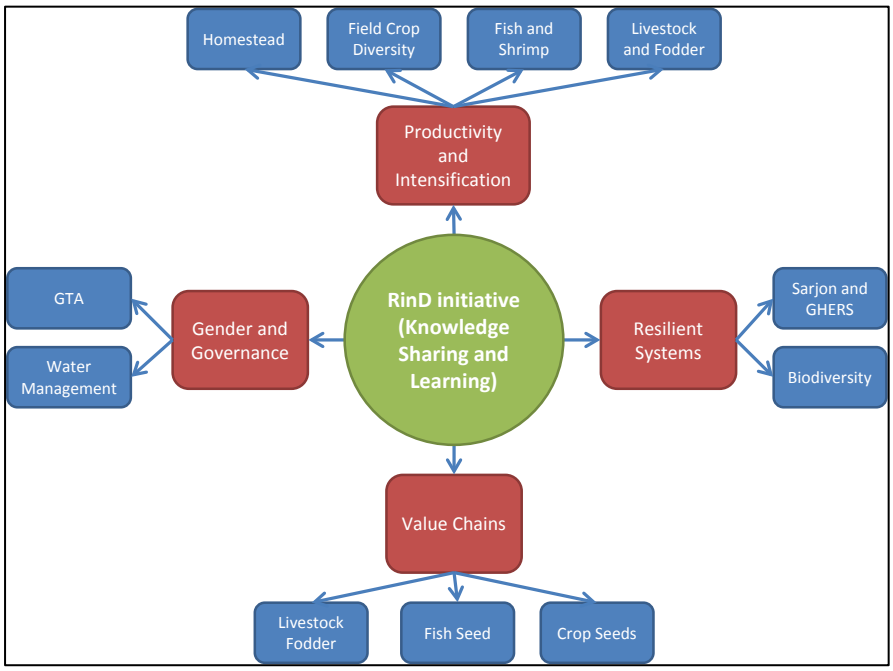
- Figure D-4 also show the allocation of staff time to the different themes. Among the staff members funded by W1/W2, the largest time share is allocated to knowledge sharing and learning. Productivity receives more almost three quarters of the staff time in AIN and CSIA. Since nutrition is not listed as a separate theme, productivity may also capture nutrition. Hardly any staff time from WorldFish is allocated to governance under any program. No time of any of the 143 staff members was allocated to the theme “global science” (even though this column was included in the spreadsheet provided by AAS).

Process of implementing AAS

The main steps of the implementation process are displayed in Figure D-3 above. The process started with the activities of the multidisciplinary scoping team in April 2012. In principle, the roll-out process followed the steps described in the Roll-out Handbook.

Figure D-5 displays the program structure that was developed as part of the roll-out process. The AAS team deliberately decided not to develop a specific display for the program structure, such as the “flower” in Zambia.

Figure D-5: BAN - Program Structure



Source: Presentation by project staff

➢ Key observations

Scoping Report

- The Scoping Report that was prepared as part of the roll-out process provides useful background information for the hub. The Report is based on data collection efforts that are comparable to those done for larger development projects. The section on the context at the national level does, however not include major elements foreseen in the Roll-out Handbook. There is no "Drivers of Change" analysis, and specific government policies relevant to AAS are not identified and described.

- The Scoping Report identified poor water management and elite capture as major problems at the community level. The report states: "The overarching finding of the team was that poor water management affects every aspect of life. […] The fact that the majority of the people in these areas live in poverty is closely linked to the way water and land use is managed: Most people are less educated than, have fewer resources than, and are thus marginalized by the wealthy few, who tend to be shrimp farmers and landowners. The elite and powerful appear to manipulate decision-making on water management, as well as on other community issues and needs".[17] At the time of the evaluation, these challenges were not (yet) major focus areas of AAS.

[17] See Hub Scoping for Aquatic Agricultural Systems Program, Field Scoping Report of Khulna, Satkhira, and Barguna/Patuakhali Districts, May 22–28, 2012, Section "Conclusions".

Village selection and selection of group members

- The village selection followed a two-step procedure. In the first step, polders were selected to reflect different levels of salinity. The selection of polders was based on very intensive interactions with local stakeholders, including the local governments (at *upzilla* and district levels). Private sector actors were also consulted. AAS staff also talked, for example, to medical officers in local hospitals, a stakeholder that WorldFish had not interacted before.

- In the selected polders, the design team considered a list of 30 to 40 villages. Villages were visited and the AAS staff held discussions in the villages, e.g., in tea shops. Several criteria were considered, such as salinity levels, infrastructure, size and religious composition. The goal was to have variation according to those criteria. Another important criterion was the willingness of community members to cooperate. The AAS team experienced that there was a certain fatigue to collaborate, which may have been partly caused by the large inflow of aid following the last cyclone. Some organizations, such as FAO, had started to pay villagers for participating in their activities, which made it a challenge to identify villages where there was interest in participation without payment. Still, the number of villages that potentially fulfill the specified criteria is large, and how exactly the 16 villages were selected is not documented.

- In the stakeholder workshop held in July 2012, there was an intensive discussion on how to select the village group members for the AAS program. The advantages and disadvantages of different approaches were discussed.[18] Eventually, the program apparently used a self-selection process, in which local "opinion leaders" played a role. The team placed emphasis, though, on including both women and men in the groups.

- The team conducted a participatory poverty mapping after the groups had been formed. The method was to have community groups rank all households in the village into five wealth strata. This procedure was done three times in the same village with community groups residing in different parts of the village. According to the Country Program Leader, the poverty mapping showed that approximately 10-15% of the participants came from the upper social stratum of the village, around 40% from the middle stratum and the rest from the lower stratum.

Selection of research activities

- In the Stakeholder Workshop held in July 2012, a distinction between community-led and researcher-led activities was drawn. Research on crops and livestock was mostly identified for community-led activities, whereas activities that need to be organized on a larger scale, such as water management, and/or that require special expertise, such as biodiversity assessment, were placed in the researcher-led category. Research activities were identified for all themes according to this classification.

- As could be seen from the description of the visioning process for the case of Sahos (one village visited by the team, used here for the purpose of illustration), a large number of non-agricultural goals were identified next to a number of agricultural activities. This was similar in all other villages visited. In the case of Sahos, there was not much differentiation in the priority assigned to the agricultural priorities. In some of the other villages, there was more differentiation.

[18] See AAS Khulna Stakeholder Consultation Workshop, Jessore, Bangladesh, July 3–5, 2012.

Priorities differed across villages. In some villages, fish and livestock-related activities received a higher priority, in others, vegetables were considered to be of higher priority. The ranking had been done separately by men and women. In the case of Sahos, the outcomes did not differ much between men and women.

- The team responsible for the Khulna Hub experienced a loss of momentum after the stakeholder workshop that was held in July 2012. Guidance from Headquarters on how to proceed with the PAR was not forthcoming. Until April/May 2013, there were no activities. The team then decided to move ahead with the on-farm trials because they felt that community groups would become disappointed if there was no follow up after the visioning exercises. Moreover, there were concerns regarding the performance of the program if there were long delays in implementation. The on-farm research could benefit from the Country Program Leader's extensive experience with the Farmers' Field School approach.

- The expertise of Constellation, the international NGO contracted by AAS to support the Roll-Out Process, was welcome by the AAS team in Bangladesh, but there was a concern that Constellation did not have expertise in the field of agriculture and aquaculture. In order to ensure that results can be achieved in this area, which is the core of AAS, the Country Team Leader decided to hire AAS staff as community facilitators, rather than "outsourcing" this component of the program to NGO partners.

- The initial focus on community-led research on the seed quality and productivity of horticulture crops for homesteads was based on the concern, expressed particularly women, regarding the quality of vegetable seeds used to grow vegetables both for consumption and for sale. As stated in the Stakeholder Consultation Workshop report, concerns included poor germination rates, poor growth, poor productivity, susceptibility to disease, and vegetables not true to type.[19] This topic was selected as first activity, because it was considered to be important to women from households with little access to land. Moreover, this line of research could be realized with low external inputs. The focus on "challenged ponds" and "vertical horticultural systems" (e.g., "vegetable towers") was also based on the concern to focus on activities that can be realized on small areas and without expensive external inputs.

- The AAS team recognizes that WorldFish does not have specific expertise in horticulture. Therefore, the AAS team decided to rely on partnerships with BARI, Khulna University and the agricultural extension service to draw on their technical expertise.

- In addition to the field trials, several research activities were conducted. These include GIS mapping of the villages, and the Gender and Social Analysis, which was coordinated from WorldFish Headquarters in cooperation with the University of East Anglia.

Theory of Change

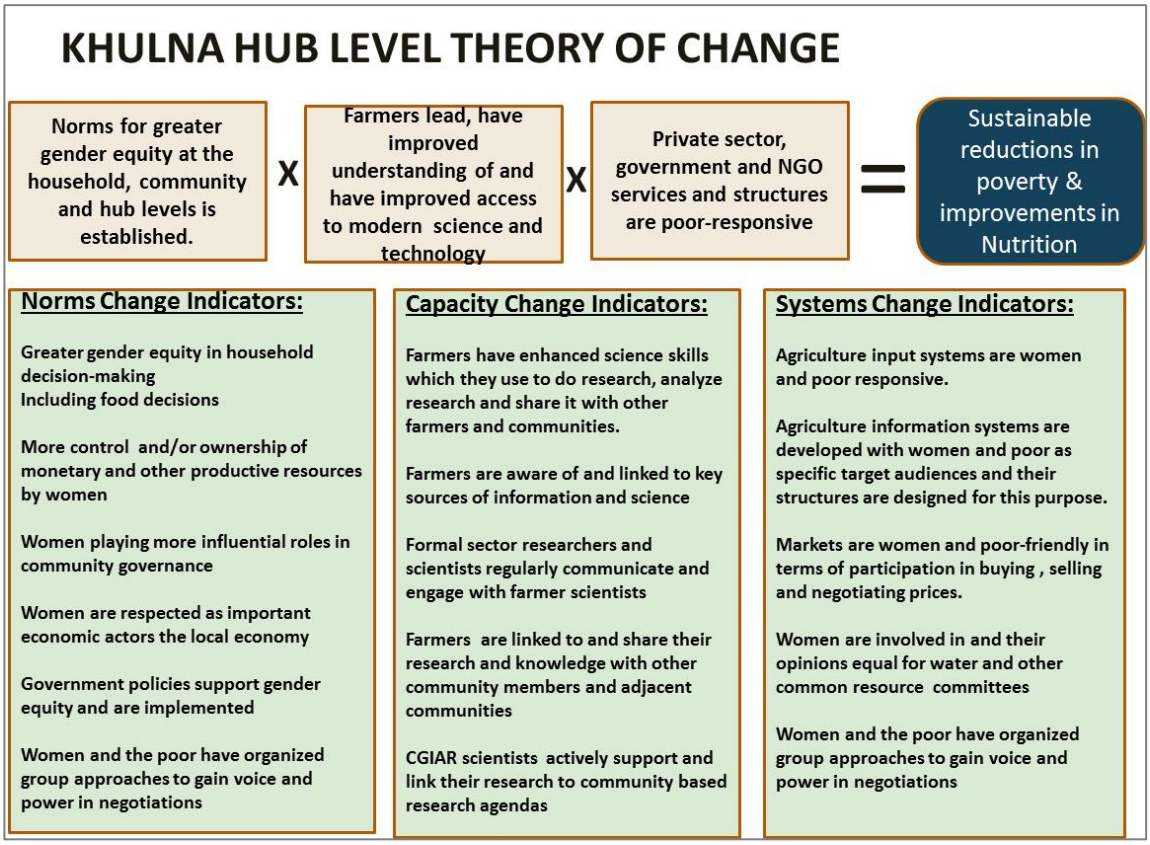
- Figure D-6 shows the "theory of change" that was developed for the hub. The figure indicates that the main goal of change is sustainable reductions in poverty and improvements in nutrition. Environmental goals are not included in the objective. The diagram identifies three factors contributing to this goal: norms for greater gender equity, improved understanding and access

[19] See AAS Khulna Stakeholder Consultation Workshop, Jessore, Bangladesh, July 3–5, 2012.

of farmers to modern science and technology, and pro-poor responsive services provided by the government, NGOs and the private sector.

- The diagram also identifies three sets of indicators: Norms change indicators, capacity change indicators and systems change indicators. Most of these indicators are statements that do not refer to changes. Just to illustrate the point: There is an indicator "Farmers are aware of and linked to key sources of information and science." If this formulation is meant to be a change indicator, the assumption would be that before the AAS intervention, farmers were not aware of and linked to key sources of information and science at all.

Figure D-6: BAN - Khulna Hub Level Theory of Change



Source: Presentation by project staff

- This "theory of change" is linked to the concept of theory-based evaluation.
    - One can see some important positive points in the effort to develop such a "theory of change." For example, there is an emphasis on gender norms, which may help to sensitize staff on the issue.
    - From a research perspective, the value of such a "theory of change" is less clear. There are numerous theories related to technology adoption (e.g., sociological theories of diffusion of innovations, the economic concept of induced innovation, innovation systems approaches, etc.). Compared with those theories, the "theory of change" of the hub displayed below looks rather generic and simplistic. It is also not clear how international public goods can be generated by an application of this approach.

- For example, it is obvious (almost by definition) that markets that are women and poor-friendly in terms of participation in buying, selling and negotiating prices contribute to the overall goal of poverty reduction. The real question is *how* this goal can be achieved. A theory of change would have to capture the respective conditions and processes, and the research would have to be designed in such a way that they can be identified. Likewise, it is well-known that group-based approaches can improve the voice of women and poor people. The question of interest is how this can happen in this specific situation, for example with regard to water management. The formation of groups alone is not likely to improve the long-standing conflict of water management, which was identified as a major problem in the scoping study, as quoted above.

Activities in the communities

The evaluation team split up in two teams and visited a total of 10 communities, where it conducted focus group interviews (first with the entire group and then with only women) as well as village walks during wich the teams had the opportunity to talk to community members individually. Through the interaction at community level, the teams collected information particularly on:

- the challenges of the communities relating to agriculture and fish farming
- the roll out process of AAS at community level
- the communities' involvement in AAS and the activities which have been conducted through AAS
- other projects/organizations which are active in the communities
- gender norms and power relationships

While all communities had been involved in visioning exercise (also called dream planning in one case), the participation in AAS activities and the type of activities, which were conducted in the communities through AAS varied. Activities ranged from pond trials, research on tomato, ginger and chillie varieties, field trials on okra to joint fish and vegetable production. With regards to gender issues, the results observed have been quite different. While in some communities a shift in gender norms has been reported, in other communities the influence of AAS on gender relations observed seemed to have been limited.

Partnerships

In this section, the results from the meetings with research partners and development partners are summarized. A list of all partners that were met is provided in Annex H of the evaluation report. To ensure confidentiality, the information derived from the interviews is presented here in form of a summary. The contents of the individual interviews were shared among the team members to inform the assessment.

Research partners

Discussions were held with eight scientists representing five different research organizations based in Dhaka and in Khulna. They included two universities (Khulna University and Bangladesh Agricultural University), one national research institute (Institute of Water Modeling), and three CGIAR centers (IFPRI, IRRI and CIMMYT).

The interviews with the national research partners indicated that their relationships with AAS have been intensive and were considered to be mutually beneficial. AAS benefitted from the expertise of the national research partners in areas outside the expertise of WorldFish, especially horticulture. In

the Khulna hub, AAS also benefitted from the opportunity to use research infrastructure, such as laboratory facilities. According to the interviews, the national research partners benefitted considerably from learning about the AAS approach. The bottom-up nature of the research in AAS and the close interaction with stakeholders was particularly highlighted and seen in contrast to the research approaches usually adopted by other national and international research organizations. The efforts to share research results with stakeholders in the form of workshops were also highlighted as a positive feature of AAS. Some interviewees also benefitted from being introduced to the use of qualitative methods, such as focus group interviews, which they had not used before. One interviewee, who was involved in the field trials, explained that, initially, he had doubts about the AAS approach but ultimately he was astonished at how fast farmers learned to take accurate measurements, and to do trials for comparison, for example, line sowing against broadcasting. In his view, AAS has had a positive impact on farmers. For him, some of the unique characteristics of the AAS approach include the fact that farmers are interested and motivated; there is no cash or compensation for labor (only a small amount of food is offered); farmers consider it to be their program, they see themselves as farmer-researchers and their dependence on experts is decreasing.

In spite of these positive experiences, there was, however, also evidence of constraints to collaboration with national research organizations. For example, the fact that the Rohu Breeding Program of AIN was implemented entirely independently from existing national research organizations, such as BFRI (Bangladesh Fisheries Research Institute) is an indication.

The collaboration with other CGIAR was generally considered to be positive by the interviewees. Aquaculture is a key sector in Bangladesh for improving nutrition and reducing poverty, and the other CGIAR centers value the strong technical expertise of WorldFish in this sector. There was an intensive informal collaboration with IFPRI, which provided a data set to an AAS researcher that formed the basis for several high-level publications. Vice versa, IFPRI benefitted from AAS' technical expertise in aquaculture, which informed IFPRI's own economic analysis in this field.

The collaboration with IRRI and CIMMYT mostly took place within the CSISA project. The centers made a substantial effort to work within the same villages. Before, each center had pursued their activities rather independently. However, there have been no experiments, so far, to optimize the productivity of integrated agriculture-aquaculture systems, even though there are interesting research questions (e.g., the choice of the optimum sowing time in fish-rice systems, if the goal is to optimize the combination of fish and rice yields). Interview information suggests that a joint planning between the three centers from the planning phase of the project onwards would have been necessary to make a closer collaboration possible.

Interviewees from the other CGIAR centers also indicated that they value participatory research. CIMMYT and IRRI use participatory approaches in their own activities, e.g., to test the suitability of existing varieties for different locations. However, they also feel that the PAR approach being used by AAS has some limitations because farmers can only prioritize in their area of experience. For example, mechanization ranked low among the farmers' priorities because they did not know much about available technologies. There was also a view expressed that AAS should have more scientists on the ground to achieve good research results.

Overall, it appeared that some of the research collaborators conflate AAS with WorldFish. Given the long and visible presence of WorldFish in Bangladesh, this is not surprising but it presents an additional challenge for AAS. At the same time, national researchers who were directly involved in AAS approach are appreciative of the work that is being done and believe that in the long run, it will make an important contribution.

Development partners

As indicated above, only one meeting with a government organization, the Department of Agricultural Exension in Khuna, could be organized. Most interviews took place with NGOs, including three local NGOs (Sushilan, Ashroy Foundation, Christian Services Society (CSS), and the Community Development Center (CODEC)), one national NGO (BRAC), and four international NGOs (Solidaridad, Save the Children, Helen Keller International, International Development Enterprises (iDE)). Representatives of USAID and FAO were also interviewed.

The discussions with more than 10 development partners (in some cases there were several interviews with different interlocutors) in Bangladesh gave a good impression of the experience of these partners with AAS, their perception of the program and their expectations. The can be seen from the above list, the partners cover a wide range from donors, collaborating national and international NGOs to boundary partners without an active collaboration with AAS. Some of the NGOs have been partners of bilateral projects, namely AIN and CSISA. Only those organisations that collaborate closely with AAS (e.g. on GTA or on PRA) distinguish AAS from WorldFish. Not even the representative of a main donor of bilateral projects was aware of AAS. This may be considered an internal management issue of WorldFish. In general, the development partners see WorldFish as a strong organisation and highly appreciate its competence and expertise in fisheries and aquaculture. Particularly the international NGOs see WorldFish as a partner in a supportive and expert role. Some resent, however, that WorldFish has started implementing entire development projects by itself. There is a collaboration of AAS with the government extension services, not at an institutional level (there no MoU), but at an individual level, e.g., through the involvement of extension staff in AAS villages, where they assist the communities with specific problems. The development partners acknowledged that in Bangladesh, it is rather cumbersome to come to a MoU with government partners, but this was still important, particularly because development partners note some resentment against international organisations like WorldFish, which are often considered over-resourced and competing with national organizations for funds.

The interviews also indicated that development partners often use their own extension methods to reach farmers, e.g. common interest groups or contact farmers. This is seen as problematic when different organisations work with the same communities. The intensity of follow-up by the NGOs to their groups is less intensive than in AAS. Usually, one BSc-level field person looks after four to seven village groups, while in in AAS, one MSc-level trained staff is responsible for two groups. AAS field staff are 2-3 times better paid than NGO staff. The question was, thus, raised by development partners whether the AAS approach is replicable and scalable. Some development partners would have expected AAS to have a larger coverage than 16 communities and also cover areas outside the Khulna region. The issue was brought up that many organisations work with the same communities that are easy to reach.

The staff of some NGO partners in Khulna received a two-weeks training on the AAS approach (PAR, ToC, outcome harvesting….), which they appreciated. NGOs were asked to take over the work in the AAS cluster. NGOs would appreciate a longer-term partnership with AAS, but most have only short-term contracts, e.g. three months to six months to implement a specific task, e.g. trials on fodder or the wish-pond and eco-pond project. These NGOs that are paid for their work see themselves rather as subcontractors then as partners.

Those organisations working with AAS on GTA appreciated this approach and also the learning attitude inherent in AAS, including the outcome harvesting approach. Some of them received

support and participated in meetings in Khulna. Still, they are not prepared to abandon their own systems, which they had developed, such as the gender champions approach, or the stepping stone approach.

In summary, the development partners appreciate WorldFish for its competence in fishery and aquatic resources, and many also see positive features in GTA, RinD, PAR and the AAS-approach as a whole. However, the partners have their own identity, priorities and methods they use and they want to be taken seriously. They are ready to take up elements from the AAS approach, but not the full approach. Donors and international NGOs can insist on "their way," while small NGOs also go for paid collaborations because they are looking for funding. NGOs would prefer longer-term partnerships on an equal footing.

Gender Transformative Approach

Overall, the gender transformative approach has been well integrated into the AAS work in Bangladesh, but there continue to be problems with ensuring that male staff members add a gender dimension to their research. Not all staff members seem to fully understand yet that including gender does not mean simply targeting women.

PAR (participatory action research) is a central component of the GTA approach. In Zambia, the AAS staff have encouraged partners to work within this approach, but in Bangladesh, AAS staff themselves have been involved in hands-on work. Staff has had PAR training and Dhaka-based staff go into the field at least twice monthly to work with communities and assess what is happening. Staff based in Khulna spend most of their time in the communities, providing support as needed, organizing meetings and identifying issues that need attention. Early on, they spent considerable time convincing men to join in the GTA activities. Once men understood that they would receive visits from agricultural extension officers and members of the RST (Research Support Team) if they participated in the GTA work, they started to join. Poor productivity from shady fish ponds was identified as a problem and researchers worked with both male and female farmers to help them to make their fish ponds more productive.

One of the tools used by the GTA team was the introduction of record books. Both male and female farmers were taught to keep record books and over time they began to see which variety and/ or crop was most profitable. This helped to build the confidence level of farmers and it also contributed to making them consider themselves to be "farmer researchers."

Although the gender team engages with farmers as individuals, they do recognize that they need also to engage with family units. They plan to provide training to women to teach them how to negotiate with men to try new approaches that they have learned through the AAS project.

The AAS gender team has also made some inroads into ensuring that the GTA is being used in the bilateral projects underway in Bangladesh. For example, they have integrated GTA into home ponds aquaculture training which is currently being pilot tested and will be brought to scale in the AIN project in 2015. Both CSISA and AIN have designed technologies specifically for women and they are now being tested.

AAS was instrumental, with Helen Keller International in the creation of the Bangladesh National Gender Working Group in 2013. It now includes 25-30 NGOS and international organizations working on gender in Bangladesh and has specific TORS and a steering committee. It is currently co-chaired

by AAS and Helen Keller International. A Gender Working group also was established by AAS in Khulna.

Productivity

The following observations were made regarding the productivity theme.

Major interventions

AAS aimed to improve productivity mainly through the following types of interventions.

Trials on spices and vegetables

While visiting the villages, it became clear that the AAS team has made substantial efforts in launching participatory research trials on the vegetables and spices selected by the farmers based on their choices. During the time of the visit, it was apparent that the majority of trial farmers prefer spices such as turmeric and ginger, followed by chilies as compared to actual vegetable crops. No trials were found with chicken, ducks, goats and other farm animals, which might generate higher incomes. Some farmers have done variety comparisons in tomato, while few others did so for potato. In one of the villages, eight farmers conducted trials to find out the best variety of those grown in the previous season. Another group of farmers are trying to determine the best sowing time by sowing in a weekly interval.

Homestead/Challenged Ponds

According to AAS staff, there are 4.27 million homestead ponds in Bangladesh most of them have not been used for farming of fish as the pond water is used for bathing, washing dishes and to feed livestock. These ponds are close to family houses but under shade. If these ponds could be utilized for aquaculture, fish production could be increased substantially, which will be beneficial for family consumption and may also generate surplus fish for sale. Hence, AAS is promoting experimentation with these ponds.

As most of these ponds are under shade, oxygen levels in the water can be very low. Therefore, careful selection of species is important. Recommended species for poly-culture are mixed sex tilapia, Pangasius, Koi and Mola in the ponds. Magur and Singhi are highly carnivorous they prey on mola easily and also small fish of other species. Productivity can be low due to these catfish and low inputs.

Five farmers with homestead ponds were visited in Fultola and another five farmers in Akra. However, it was seen that these ponds are not managed intensively, and that the combination of fish, especially inclusion of catfish (Magur and Singhi), has had a negative impact on productivity due to the problem indicated above.

Some farmers prefer Magur and Singhi, because they survive at low oxygen levels. It is, therefore, suggested to using a “hapa or cage-in-pond” method in which mixed-sex tilapia (>50 g) are grown in large mesh size hapas, while the catfish is grown outside. Tilapia can be fed with left-over from the kitchen, fruit peels, vegetable leaves, and homemade feed such as a mixture of rice bran or wheat bran and oilcakes. Mixed sex tilapia produce fry and fingerlings (recruits) that come out of the hapas and serve as feed for catfish. Larger recruits remaining in the pond also serve as seed to restock in hapas after harvesting. A farmer can have several hapas in a pond, depending upon the size of the

pond. Suggested hapa size are $10m^2$ (small) or $20m^2$ (larger) in which 50 -100 tilapia can be stocked. This "cage or hapa-in-pond" system has several advantages. Tilapias in cages can grow fast and farmers can harvest them easily by lifting cages without draining the pond.

Eco-Pond

Several "Eco-ponds" were seen while visiting the project sites. They were supported with USAID funding (US$15 million). In these ponds, three boxes of bamboo frames with nylon strips are hanged to provide substrate to the algae, which are the main source of nutrients for fish. Similarly, some palm leaves were submerged to provide additional shelter. Indigenous fish have been stocked. These fish grow very slowly and they do not grow big. From an ecological point of view, this concept sounds very promising; however, as compared to systems that focus on fast growing species and the use of home-made feed, this system might not fulfill the needs of a family for home consumption throughout the year or generate substantial income.

The Gher System

This system is widely distributed in Bangladesh. Farmers plant rice during the dry season, and produce shrimp, prawn or fish during the rainy season on the same land when the water level is high enough. Normally, ponds have dikes that are about 1-2m tall. Farmers also utilize pond bottom mud, which is a nutrient rich-sediment after each harvest of prawn/shrimp/fish, which they put on top of dikes, where they grow vegetables such as tomatoes, beans, pumpkins, ash gourd and others. Vegetables, which have vines, are even grown on trellis or on a bamboo raft above the pond, so that they do not need additional space for those vegetables. This system has spread almost all over Bangladesh. It was most probably developed by various organizations, including Bangladesh Agriculture Research Institute (BARI). What AAS has in particular added to this system to increase productivity and profitability was not clear from the field observations.

Shrimp / Prawn farming:

As mentioned above, farmers were seen to grow shrimp/prawn in the *gher* system, which has existed since a long time. The productivity of these system ranges from 200-300 kg per ha, which is quite low (one-fourth), as compared to other countries of Asia. Moreover, farmers were facing viral disease problems. Therefore, WorldFish introduced the PCR technique in collaboration with Khulna University. They started to screen the post-larvae (PLs) and distribute only disease free PLs to the farmers. As a result, the Government of Bangladesh has also started the same approach. This has helped farmers to save their shrimp/prawn. In addition, WorldFish also imported specific pathogen free (SPF) broodstock from Hawaii and PLs produced from SPF broods were distributed to 52 households. However, the available evidence indicates that the results were not encouraging.

Farmers grow shrimp during rainy season, when their ponds are full of water and they grow rice in the same pond during dry season, when they can drain the water from the pond. A simple calculation shows that there is a substantial difference in income from these two crops. Farmers harvest approximately 10 ton of rice per ha, which is worth about 22,500 taka, whereas they could easily earn about 10 times more if they grew fish (10 ton/ha x 200 Taka/kg) or prawn (250 kg x 900 Taka/kg) from the same pond. Then they could buy rice from the income, as rice is inexpensive and readily available. This indicates that farmers are not motivated by income and profitability only. There is a strong social norm indicating that families who buy rice are poor. There are other benefits of growing rice also. Rotational farming helps to break the cycle of bacteria and virus in the pond and

helps to maintains productivity. Still, the productivity of prawn could be doubled by irmpoved feed and management techniques.

Tilapia Hatcheries (AIN)

Two tilapia hatcheries were visited in Jessore. The first one, has been selected to serve as the Tilapia Breeding Nucleus (TBN), where tilapia broods are maintained. Eight cohorts of GIFT from Malaysia have been maintained in this TBN hatchery. They will be the source for other satellite hatcheries, where they cross with various groups to avoid inbreeding. Satellite hatcheries then produce mono-sex fry. According to WorldFish, staff, there are four TBN and 16 satellite hatcheries under the close monitoring and supervision of WorldFish staff. Although the two tilapia hatcheries visited seem to be functional, no eggs and fry were seen at the time of visit. According to the staff, the season was off and fry production will start from February-March when warm weather starts.

It seems that more emphasis has been placed on broodstock genetics than on actually scaling-up tilapia hatcheries, following up on the standard and established protocols applied in other hatcheries in Bangladesh and in the region. The hatcheries supported by AIN have quite good facilities, and it was surprising that each of these two hatcheries produces and supplies relatively little monosex fry. The first one supplies about six million monosex fry a year (2014), which is less than half of its capacity and quite low as compared to other hatcheries found in Bangladesh as well as in other countries in the region. At the same time, the quality of monosex fry, measured as percentage of male to be around 95%, is quite low as compared to the expected 99% achieved by many other hatcheries in the region. Moreover, actual quality testing was done only once, even though testing of monosex quality is recommended to be conducted on regular basis (at least monthly). The second hatchery visited applies slightly different protocols that the recommended ones.[20] Fry production is less than only 3 million per year (2013), which is also far below its capacity.

The price of monosex fry is 0.7 Taka per fry and production cost is about 0.25 Taka. This shows that the net profit is more than 100%. This should be highlighted so that more farmers could be involved in the hatchery business to solve the shortages of fry. Although the attempt is a good step, the observations suggest more efforts are needed to improve hatchery productivity and monosex fry quality.

Rohu Genetic Improvement Program (AIN)

Realizing the problem of inbreeding in Rohu, the most preferred fish in Bangladesh, a program called “Rohu Genetic Program” has been started. It was mainly funded by the AIN project, and is mapped into the Livestock and Fish CRP. The project pursues selective breeding in an extensive hapa based system using hundreds of hapas in large ponds, which were specifically constructed for the project. With a view to sustainability (as project funds will end in 2016) and capacity development, the question arises as to why WorldFish is setting up its own project-funded breeding program, rather than trying to incorporate this program within national organizations. Project staff indicated that this would indeed be desirable, but the length of the procedures involved in working with national government organizations and the management and governance challenges typically involved in such cooperation would not be compatible with the conditions and time lines of a USAID-funded project.

[20] For example, feeding hormone for 28 days instead of 21 days, and use of 350 ml of ethanol instead of 240 ml.

Comments and suggestions

Assessing the interventions described above, the following challenges were observed.

Implementing partners

Most of the community activities are launched via NGOs, which focus solely on extension activities. While national research organizations were involved in conducting studies for the program (see section on research partners above), their involvement in the field trials on the ground has been rather limited, which may have contributed to problems with research design that were observed. Field observations by the evaluation team indicate that some of the on-going trials with farmers have not been designed according to established principles of good practice in on-farm research, which would allow for the collection of reliable data (see further details below).

Selection of technologies

A number of issues can be raised regarding the selection of the technologies promoted under AAS.

Selection of technologies for aquaculture

Bangladesh has a long tradition of fish farming and consumption. The sector also experienced rapid growth. However, the productivity levels are rather low as compared to other developing countries in Asia where this sector plays an important role. This indicates that there is a substantial room for income generation due to improved technologies that has not been exploited, so far.

Selection of vegetables and spices

Much emphasis has been given to spices such as turmeric, ginger and chilies. A main rationale of the project to focus on those spices is that they can be grown in shaded areas around the residence on land that is not used otherwise. Thus, they offer particular opportunities for poor families with little access to land, and for women who may gain access more easily to such land. Still, the question arises as to why there has been not more focus livestock such as chicken, duck and goats, for which fodder resources that do not necessarily compete with other land requirements could be used and higher incomes might be achieved. Considering the focus of AAS on aquatic agricultural systems, one may also ask why there has been not a stronger focus on pro-poor technologies that have direct linkages with the surrounding aquatic system. For example, the spices promoted in the field trials do not have leaves that could be not used as ingredients of fish feed nor can they be used as pond inputs directly.

Post-harvest processing

Although the AAS proposal emphasizes the entire value chain, almost all project activities have emphasized production technologies. No post-harvest handling, processing, packaging and marketing aspects was found at the community level. Simple and low cost techniques could result in a substantial profit to the farmers. For example, production of fish powder / paste or chutney could be popular items among rural women. Similarly, other products such as vegetable pickles and drying fish or vegetables could help to make them available throughout the year.

On-farm research

A number of issues arise regarding the design of on-farm trials conducted under the program.

Plot orientation and layout

The trial plots have been established without the consideration of sunlight direction and shade conditions. Many plots have been oriented from east to west. As a result, some plots (treatments or varieties) located in the trial area are under shade throughout the day while others get more sunlight. These plots should have been established with a North-South orientation so that all the varieties/treatments get sunlight and shade equally.

Similarly, in some trials, a variety is cultivated in two plots or ridges on a trial site, but these two plots/ridges are adjacent to each other. When comparing three varieties providing two plots/ridges to each variety, treatments should have been randomized instead of providing two adjacent plots/ridges to each of the varieties so as to account for possible differences in conditions.

Collection of data for scientific research

Farmers, who have been encouraged to become farmer-researchers are collecting data. It was observed that this data collection varied across villages. In some cases, the record books could not be shown to the team. Moreover, farmers keep records of production (g or kg) and income (Taka) from sales only. Farmers have been taught to keep these records, but have not been taught to convert economic value of each product consumed.

A main advantage of the approach pursued by AAS is to encourage the farmers to start experimenting with different varieties and treatments by themselves. The goal was to focus on activities that farmers can, indeed, do by themselves because they do not rely on any inputs provided by the project, so that they could continue to experiment after project support has ended. This can certainly be seen as a useful goal in its own.

However, if the goal also is to interpret the results in a scientifically sound way, more data would have to be collected, e.g., regarding the number/size of each individual product (e.g. individual weight and length of fish), the height of the plants, soil salinity, pH, moisture content, and others. As these additional data are not directly valuable to the farmers, they may not be interested to collect them, nor would it be feasible for many of them to apply proper methods or using scientific equipment. The field staff assigned by AAS to work in those villages should, in principle, be able to collect such data, since they are expected to spend a considerable amount of time in each village advising the farmers.

Replications

In order to produce scientifically sound results, which provide both reliable data to the farmers themselves and which can also be published in peer-reviewed journals (international public goods), the on-farm trials would have to be well-designed with adequate replications. In order to compare the results with average yield levels from census data at the district, region and/or national level, a minimum number of replications in the range of 30 is needed. In most trials, the number of replications was between 8 to 12. This will make it possible to compare among the treatments only.

Data analysis and interpretation, writing of scientific papers

In face-to-face interviews with AAS staff, there was an agreement that very few staff members have adequate expertise and skills in data analysis, interpretation of writing up results for scientific papers. The majority of the research data collected in the field does not get published due to this lack of required skills. According to the AAS scientists based in Dhaka and Khulna, there are plenty of data available, and many scientific papers could be produced, but this is not happening. There are several underlying reasons, which include, next to the lack of the respective skills, lack of guidance and monitoring of staff in terms of research work, lack incentives for research and shortage of time for scientists. These observations indicate that there is a strong need for staff training and capacity development. A staff member with strong research background and practical skills in the type of on-farm research pursued under AAS should serve as Research Director across the different projects and activities in the AAS program to overcome the problems observed.

Publications of the program

The Annex lists the outputs of the project, as provided by the AAS Country Team. The list features for the time period from 2012 to 2014 a total of 17 peer-reviewed journal publications, two book chapters, one magazine article, 10 working papers, 5 reports, one publication in Conference Proceedings, and one online article.

At first sight, the number of 17 international journal publications is rather impressive, considering that the number of PhD level staff assigned to AAS, from whom such publications can be expected, is relatively small (see above), and that those staff members are also assigned substantial project management functions. The journal publications have been published in well recognized journals in the field of aquaculture and fisheries, such as Aquaculture, which has an impact factor of 1.8, or general development journals, such as World Development, which has an impact factor of 1.7. These impact factors are considered to be rather high for their respective fields (they cannot be compared with general science journals, which have a wider audience and higher impact factors and citation rates). The publications also refer to topics that are highly relevant for AAS. For example, one paper addresses the contested question whether aquaculture development in Bangladesh has been pro-poor, and another one the question whether aquaculture can benefit the extreme poor. Some are reviews, including an excellent review of the status of pond aquaculture, which addresses the question whether it is still the case that predominantly richer households have ponds. Other publications, which are published in high-quality journals, evaluate different aquaculture technologies.

However, there are also some constraints regarding the publications record of the program. Eight of the 17 journal publications and the magazine article have been authored or co-authored by one single staff member, Ben Belton, who has meanwhile left. Most of the publications are based on what would be called “conventional research” in AAS terminology. The publications address important topics where knowledge gaps exist, but most of them are not based on the use of standard methods and do not feature any particularly advanced or innovative methodological approaches. As an example, papers that compare different technologies adopted by farmers do not correct for sample selection bias or use matching techniques. An exception is a working paper that uses an innovative simulation-based approach to impact assessment called Tradeoff Analysis for Multi-Dimensional Impact Assessment (TOA-MD). Not many papers that specifically focus on participatory action research. There is one working paper on “Participatory Action Research on Climate Risk Management, Bangladesh”, which reports the results from using participatory research

methods (not action research). While interesting, this paper mainly describes the findings without presenting an analysis.

At this point in time, it is certainly too early to expect results from the on-farm trials to be published. Papers based on on-farm research can be published in high-ranking journals such as Agricultural Systems or Field Crops Research, as recent such publications show (both journals have impact factors over 2.5). However, for the reasons discussed above (Section 3.5), it is not likely that such outputs can be expected due to problems in the design and data collection related to the field trials. What is also noticeable is that none of the publications specifically takes a farming systems perspective, even though many produce important insights about the farming system that is represented by the Khulna hub.

Assessing the outputs, one also needs to consider the plans that were made for 2014 in the Activity Plans. A rather long list of "research papers" or "papers" were planned for the different themes. It appears that most of them had not been produced at the time of the evaluation, and many may have been dropped as the planning for 2015 proceeded.

Support to staff for publication activities might be useful to improve the publications record of the program. It was learned that most of the scientists spend a considerable share of their time on project management, and that they also spend 2-3 hours daily in commuting to and from the office. Having a provision for scientists to work at home one day a week may be productive in terms of scientific publications. However, there should be a designated Research Director who monitors their work.

Governance

AAS in Bangladesh does not have a separate governance mechanism. At the start of AAS there was a stakeholder workshop and there were design meetings in 2011 and 2012. There were, however, no comparable general meetings with partners in 2013 or 2014. In a paper prepared for the BOP meeting Session of the 11th December 2012, there is a provision for a *"Country Program Committee (CPC)."* The paper states that *"A CPC will be established in each focal country and will oversee and coordination of program there. The CPC will consist of representatives of NARS partners, all participating CGIAR Centers and partner research Programs, and core NGO partners. The CPC will be chaired by a representative from the NARS partners."* In Bangladesh, such a national oversight body was never established. Neither was a Program Forum created, which is described in the above paper as follows: *"The Program Forum will be convened every two years to review program implementation together with partners from focal countries".* This apparent intention was not realized in Bangladesh.

Management

AAS in Bangladesh is fully integrated in a large and well-established structure of WorldFish. Out of the approximately 260 WorldFish staff members in Bangladesh, around 10%, mostly junior researchers and programme officers, are funded by W1/W2 and can be considered fully AAS. Most other staff and collaborators have been hired under bilateral project funding and were in a second step partially mapped against research tasks in AAS. The two other CG-centers collaborating with AAS, Bioversity and IWMI, do not have personnel permanently based in Bangladesh. Some researchers give punctual support to some of the research themes in Bangladesh. Kevin Kamp is the Country Programme Leader of AAS in Bangladesh and at the same time Deputy Regional Director. He reports to the Regional Director South Asia (Craig Meisner) with whom he conducts also the 6-

monthly Performance Management Planning (PMP) interviews. He maintains an intensive working relationship with the Programme Director AAS (Patrick Dugan).

D.3.4. Overall assessment

A preliminary assessment was shared with the AAS team at the end of the evaluation visits and feedback was received by the country team in form of a written response. The feedback was considered for the overall assessment of the case study as well as for the overall evaluation of the program.

Strengths

- The AAS program can draw on a long history of engagement in Bangladesh. Hence, the country program team has substantive knowledge of the research region. All team members with whom the evaluation team interacted are very committed to the AAS program and its ambitions. The interviews with the program officers working in the AAS villages indicated that are highly satisfied with their assignment and work intensively on a daily basis in the villages.

- The intensive work on community participation promoted by Constellation, in particular, the visioning process, was still very present among the members participating in AAS, and it seems that this approach has indeed played a major role in guiding the work of AAS at the community level.

- The participatory action research pursued in the villages was conducted in a way that strongly focuses on farmers' empowerment. There was evidence from the village visits that the farmers showed a high commitment and ownership in this approach, and that they perceived the approach to be more engaging than what is usually done in agricultural development projects. What needs to be highlighted in particular is that female farmers felt equally empowered as farmer-researchers. The program certainly benefitted from the extensive experience of the Country Program Leader with the Famers' Field School approach, which could outweigh the lack of specific experience of Constellation in this area.

- The Gender Transformative Approach was widely introduced and seems to have taken root in many of the villages. The focus on empowerment in this approach is clearly a departure from earlier approaches that focused more narrowly on gender roles. AAS is recognized by development partners for its efforts on GTA. Moreover, GTA can be seen as a promising innovative research area.

- AAS is widely recognized among development organizations for its innovative efforts to develop technologies that are suitable for resource-poor households. These include AAS' research on challenged ponds, eco-ponds, wish-ponds, small fish, vegetable towers and floating gardens.

- The program has established important research partnerships with national research organizations, most notably Bangladesh Agricultural University, Khulna University and with the Institute of Water Modeling. The research partners highly appreciate the strong focus on community interaction and stakeholder consultation in AAS research, and they note that AAS is clearly different from other international research programs in this respect. They have also benefitted from the use of qualitative research methods, such as Focus Group Discussions, which that they had not used before.

- There has also been a good collaboration with NGO partners. Most organizations have expressed interest in the AAS approach and are willing to take up elements of the approach, to be combined with their own approaches. AAS has also started to collaborate with private sector, for example in the AIN project with regard to Tilapia production.

- Funding agencies value the role of WorldFish as a science based organization. It was also noted that WorldFish has taken on a leadership role among the CGIAR centers in Bangladesh. There is evidence of integration of AAS RinD principles into new bilateral projects.

- AAS Bangladesh has already produced a considerable number of publications in high-impact international journals. These include important analyses and reviews that are of central importance to AAS, e.g., on the poverty impact of aquaculture in Bangladesh and on the role of fish ponds. One needs to note, however, that a substantial share of those publications was co-authored by one single researcher (who has meanwhile left).

Problems and Challenges

- There does not seem to be the right balance between AAS as a research program and a development program at this point, a concern that is also recognized by the AAS country team. Problems to hire a national Research Coordinator and an international Systems Scientist were quoted as contributing to this problem. However, there are problems in the organization of the research program that go beyond this problem. The rather unusual ratio of PhD-level to MSc./BSc. level scientists discussed above points to the neglect of research that aims at contributing to international public goods.

- There is a need to provide stronger incentives, space and support for staff members to focus on producing international publications. AAS management has pointed out that all AAS researchers who have the designation of scientist are encouraged to publish. However, interviews with staff indicate that there is room for improvement. A high burden of management functions for senior scientists was seen as a problem, and junior scientists with less experience in publishing would need more coaching and support.

- The work that has been published is based on what may be called “conventional research approaches.” There is also a substantial amount of research going on in the bilateral projects that might be called conventional.

- The evaluation team does not expect that research based on PAR in the AAS villages has already been published in international journals, since it is clearly too early for that. The evaluation team also acknowledges that there are serious efforts underway to regularly collect data from the on-farm trials, based on the farmers’ own data collection, the collection of that information by the community facilitators, and the documentation efforts of an intern who has created a data base to make this information accessible. However, for the following reasons, the evaluation team has doubts that these efforts will lead to international public goods.

    - As indicated in the section on productivity above, there are some shortcomings in the research design and data collection of the on-farm trials, which limit the possibility to derive conclusions that would meet the established standards of on-farm research.

    - To be able to produce international public goods, in the form of international journal

publications or in other forms, it would be necessary to involve researchers who know the international literature in the respective fields and who are aware of the state of the art, the scientific debates and the knowledge gaps in the areas under consideration. Such researchers are, however, hardly involved at this point. Therefore, there is a risk that the current PAR efforts, while being useful for the community members involved, may not lead to public goods because the insights generated are already well established (e.g., on factors determining technology adoption). The way in which the "theory of change " is formulated (see discussion above) underlines this concern.

- The evaluation team also noted a lack of a joint vision for interdisciplinary research among the team members, which occurred in spite of the substantial number of workshops that have been held during the roll-out process. The program seems to pursue a multi-disciplinary approach, where different issues (horticulture, fish production, gender, water management) are pursued rather independently from each other.

- As indicate above, Gender Transformative Approach was successfully implemented in the AAS villages. The team was informed that efforts were underway to document and write up the experience (two working papers are in preparation). Yet, there are some concerns regarding the possibilities to apply the GTA in the bilateral projects that are mapped into AAS. The very low percentage of female staff in AIN and CSISA (see figures above) can be seen as a constraint.

- Even though AAS has the goal to focus on poor and marginalized groups, the evaluation team could not identify specific efforts in the AAS program to target these groups, neither in the AAS villages nor in the bilateral projects. The program apparently relied mostly on working through local opinion leaders and self-selection, an approach that is well-known to be prone to local elite capture. There is also strong evidence, as documented above, that at least a substantial share of the participants in AAS activities did not belong to the poorer and marginalized section of the village population. There was also no evidence that a serious effort was made by AAS to understand and analyze local power structures in the AAS villages, paying attention to problems such as local party politics. Previous efforts to analyze governance have mostly focused on understanding water governance, but for AAS' work, it would be essential to study the broader context of local power structures and to critically reflect on AAS' own role in this context.

D.3.5. Annexes for case study

Table D-12: BAN – Schedule of visit

Date	Schedule	Activities
6 Nov	Evaluation Team Dinner to be arranged by EvalTeam	EvalTeam review team members [only] working dinner (Regina and Jim to inform members)

7 Nov	Global AAS Program Discussions The discussions will be at the Hotel Sarina, Dhaka	9:00 AM start: Review Team and Global AAS Team Discussions (all day) Jim Sumberg Regina Birner Nadarajah Sriskandarajah Ram Chandra Bhujel Felix von Sury-von Bussy Eva Rathgeber Patrick Dugan, WorldFish Charlie Crissman, WorldFish Marina Apgar, WorldFish Ranjitha Puskar, WorldFish Boru Douthwaite, WorldFish Andrea Robinson, WorldFish Kevin Kamp, WorldFish Manjural Karim, WorldFish Orko Nur, WorldFish Naseem Ahmed, WorldFish Afrina Choudhury, WorldFish Jahan Murshed, WorldFish Evaluation team meets for exchange over dinner
8 Nov	8 AM departure from Swiss Garden Hotel for Khulna via Mauwa Port 12 PM Arrive Khulna	All morning is travel to Khulna **Suggested Presentations in PM:** CGIAR collaborative science history: SBPZ context (Manoranjan, IRRI) Overview AAS Program of Work in Hub (Kevin, WorldFish) RinD (PAR) and trajectory (Kevin) Review of the Initiatives Science 2015/6 (Paula/Kevin) M&E systems Next day field visit briefing of AAS pilot Villages Dinner: CSS
9 Nov	Team A (Regina & Ram) goes to AAS pilot Fultola Village and Akra Village Team B (Felix, Eva & Sri) goes to AAS pilot Sahos Village and Gojendrapur Village KSL Interactions with partners	4 AAS pilot village visits (assumption is that the review team splits into two groups and that communities are chosen which are no more than one hour from Khulna so that both a morning and an afternoon visit can be supported) Initial Processes of Community Visioning Community Priorities Evening: Presentation: GTA program rollout (Afrina/Paula) Homestead Pond Research (Faruque/Afrina) AIN and CSISA program overview presentations

	Scaling	AIN and CSISA briefing for next day visit
10 Nov	Team A (Regina & Ram) goes to AIN supported Arulia Village and CSISA supported Garakhula Village Team B (Felix, Sri & Eva) goes to AIN supported Moshni Village & CSISA supported Sunakandor Village KSL Interactions with partners Scaling	AM and PM: 2 AIN and 2 CSISA supported Villages Focus on Productivity Local Service Providers Private Sector engagement (feed/seed) Understanding and scaling of the AAS Approach Capacity Development Gender Next day field visit briefing of AAS pilot Villages in Satkhira Dinner
Date	Schedule	Activities
11 Nov	Team A (Regina, Ram & Eva) goes to AAS pilot Ghonapara Village in the morning and Borea Village in the afternoon Team B (Sri & Felix) join partner discussions at WorldFish Khulna Office	AM and PM: 2 AAS pilot Villages visit in Satkhira Focus on Productivity Understanding and scaling of the AAS Approach Capacity Development Gender AM: Partner discussions Partners: BRAC, Christian Service Society (CSS), Shushilan, Khulna University, Aquaculture for Income and Nutrition (AIN) and AAS Communications Specialist. Felix and Sri leave Khulna for flight to Dhaka Dinner: Western Inn Restaurant
12 Nov	Partners Discussion and Jessore Field Visits All travel to Jessore Flight to Dhaka	AM: Partner discussions Regina, Eva and Ram will engage discussion with partners: Save the Children Fund (SCF), Ashroy Foundation, Solidaridad, Climate-Resilient Ecosystems and Livelihoods (CREL), BRAC, Christian Service Society (CSS), Department of Agriculture Extension (DAE), Community Development Center (CODEC), Khulna University, AIN, AAS Hub Manager and AAS gender team PM: Field Visits Regina and Ram will visit AIN project supported Satellite Tilapia Hatchery, Tilapia Breeding Nucleus (TBN) and Ruhu Genetic Improvement Program (RGIP) in Jessore
13 Nov	Partner Discussions Dhaka	AM and PM: Partner discussions Regina, Eva and Ram will engage discussion with partners:

		Institute of Water Modelling (IWM), Bioversity International, United States Agency for International Development (USAID), Hellen Keller International (HKI), International Food Policy Research Institutes (IFPRI), BRAC, Bangladesh Agricultural University (BAU), International Development Enterprise (iDE), and Food & Agricultural Organization (FAO) Evening Joint dinner
Date	Schedule	Activities
14 Nov	Wrap up Discussions	AM: AAS Evaluation Team De-Briefing at WorldFish Dhaka Office **PM: Meeting** of AAS Evaluation Team (including Felix) with Kevin Kamp for additional discussion on management and governance Evening: Wrap-up dinner by evaluation team

Outputs:

Table D-13: BAN – publications

Publication Type	Author	Source	Title	Pub Date
Book Chapter	Thilsted, S.H.	p. 270-282. In: Fanzo, J. et al (eds.) Diversifying food and diets: Using agricultural biodiversity to improve nutrition and health. Earthscan, London	Fish diversity and fish consumption in Bangladesh	2013
Book Chapter	Karim, M. ; Meisner, C.A. ; Phillips, M.	p. 57-88. In: Delaney, C.A. (ed.) Shrimp Evolutionary History, Ecological Significance and Effects on Dietary Consumption. Nova Science Publishers, N.Y.	Shrimp (Penaeus monodon) farming in the coastal areas of Bangladesh: Challenges and prospects towards sustainable development	2013
Journal article (refereed)	Ali, H. ; Haque, M.M. ; Belton, B.	Aquaculture Research, 44(6): 950-965	Striped catfish (Pangasianodon hypophthalmus, Sauvage, 1878) aquaculture in Bangladesh: an overview	2013
Journal article (refereed)	Nagabhatla, N. ; Beveridge, M. ; Mahfuzul Haque, A.B.M. ; Nguyen-Khoa, S. ; van Brakel, M.	International Journal of River Basin Management 10(1): 121-136	Multiple water use as an approach for increased basin productivity and improved adaptation: a case study from Bangladesh	2012
Journal article (refereed)	Belton, B. ; Haque, M.M. ; Little, D.C.	Journal of Development Studies 48(7): 904-922	Does size matter? Reassessing the relationship between aquaculture and poverty in Bangladesh	2012

Publication Type	Author	Source	Title	Pub Date
Journal article (refereed)	Haque, A.B.M.M. ; Visser, L.E. ; Dey, M.M.	Asian Journal of Agriculture and Development 8(1): 1-18	Institutional arrangements in seasonal floodplain management under community-based aquaculture in Bangladesh	2012
Journal article (refereed)	Belton, B. ; Azad, A.	Aquaculture 358-359: 196-204	The characteristics and status of pond aquaculture in Bangladesh	2012
Journal article (refereed)	Debnath, P.P. ; Karim, E. ; Haque, M.A. ; Uddin, M.S. ; Karim, M.	Journal of Advanced Scientific Research 3(3): 58-63	Prevalence of White Spot Syndrome Virus in brood stock, Nauplii and Post-larvae of Tiger shrimp (Penaeus monodon Fabricius, 1798) in Bangladesh	2012
Journal article (refereed)	Hasan, M. ; Khan, M.S.K. ; Haque, M.A. ; Karim, E. ; Debnath, P.P.	International Journal of Sustainable Agricultural Technology 8(9): 1-7	Livelihood strategies of tiger shrimp post larvae collectors in backkhali river estuary, cox's bazar of Bangladesh	2012
Journal article (refereed)	Debnath, P.P. ; Karim, M. ; Kudrat-E-Kabir, Q.A.M. ; Haque, M.A. ; Khan, M.S.K.	Journal of Advanced Scientific Research 3(4): 55-67	Production performance of white fish in two different culture systems in Patuakhali, Bangladesh	2012
Journal article (refereed)	Dey, M.M. ; Spielman, D.J. ; Haque, A.B.M.M. ; Rahman, M.S. ; Valmonte-Santos, R.	Food Policy, 43: 108-117	Change and diversity in smallholder rice-fish systems: Recent evidence and policy lessons from Bangladesh	2013
Journal article (refereed)	Pant, J. ; Barman, B.K. ; Murshed-E-Jahan, K. ; Belton, B. ; Beveridge, M.	Aquaculture, 418-419: 1-10 [open access]	Can aquaculture benefit the extreme poor? A case study of landless and socially marginalized Adivasi (ethnic) communities in Bangladesh	2013
Journal article (refereed)	Belton, B. ; van Asseldonk, I.J.M. ; Thilsted, S.H.	Food Policy, 44: 77-87	Faltering fisheries and ascendant aquaculture: Implications for food and nutrition security in Bangladesh	2014
Journal article (refereed)	Debnath, P.P. ; Karim, M. ; Kudrat-E-Kabir, Q.A.Z.M.	Science and Technology, 3(1): 1-16 [open access]	Comparative study on growth performance of Bagda (P. monodon, Fabricius, 1798) in traditional and semi-intensive culture systems	2013
Journal article (refereed)	Debnath, P. ; Karim, M. ; Belton, B.	Aquaculture, online first 5 Jan [Open Access]	Comparative study of the reproductive performance and White Spot Syndrome	2014

Publication Type	Author	Source	Title	Pub Date
			Virus (WSSV) status of black tiger shrimp (Penaeus monodon) collected from the Bay of Bengal	
Journal article (refereed)	Karim, M. ; Sarwer, R.H. ; Phillips, M. ; Belton, B.	Aquaculture, 428-429: 61-70	Profitability and adoption of improved shrimp farming technologies in the aquatic agricultural systems of southwestern Bangladesh	2014
Journal article (refereed)	Murshed-E-Jahan, K. ; Belton, B. ; Viswanathan, K.K.	Ocean and Coastal Management, 92: 65-73 [open access]	Communication strategies for managing coastal fisheries conflicts in Bangladesh	2014
Journal article (refereed)	Hossain, M.A. ; Mridha, M.A.R. ; Shah, A.K.M.A. ; Nahiduzzaman, M. ; Uddin, M.S.	Aquaculture Research, online first 6 Dec	Performance of mono-sex tilapia (Oreochromis niloticus) in rice field with different ditch size	2013
Journal article (refereed)	Mridha, M.A.R. ; Hossian, M.A. ; Azad Shah, A.K.M. ; Uddin, M.S. ; Nahiduzzaman, M.	Journal of Applied Aquaculture, 26(1): 60-70	Effects of stocking density on production and economics of all-male tilapia (Oreochromis niloticus) culture in a rain fed rice-fish ecosystem	2014
Magazine Article	Mamun-Ur-Rashid, M. ; Belton, B. ; Phillips, M. ; Karim, M.	World Aquaculture Magazine, 44(4): 23-27	The Current status of aquaculture and aquafeed production in Bangladesh	2013
Report		Dhaka, Bangladesh. 80 pp.	Value chain analysis: shrimp, prawn and tilapia from the southern region of Bangladesh & feasibility analysis: brackish water sea-bass in the southern region in Bangladesh	2012
Report		Community Based Resource Management Project. Dhaka, Bangladesh	Fishing gears diversity in Sunamganj, haor region within CBRMP's working area Introduction to fish species diversity: Sunamganj haor region with CBRMP's working area	2013
Report	Ahmed, T. ; Hasemann, A. ; WorldFish	WorldFish. Penang, Malaysia. Workshop Report: 2013-66		2013
Working paper	Braun, M. ; Saroar, M	Studies & Reviews: 2012-39. WorldFish. Penang, Malaysia	Participatory action research on climate risk management, Bangladesh	2012

Publication Type	Author	Source	Title	Pub Date
Working Paper	Murshed-E-Jahan, K. ; Crissman, C. ; Antle, J.	CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Workshop Report: AAS-2013-02	Economic and social impacts of Integrated Aquaculture-Agriculture technologies in Bangladesh	2013
Working paper		The WorldFish Center, Bangladesh. 48 p.		2013
Working paper		WorldFish. Bangladesh. 72 pp.	Feed the future aquaculture project: October 2011-Sept 2012 Feed the future aquaculture project: Draft quarterly progress report. Jan-March 2013	2012
Working paper		WorldFish. Bangladesh. 46 pp.		2013
Working paper		WorldFish. Bangladesh. 38 pp.		2012
Working Paper	Mamun-Ur-Rashid, M. ; Belton, B. ; Phillips, M. ; Rosentrater, K.A.	WorldFish. Penang, Malaysia. Working Paper: 2013-34	Improving aquaculture feed in Bangladesh: From feed ingredients to farmer profit to safe consumption	2013
Working paper	Islam, A.S. ; Attwood, S. ; Braun, M. ; Kamp, K. ; Aggarwal, P.	WorldFish, Penang, Malaysia. Project Report 2013-35	Assessment of capabilities, needs of communities, opportunities and limitations of weather forecasting for coastal regions of Bangladesh Scoping report: Current status of index-based insurance in Bangladesh	2013
Working paper	Ahmed, T.	WorldFish. Penang, Malaysia. Project Report: 2013-38.		2013
Conference proceedings	Shrestha, M.K. ; Pant, J. (eds.)	Proceedings 2012-15. Institute of Agriculture and Animal Science. Chitwan, Nepal and The WorldFish Center. Penang, Malaysia. 189 p.	Small-scale aquaculture for rural livelihoods: Proceedings of the Symposium on Small-scale aquaculture for increasing resilience of Rural Livelihoods in Nepal. 5-6 Feb 2009. Kathmandu, Nepal	2012
Online Article	Hussain, M.G. ; Barman, B.K. ; Karim, M. ; Keus, E.H.J.	The Fish Site	Progress and the future for tilapia farming and seed production in Bangladesh	2014

Source: Provided by AAS Bangladesh Team

D.4 Solomon Islands

Time of country visit:	November 2014
Evaluation team members:	James Sumberg

D.4.1. Overview of AAS activities

"WorldFish (previously called ICLARM) has been present in Solomon Islands since 1986 and has worked with a wide range of communities in different provinces, together with the Solomon Islands Government (Ministry of Fisheries and Marine Resources and Ministry of Environment, Climate Change, Disaster Management and Meteorology) and other institutions. Research projects have covered a diverse range of topics, ranging from community-based fisheries management and climate change planning, to mariculture (giant clams, post larval fish and invertebrates and corals), and aquaculture (pearls, sponges and pond aquaculture). Since 1991, WorldFish has worked in Western Province either directly with communities or through partnerships with organizations that include: WWF, Roviana Conservation Foundation and the University of Queensland. The primary focus over the last five years has been on Vella Lavella, Shortland Islands and Gizo Island."[21]

During the country's ethnic tensions of 1999-2002 when law and order broke down and the Honiara research station was lost to fire and looting, the Western Province office of ICLARM, was retained with a skeleton staff, but no research projects. Following the restoration of peace through a Pacific regional force led by Australia; WorldFish research activities began again in 2005 when Australian and New Zealand donors re-engaged. National university graduate staff began to be employed from 2006. In 2012 WorldFish established an additional office in Malaita Province, co-incident with the scoping phase of the AAS Program and the implementation of two ACIAR funded projects (land based aquaculture and community based fisheries management) with activities in Malaita Province. All AAS staff in the Hub have been recruited since that time. WorldFish also has an office in the capital Honiara from which national government relationships and national partner networks are managed and where the Country Manager, Accountant, Business manager and AAS Country Program Leader are based. The Honiara office supports the Hub offices with supplies and services.

AAS activities were initiated in SI in August 2011. The roll-out process started in Malaita Hub in January 2013 and in Western Hub in September 2013 (Table D-14).

Table D-14: SOL - Timeline of key AAS events

Date	Event
July '11	CRP AAS begins operation
Aug-Dec '11	SI AAS planning phase
Jan-Jun '12	Scoping phase for Malaita hub
Feb '12	Malaita Hub Scoping visit
04-06 Jun '12	Malaita Stakeholder Consultation Workshop

[21] Bennett, G., Cohen, P., Schwarz, A.M., Rafe, M., Teioli, H., Andrew, N. (2014). Solomon Islands: Western Hub scoping report. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2014-14. (p.9)

04-06 Sep '12	Malaita Community Consultation Workshop
09-12 Nov '12	Malaita Hub Program Design Workshop
Sep '13	Western Hub Scoping visit (one week)
11-12 Nov '13	Western Hub Stakeholder Consultation Workshop
09-10 Oct '14	Western Hub Program Design Workshop

At the time of the evaluation visit six bilateral research projects were being implemented by the WF team in SI (Table D-15).

It is important that this report is read with the understanding that there have been 24 months of post-design workshop activity in the Malaita Hub, while the design workshop in the Western Hob took place only one month previous to the evaluation visit.

Table D-15: SOL - Major bilateral projects associated with AAS

Research Theme	Project Title	Budget (USD x 1,000	Funder	Start date	End date
Productivity, Income and Nutrition	Developing inland aquaculture in Solomon Islands (SL3756ACI)	0.279	ACIAR	1-Oct-11	30-Sep-15
Global & Regional Scaling	Pacific fisheries (BU10275-278)	1.37	ACIAR	1-Jul-13	30-Jun-17
Governance	Scaling out community based marine resource governance in Solomon Islands, Kiribati and Vanuatu (SL3766ACI)	0.324	ACIAR	17-Jun-11	16-Jun-15
Natural resource management, governance and resilience	ADB TA No 7753-REG: Strengthening Coastal and Marine Resources Management in the Coral Triangle of the Pacific (Phase 2) Integrated Coastal Management in Malaita Province	0.297	ADB	9-May-13	31-Oct-15
CC adaptation	Implementation of Community Based Marine and Coastal Resource Management in Western Province, Solomon Islands	0.235	Australian Governmen t (DSEWPAC)	4-Nov-13	31-Nov-14
Governance and Resilience	Ecosystem Approach to tropical fisheries management		EU	21-Dec-11	28-Dec-14

D.4.2. Overview of evaluation team visit

The evaluation visit on which this report is based was undertaken by James Sumberg, AAS Evaluation Co-Leader, between Monday 10 November and Tuesday 18 November, 2014. The visit included a total of 45 interviews with WorldFish staff, partners, community members and others in Honiara, Auki (Malaita Provence) and Gizo (Western Provence) (Table D-16). A detailed schedule of the visit is given in the Annex.

Table D-16: SOL - Individuals interviewed during evaluation visit

	Gender		Type of interview			
Category	Male	Female	Individual	Group	I+G	Total
WF Staff	9	6	3	10	2	15
Partners	8	2	0	9	1	10
Community members	10	5	0	15	0	15
Others	5	0	3	2	0	5
Total	32	13	6	36	3	45

While this report is informed by a reading of documentation produced by AAS in SI, and by AS documents more generally, it primarily reflects what was seen, heard and learned during the visit.

Because of the general election planned for the day after the last day of the visit it was not thought wise to travel to the village clusters in North Malaita. As an alternate, six individuals from these villages were brought to Auki where I was able to interview them. This was obviously not ideal, but it was the best that was possible under the circumstances.

Individuals were interviewed in individual or group settings. In both cases an effort was made to contextualise each individual's involvement in or engagement with AAS. As appropriate, and particularly with staff and partners, some considerable emphasis was placed on exploring key AAS terms and concepts, including theory of change, participatory action research, "gender transformative approach" and benchmarking. Notes were taken during these discussions and transcribed immediately afterwards.

D.4.3. Findings

Staff

Of a total staff compliment of 36 individuals employed by WF in SI, 35 are classed as Scientist, Research Analysis (RA) or Technical Aid and are considered to make a direct contribution to the research programme. From these individuals a total of approximately 23.6 FTE are devoted to research. The distribution of this research effort by degree level and place of posting is shown in Table D-17. Of the eight PhD level staff members who contribute to the research effort, two are from the SI, and five others are based in Australia. Indeed 63.8% of PhD FTE researchers are based in Australia.

Table D-17: SOL - Distribution of FTE research effort by base and degree level

	FTE research effort				
Place of posting	PhD	Masters	UG or High School	Total	%
Honiara	1.3	2.5	2.1	5.9	24.9
Auki (Malaita Prov.)	0.0	0.0	6.8	6.8	28.7
Gizo (Western Prov.)	0.8	0.0	6.5	7.3	30.8
Australia	3.7	0.0	0.0	3.7	15.6
Total	5.8	2.5	15.4	23.7	100
%	24.5	10.5	65.0	100	

➢ Key observations

- Approximately 65% of the research effort is funded by bilateral projets

- 65% of the research FTE are at UG degree level or less
- There would appear to be a significant "missing middle" of masters-level staff
- No research staff with a degree higher than UG is based in Auki (Malaita Hub)
- The educational background of the Research Analysts are heavily oriented toward marine science: on the nine RA who were interviewed, six did UG studies in marine science, marine affairs, marine resources or fisheries, one studied natural resources, and two studied sociology. None of the RAs interviewed had a background in agriculture.
- The programme director reports that they have difficulty recruiting international scientific staff to be based in Honiara, to say nothing of the hubs.

The distribution of research effort across the research themes is very uneven, ranging from nearly 14 FTE for natural resource management and resilience to 1.8 FTE for gender (Figure D-7). The PhD level FTE is also very unevenly distributed across the themes: while 80% of the research FTE devoted to governance is at PhD level, only 10% and 12% of research FTE devoted to KSL and gender respectively is at this level (Figure D-8).

Figure D-7: SOL - Distribution of research effort by theme and degree level (FTE)

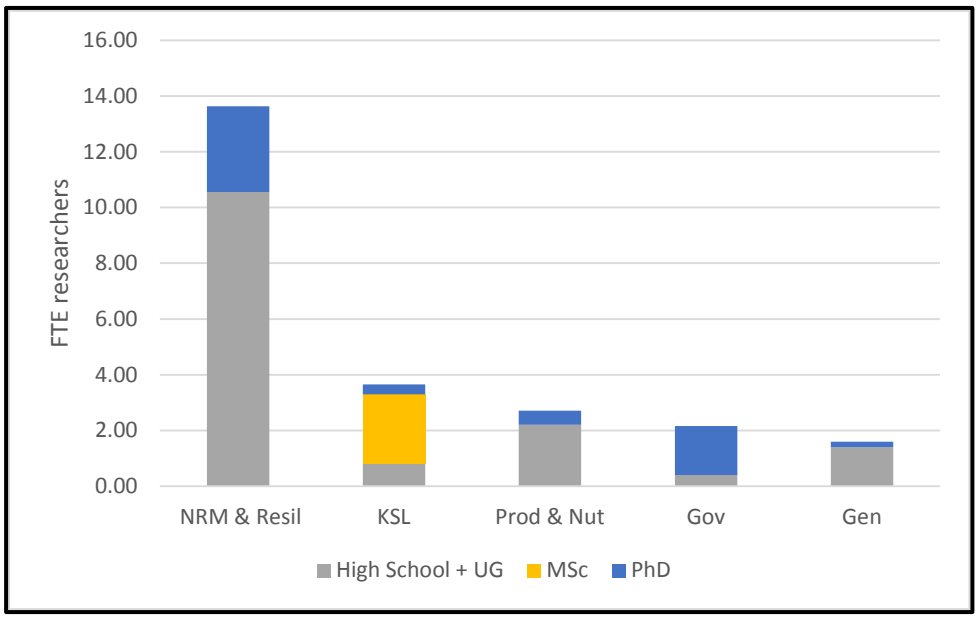
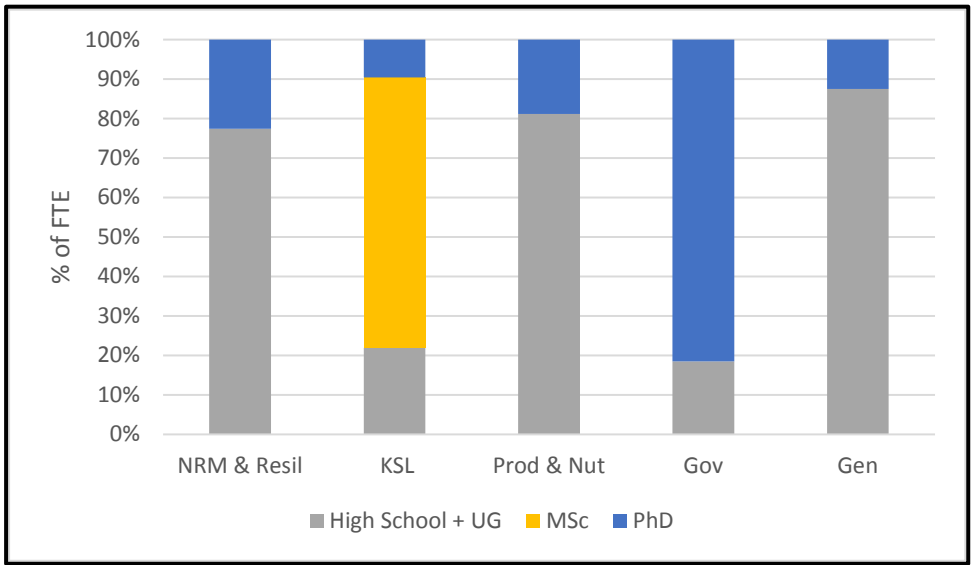


Figure D-8: SOL - Proportion of research FTE by degree level and theme.



➢ Key observations

- Especially when it is considered that the research is spread over two geographically separate hubs, the research effort appears to be highly fragmented, with three of the five themes benefiting from limited research effort overall, and only minute amounts of PhD level input.

Process of implementation

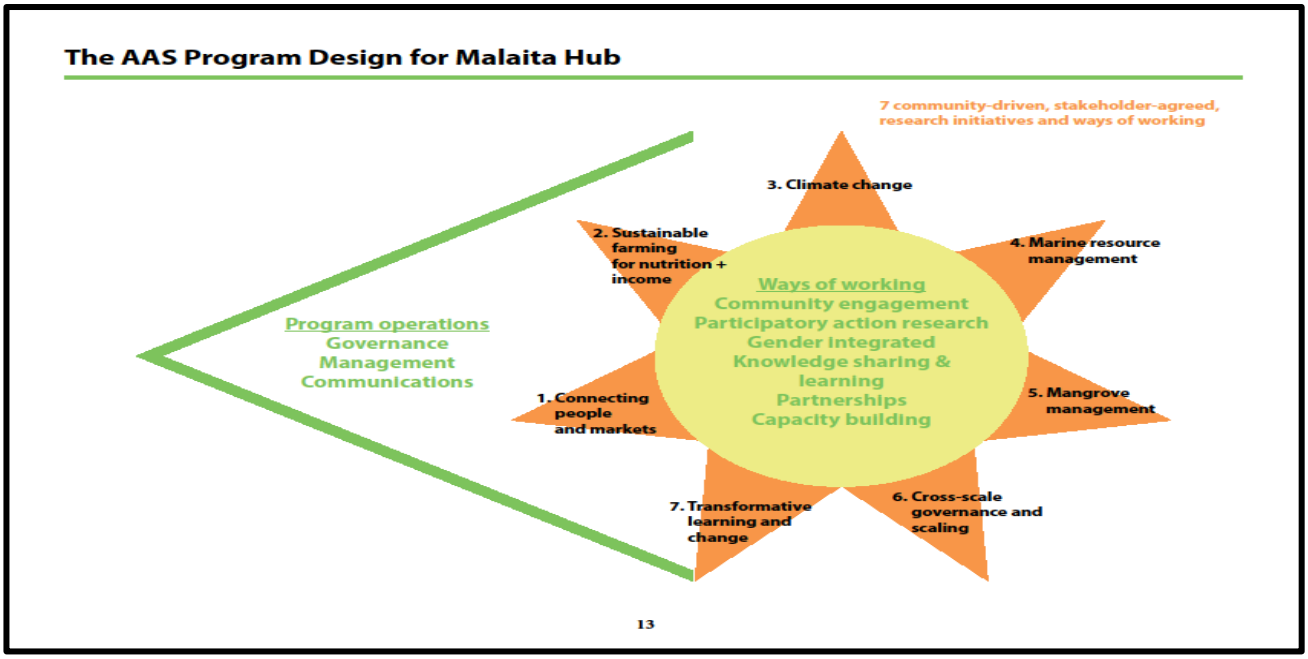
All the evidence suggests that the process of implementation (roll-out) occurred as specified in the AAS Program Rollout Handbook. This included a scoping phase, stakeholder and community consultation exercises and a design workshop. This series of activities resulted in the identification of a "development challenge" for each hub, as well as various "action plans". The "programme design" for the Malaita Hub is depicted in Figure D-9.

Box D-3: SOL – Development challenges for Malaita and Western Hub

Malaita Hub: "to improve their lives through more productive, diversified livelihoods that empower communities to be better able to adapt to change and make more effective use of their resources"

Western Hub: "to improve the lives of people in Western Province by empowering communities to increase the benefits they derive from their natural resources, while accounting for the diversity and variability in the way they lead their lives and access resources and services"

Figure D-9: SOL – Program design for Malaita Hub



Since completing the scoping and design exercise for Malaita Hub, activities linked to the agreed action plans have been carried out and are being monitored by AAS staff. In addition, some benchmarking activities have been carried out and research and other activities linked to the bilateral projects continue to be implemented.

Partnerships

One of the defining conditions of the AAS programme in the SI is the lack of local research capacity in fisheries, agriculture or social sciences in the government or university sectors. Because of this the programme has few if any local research-based partnerships. A partnership has been established with the Asian Vegetable Research and Development Centre's (AVRDC) programme in SI, which has one PhD-level staff member.

As an alternative, and as a way around the difficulty in recruiting senior research staff to be based in the SI, the programme has established a number of research partnerships with organisations and individuals based outside SI. The strong link with James Cook University (JCU) in perhaps the best example. Individuals involved in these arrangements spend some time in the SI: the one JCU-based researchers reported spending 5-6 of the previous 18 months in SI.

On the other hand the programme has established partnerships with a number of NGO and other development-oriented organisations. The Malaita Provence Partners for Development (MPPD) network is an interesting example. The network's members include Malaita Prov. Women's Development Officer, World Vision, the Malaita Chazon Development Authority, WorldFish and a handful of others. In Western Province the links with Natural Resources Development Foundation (NRDF) appears to be well established (one of the key members of NRDF is the chief of Leona village in which AAS is active and where I visited).

Faced with a lack of capacity (internal and amongst partners) in areas like agriculture the programme is using another type of partnership. In one example a particularly enthusiastic individual from one of the hub communities is being used to demonstrate alternative agricultural techniques, particularly in relation to watermelon cultivation (both he and the programme refer to this as "organic" farming, but it has little relation to what would commonly be understood by this term). This individual is also a “lead farmer” in the network of the well-established national NGO Kastom Garden Association (KGA).

While not necessarily to be considered under partnerships, the programme's links with government at the national and provincial levels appear to be very positive.

A list of all partners that were met is provided in Annex H of the evaluation report.

Gender transformative approach

With the exception of the RA designated as a member of the CRP AAS "gender team", in discussion with AAS SI staff and partners there was little evidence of more than the most superficial engagement with or understanding of the notion of the gender transformative approach. Most often this was interpreted as meaning "better balancing" between men and women, being inclusive, and give women voice in public meetings. During a group discussion with RAs I was told that GTA "is about getting a better balance… getting their views", but also "changing the normal ways of doing things". One of the RAs who had studied sociology mentioned "norms" but then quickly shifted to talking about "changing who does what, how people participate in activities".

Research

During the course of the interviews, discussions and field visits I heard of or saw evidence of two main types of on-going empirical research. The first was research relating to aquaculture, and specifically (a) a tilapia feeding trial being undertaken at the WF experiment station Western Provence and (b) an on-farm trial that includes 44 fish ponds in the vicinity of Zion village in Malaita. This trial involved different feeding practices and farmer-kept records, and is funded through the ACIAR bilateral project "Developing Inland Aquaculture in Solomon Islands". The second area of empirical research was the work around community-based resource management (CBRM) and resource governance in Western Province under the guise of the ACIAR bilateral project "Pacific Fisheries".

In addition to this empirical research, AAS staff have produced a number of reviews and other outputs based on secondary sources (also see Outputs section below).

In recent months, and in response to requests from AAS management, the SI team has produced and has had approved a number of preliminary protocols for research "initiatives", each of which presents a series of research questions (Box D-4). The idea is that these questions will be reviewed in the coming months as the various initiative protocols are finalised.

Box D-4: SOL - AAS research questions

Gender [Transformative Learning and Change]

Initiative Research Question 1: What is the evidence for the AAS approach influencing the enabling and the material IDO's, and how are these interacting at the community level?

Initiative Research Question 2: What is it about the AAS approach in Solomon Islands and the Pacific regions that is moving us along the scaling pathways?

Nutrition [Sustainable Farming and Nutrition]

Initiative Research Question 1: How can fixed gardening (non-slash and burn) and integrated (fish, livestock and vegetables) farming practices be improved through new technologies to provide sustainable and equitable increases in productivity and income for men, women and children?

Initiative Research Question 2: How can gender and socially equitable approaches foster the uptake of improved agricultural technologies, resulting in improved dietary diversity?

Initiative Research Question 3: What factors, processes and relationships foster the spread of successful innovations for fixed gardens and integrated farming amongst farmers within hubs and nationally?

Natural Resource Management

Initiative Research Question 1: What resource management models contribute towards IDOs (e.g., future options, income, and productivity), and how?

Initiative Research Question 2: What are the social, cultural, and gendered dimensions of resource use, decision making about resource management and the outcomes of various resource management models? How has the AAS approach affected or interacted with these dimensions?

Initiative Research Question 3: What factors, processes and relationships (including elements of the AAS approach to scaling) foster the uptake and spread of RinD informed resource management within hubs, nationally and regionally?

Cross scale governance and scaling

Initiative Research Question 1: What modes of governance (self-governance, co-governance, hierarchical governance, hybrids) are locally accepted and affecting favourable change across scales?

Initiative Research Question 2: How has the AAS approach built governance capacity and enabling conditions in the hub, nation and region to improve the lives of poor and marginalized in AAS? How are these outcomes different from those observed in programs that don't explicitly address institutional and governance challenges?

Initiative Research Question 3: How have innovations been spread most effectively to improve the lives of the poor and marginalised in AAS, within hubs, nationally and regionally?

➢ Key observations

- While there is clearly some important empirical research underway – and in the case of the CBRM and governance, this is quite substantial – during this visit the research dimension of the

CRP was often difficult to discern.

- While aspects of participatory research are evident, it would appear that little of the empirical research draws from or engages with the suite of methodological elements that would normally be associated with action research or participatory action research.
- In discussions with staff and partners there was little sign of anything more than a superficial understanding of the logic for or methodological elements that would normally be associated with action research or participatory action research.
- The research questions associated with the recently approved initiatives may need to be revisited / significantly refined before they can provide a useful basis for empirical research.

With a significant proportion of the PhD level research FTE based outside SI, and the research staff heavily weighted toward Research Analysts with little if any formal research training, the creation of dynamic and supportive research culture is a difficult but important task. Some steps have been taken – e.g. the organisation last April of a discussion day around a number of CBRM research papers. Staff spoke enthusiastically of this experience.

➢ Key observations

- Given the general lack of research capacity in both the SI and the AAS team, a much more explicit and intensive capacity building strategy focused on WF staff would seem to be appropriate.
- It will be critical that this is seen as a key part of every scientist's job, and not an optional add-on; the incentive structure must point firmly in this direction.

Outputs

The AAS programme in the SI has produced a wide variety of outputs including situation analyses, reviews, scoping reports, design documents, working papers, briefs, and refereed papers. In the Annex outputs available through the AAS website are grouped into those that appear to relate directly to or derive from hub roll-out activities and others. Other outputs relating to roll-out activities, including various hub consultation and workshop reports, were also made available.

➢ Key observations

- The roll-out activities have been well documented.
- The program is very successful in placing its work in highly regarded, international, refereed journals.
- To date it would appear that relatively little of the work published in these international, refereed journals is based on or engages with participatory action research or the AAS RinD approach more broadly.

Management

The organigram depicting reporting lines within the SI AAS programme and between the SI programme and other parts of AAS and WF is anything but simple. Specifically:

- The researchers based in Australia, even those who work solely or primarily on AAS, report to the WF Regional Manager (also based in Australia) and not the SI-based AAS Programme Leader.
- Within SI there is a Country Manager (to whom a Sen. Research Analyst and a Research Analyst working on AAS report) and an AAS Programme Leader (to whom all other SI-based research staff report). There is little if any non-AAS activity within the SI.
- Both the Country Manager and the AAS Programme Leader report to the WF Regional Manager (i.e. the SI AAS Programme Leader does not report directly to the AAS Director).

D.4.4. Overall assessment

- The AAS programme in SI is severely constrained by a lack of trained research capacity.
- The roll out process in the Malaita and Western Hubs appears to have proceeded in accordance with the AAS Rollout Manual.
- Out of necessity the programme is exploring some innovative partnership models.
- Knowledge / awareness of some key AAS terms and concepts among staff and partners is limited.
- There would appear to be significant gaps between the “big ideas” and ambitions of AAS as a CRP, and the realities of implementation in the SI hubs.
- In order to create a dynamic research culture there is much more that could / should be done to build the capacity of AAS research staff to engage in research in more critical and informed ways (e.g. starting with some critical engagement with central AAS terms and concepts; how to search for, access and analyse research literature; and how to develop an argument etc).
- The on-going empirical research appears to have few links to the AAS RinD approach.
- It is not altogether evident what aspect(s) of the work in SI, specifically in terms of participatory research methodologies, is particularly new or innovative.
- Some parts of the programme have an excellent record of placing research in highly regarded, international referred journals.
- Nevertheless, it is not obvious if or how this work does or will contribute to the big AAS international public goods prize (i.e. of developing and demonstrating a new model of agricultural research).

D.4.5. Annexes for case study

Table D-18: SOL - Schedule of visit,

Date	Activity
Monday, 10 Nov	Arrive Honiara, Logistics briefing with Anna Individual interviews with Honiara based staff Travel buy ship to Auki in Malaita Province
Tuesday, 11 Nov	Group discussions with six community members from Northern Malaita Hub Group discussion with seven Malaita hub staff
Wednesday, 12 Nov	Visit by boat to Oibola village and walk around the surroundings Group discussion with four members of the Malaita Provence Partners for Development (MPPD) network
Thursday, 13 Nov	Travel to fast ferry Honiara Group discussion with representative from Ministry of Agriculture, Ministry of Development Planning and AVRDC Individual interview with Perm Secretary of Ministry of Fisheries and Marine Resources
Friday, 14 Nov	Travel by air to Gizo, Western Province Group discussion with four hub staff Group discussion with three staff of Natural Resources Development Foundation (NRDF) Individual interview with Western Provence Fisheries Officer
Saturday, 15 Nov	Travel by boat to Leona village Group discussion with five members of community Walk around the village
Sunday, 16 Nov	Individual discussion with staff Travel by air to Honiara
Monday, 17 Nov	Discussion with Anna Debrief session with AAS staff
Tuesday, 18 Nov	Depart Honiara for Siem Reap, Cambodia

Outputs directly relating to or derived from AAS roll-out activities

Research Program on Aquatic Agricultural Systems: Program summary: Solomon Islands. Schwarz, A.M. (2012). CGIAR Research Program on Aquatic Agricultural Systems. The WorldFish Center, Solomon Islands. AAS-2012-08. (Publication Type: Brochure}

Transforming aquatic agricultural systems towards gender equality: a five country review. Weeratunge, N.; Chiuta, T.M.; Choudhury, A.; Ferrer, A.; Hüsken, S.M.C.; Kura, Y.; Kusakabe, K.; Madzudzo, E.;Maetala, R.; Naved, R.; Schwarz, A.; Kantor, P. (2012).

CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Working Paper: AAS-2012-21. (Publication Type: Working Paper)

Solomon Islands Aquatic Agricultural Systems program design document.

Schwarz, A.M.; Boso, D. (2013). CGIAR Research Program on Aquatic Agricultural Systems. Solomon Islands. (Publication Type: Program brief)

Solomon Islands national situation analysis. Govan, H.; Schwarz, A.M.; Harohau, D.; Oeta, J. (2013). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2013-16. (Publication Type: Working paper)

Solomon Islands: Malaita Hub scoping report. Schwarz, A.M.; Andrew, N.; Govan, H.; Harohau, D.; Oeta, J. (2013). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2013-18. (Publication Type: Working paper)

Solomon Islands: Essential aspects of governance for Aquatic Agricultural Systems in Malaita Hub. Govan, H.; Schwarz, A.M.; Harohau, D.; Oeta, J.; Orirana, G.; Ratner, B.D. (2013). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2013-19. (Publication Type: Working paper)

Food and nutrition security in Solomon Islands. Andersen, A.B.; Thilsted, S.H.; Schwarz, A.M. (2013). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Working Paper: AAS-2013-06. (Publication Type: Working Paper)

Learning from implementation of community selection in Zambia, Solomon Islands, and Bangladesh AAS hubs. CGIAR Research Program on Aquatic Agricultural Systems. (2013). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Evaluation and Learning Series Paper: AAS-2013-24. (Publication Type: Program brief)

Livelihoods, markets, and gender roles in Solomon Islands: case studies from Western and Isabel Provinces. Kruijssen, F.; Albert, J.A.; Morgan, M.; Boso, D.; Siota, F.; Sibiti, S.; Schwarz, A.J. (2013). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2013-22. (Publication Type: Working paper)

Solomon Islands: Western Province situation analysis. Bennett, G.; Cohen, P.; Schwarz, A.M.; Albert, J.; Lawless, S.; Paul, C.; Hilly, Z. (2014). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2014-15. (Publication Type: Working paper)

Solomon Islands: Western Hub scoping report. Bennett, G.; Cohen, P.; Schwarz, A.M.; Rafe, M.; Teioli, H.; Andrew, N. (2014). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2014-14. (Publication Type: Working paper)

Foods and diets of communities involved in inland aquaculture in Malaita Province, Solomon Islands. Jones, C.; Schwarz, A.M.; Sulu, R.; Tikai, P. (2014). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Program Report: AAS-2014-30. (Publication Type: Program report)

Other outputs (this is not necessarily a complete listing)

Strengthening governance across scales in aquatic agricultural systems.

Ratner, B.D.; Barman, B.; Cohen, P.; Mam, K.; Nagoli, J.; Allison, E.H. (2012). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Working Paper. AAS-2012-10. (Publication Type: Working Paper)

Building social and ecological resilience to climate change in Roviana, Solomon Islands: PASAP country activity for Solomon Islands: Brief review: climate change trends and projections for Solomon Islands. Brokovich, E.; Schwarz, A.M.; Oeta, J. (2012). WorldFish. Penang, Malaysia. pp. 23. (Publication Type: Report)

Assessing adaptation options for climate change: A guide for coastal communities in the Coral Triangle of the Pacific. 1. Assessment process. WorldFish. (2013). Asian Development Bank; Global Environment Facility. (Publication Type: Brochure)

Assessing adaptation options for climate change: A guide for coastal communities in the Coral Triangle of the Pacific. 2. Climate analysis. WorldFish. (2013). Asian Development Bank; Global Environment Facility. (Publication Type: Brochure)

Assessing adaptation options for climate change: A guide for coastal communities in the Coral Triangle of the Pacific. 3. Impact and adaptation assessment workshop. WorldFish. (2013). Asian Development Bank; Global Environment Facility. (Publication Type: Brochure)

Assessing adaptation options for climate change: A guide for coastal communities in the Coral Triangle of the Pacific. 4. Decision-tree and partial cost-benefit analyses. WoldFish. (2013). Asian Development Bank; Global Environment Facility.

(Publication Type: Brochure)

Assessing adaptation options for climate change: A guide for coastal communities in the Coral Triangle of the Pacific. 5. Social network analysis. WorldFish. (2013). Asian Development Bank; Global Environment Facility. (Publication Type: Brochure)

Assessing adaptation options for climate change: A guide for coastal communities in the Coral Triangle of the Pacific. 6. Landscape function analysis. WorldFish. (2013). Asian Development Bank; Global Environment Facility. (Publication Type: Brochure)

Catch rates, composition and fish size from reefs managed with periodically-harvested closures. Cohen, P.J.; Alexander, T.J. (2013). PLoS ONE, 8(9):e73383 [open access] (Publication Type: Primary Science Publication Journal article (refereed))

Community-based marine resource management in Solomon Islands: A facilitators guide. Based on lessons from implementing CBRM with rural coastal communities in Solomon Islands (2005-2013). WorldFish. (2013). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Manual: AAS-2013-17. (Publication Type: Manual)

Cost-effective methods for accurate determination of sea level rise vulnerability: A Solomon Islands example. Albert, S.; Abernethy, K.; Gibbes, B.; Grinham, A.; Tooler, N.; Aswani, S. (2013). Weather Climate and Society, 5(4): 285-292 [open access]

(**Publication Type: Primary Science Publication Journal article (refereed))**

Fishing dynamics associated with periodically harvested marine closures. Cohen, P.J.; Cinner, J.E.; Foale, S. (2013). Global Environmental Change, 23(6): 1702-1713 [open access] (Publication Type: Primary Science Publication Journal article (refereed))

Food security versus environment conservation: A case study of Solomon Islands' small-scale fisheries. Hardy, P.Y.; Béné, C.; Doyen, L.; Schwarz, A.M. (2013). Environmental Development, 8: 38-56. (Publication Type: Primary Science Publication Journal article (refereed))

Governance of aquatic agricultural systems: Analyzing representation, power, and accountability. Ratner, B.D.; Cohen, P.; Barman, B.; Mam, K.; Nagoli, J.; Allison, E.H. (2013). Ecology and Society, 18(4): 59 [open access] (Publication Type: Primary Science Publication Journal article (refereed))

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

Keeping Solomon Islands' Mangroves healthy. CGIAR Research Program on Aquatic Agricultural Systems. (2013). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Brochure AAS-2013-09. (Publication Type: Brochure)

Mangrove management in Solomon Islands: Case studies from Malaita Province.

Albert, J.A.; Schwarz, A.M. (2013). CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Policy Brief: AAS-2013-14. (Publication Type: Policy Brief)

How to construct and maintain ponds for fish farming. Research Program on Aquatic Agricultural Systems. (2013). Research Program on Aquatic Agricultural Systems. AAS-2013-21. Penang, Malaysia. (Publication Type: Fact sheet)

Milkfish (Chanos chanos) farming in Solomon Islands. Research Program on Aquatic Agricultural Systems. (2013). Research Program on Aquatic Agricultural Systems. AAS-2013-20. Penang, Malaysia. (Publication Type: Fact sheet)

Tilapia farming in Solomon Islands. CGIAR Research Program on Aquatic Agricultural Systems. (2013). Penang, Malaysia. AAS-2013-07. (Publication Type: Poster)

Lessons from implementing, adapting and sustaining community-based adaptive marine resource management. Cohen, P.; Schwarz, A.M.; Boso, D.; Hilly, Z. (2014).

CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Lessons Learned Brief: AAS-2014-16. (Publication Type: Program brief)

Locally-managed marine areas: multiple objectives and diverse strategies. Jupiter, S.D.; Cohen, P.J.; Weeks, R.; Tawake, A.; Govan, H. (2014). Pacific Conservation Biology, 20(2): 165-179 [open access] (Publication Type: Primary Science Publication Journal article (Refereed))

Marine Protected Areas in the Coral Triangle: Progress, Issues, and Option. White, A.T.; Aliño, P.M.; Cros, A.; Fatan, N.A.; Green, A.L.; Teoh, S.J.; Laroya, L.; Peterson, N.; Tan, S.; Tighe, S.; Venegas-Li, R.; Walton, A.; Wen, W. (2014). Coastal Management, 42(2): 87-106. (Publication Type: Primary Science Publication Journal article (refereed))

The socio-economic context for improving food security through land based aquaculture in Solomon Islands: A peri-urban case study. Cleasby, N.; Schwarz, A.M.; Phillips, M.; Paul, C.; Pant, J.; Oeta, J.; Pickering, T.; Meloty, A.; Laumani, M.; Korr, M. (2014) . Marine Policy, 45: 89–97. (Publication Type: Primary Science Publication Journal article (refereed))

Two steps forward, two steps back: The role of innovation in transforming towards community-based marine resource management in Solomon Islands. Abernethy, K.E.; Bodin, Ö.; Olsson, P.; Hilly, Z.; Schwarz, A. (2014). Global Environmental Change, 28: 309-321 [open access] (Publication Type: Primary Science Publication Journal article (Refereed))

D.5 Cambodia

Time of country visit: November 2014

Ram Bhujel, and James Sumberg, with Sophie Zimm

D.5.1. Overview of AAS activities

WorldFish / ICLARM have been active in Cambodia and the Tonle Sap ecosystem since the mid-1990s. Within the AAS, Tonle Sap is considered part of the Asian Mega Deltas aquatic agricultural system.

Tonle Sap is a second generation hub, with activities being initiated in January 2013. To date the activities undertaken closely reflect the sequence set out in the AAS Program Rollout Handbook (Table D-19).

Table D-19: CAM - Timeline of key AAS events

Date	Event
July '11	CRP AAS begins operation
Jan '13	Tonle Sap Hub roll out planning begins
28 Apr – 04 May '13	Tonle Sap Scoping mission
Jun '13	Stakeholder consultation workshop
Aug – Oct '13	Community Life Competence Process
Feb '14	PAR and diagnostic research planning
Mar '14	PAR training workshop
Apr – May '14	Review of Action Plans in each village
May '14	Training of Trainers workshop
May '14	Publication of AAS national situation analysis
Oct – Nov '14	Benchmarking
Nov '14	Theory of Change workshop

At the time of the evaluation visit there were five active bilateral projects "mapped" to AAS (Table D-20), although only two of these involves a significant budget for 2014. The Rice Field Fisheries Improvement Project has been studied in more detail as one of the bilateral project cases.

Table D-20: CAM - Bilateral projects in Cambodia and 2014 budgets in USD

Title	Donor	Start Date	End Date	Yearly Budget	Location
Rice field fisheries improvement project	USAID	18-Apr-12	17-Apr-16	609,083	Tonle Sap
Assessing economic and welfare values of fish in the Lower Mekong Basin	ACIAR	1-Dec-11	1-Dec-15	328,891	Mekong
EU Support to the Cambodia National Strategic Development Plan Promotion of equitable in the Agricultural Sector SPSP for MAFF, Fisheries and Livestock Sub-sectors	EC	19-May-14	19-May-18	32,500	National
Homestead Food Productions	IDRC	19-Jun-12	31-Aug-14	66,410	Mekong
Japan Mekong Fund 2013 (for period Apr 2013-Mar 2014)	Japan	1-Apr-13	31-Mar-14	64,422	Mekong

Source: AAS project database.

D.5.2. Overview of evaluation team visit

The evaluation visit on which this report is based was undertaken by Ram Bhujel and James Sumberg between 18 and 23 November 2014. Throughout the visit the evaluation team was assisted by Sophie Zimm, Evaluation Analyst at the CGIAR Independent Evaluation Arrangement.

The visit included 30 interviews with WorldFish staff, partners and community facilitators (Table D-21) and discussions with community members in Santey, Muk Wat and Peam Ta Ou villages (which are classified as land-based, land and water-based and water-based villages respectively). A detailed schedule of the visit is given in the Annex.

Table D-21: CAM - Categorisation of individuals interviewed during evaluation visit

	Gender		
Category	Female	Male	Total
AAS Cambodia Management	0	1	1
AAS Research Staff	2	1	3
Partners	1	11	12
Community facilitators	4	2	6
AAS Cambodia Admin staff	2	3	5
WF Cambodia Management	0	1	1
AAS HQ staff	2	0	2
Total	11	19	30
%	36.7%	63.3%	100%

The vast majority of interviews with staff and partners were on a one-to-one or two-to-one basis (i.e. one or two evaluation team members per interviewee). The team took advantage of the AAS Theory of Change workshop (18-20 November at Siem Reap) to meet with a wider range of staff and partners than would have otherwise been possible. Notes were taken of each interview and subsequently transcribed. For the village visits the team was accompanied by one or more village facilitators and two translators (one a professional, the other a member of the AAS administrative staff).

It is important to note that this report is not meant to provide a complete or exhaustive assessment of all of the activities of AAS in Cambodia since January 2013. Rather, it is the record of a relatively short visit. We interacted with some staff and some partners, and made short visits to only three villages. What we learned along the way, as highlighted in this report, will be one of many inputs into the AAS evaluation.

D.5.3. Findings

Staff

AAS management in Cambodia considers that 16 staff members and one NGO staff contribute directly to the research activities, giving an estimated total of 10.5 full-time equivalent (FTE) devoted to research. Twenty percent of the total research effort is by staff at Scientist or Senior Scientist grade (Table D-22); 80% of the total research effort is by staff educated to Masters level (Table D-23). Three of the Scientist/Senior Scientist staff were internationally recruited, one was recruited locally.

Table D-22: CAM - Distribution of FTE research effort by job title

Job title	Research FTE	%
Senior Scientist	0.19	2%
Scientist	1.90	18%
Research Fellow	0.13	1%
Research Officer	2.90	28%
Research Analyst	3.45	33%
Corporate	0.93	9%
NGO	1.00	10%
Total	10.48	100%

Table D-23: CAM - Distribution of FTE research effort by degree level

Education	Research FTE	%
PhD	2.08	20%
MSc / MA	8.40	80%
BSc / BA	0.00	0%
Total	10.48	100%

Annual research effort by these staff is distributed across the AAS research themes as shown in Figure D-10: no theme receives more than four FTE of effort and two themes (Governance and Markets) receive less than one FTE. As shown in Figure D-11, PhD level research inputs as a proportion of total research effort varies across the themes. More than 50% of the FTE devoted to Governance and Markets is at PhD level, while none of the research effort devoted to the Resilience theme is at PhD level.

Figure D-10: CAM - Distribution of research effort by theme and degree level (FTE)

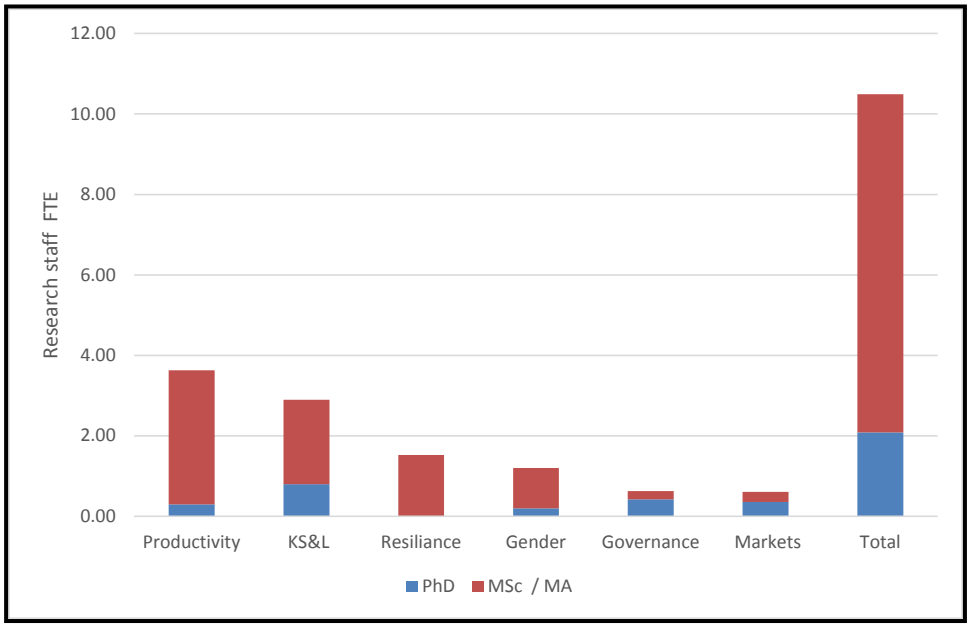
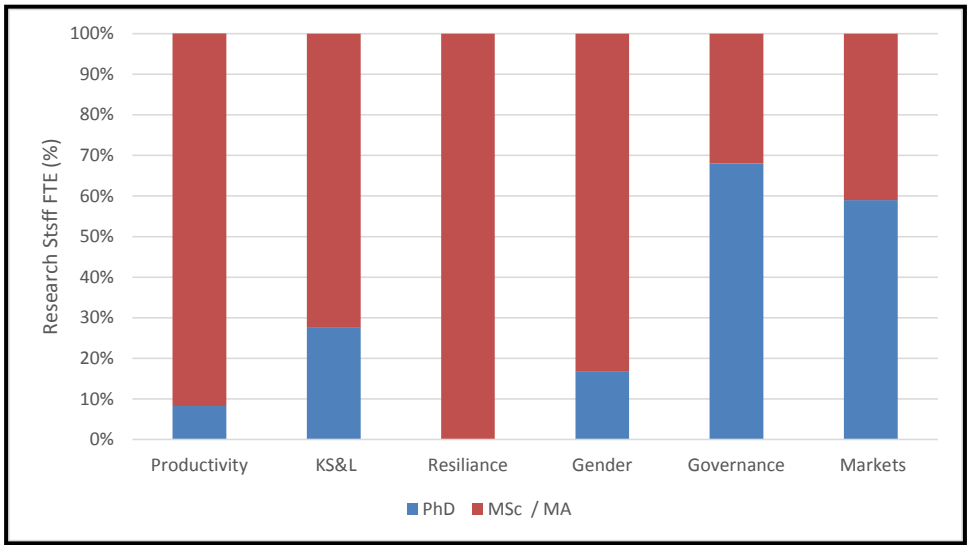


Figure D-11: CAM - Proportion of research FTE by degree level and theme



➢ Key observations

- The research effort would appear to be fragmented, with four themes receiving less than two FTE of total effort
- Some themes have no Cambodia-based PhD level input
- If the total research FTE cannot be significantly increased, perhaps a more stringent prioritisation is required so that research resources are concentrated in a limited number of key themes.

Process of implementation

Starting with a planning phase in January 2013, rollout activities have generally proceeded as set out in the AAS Rollout Manual. A situation analysis and scoping report have been published.

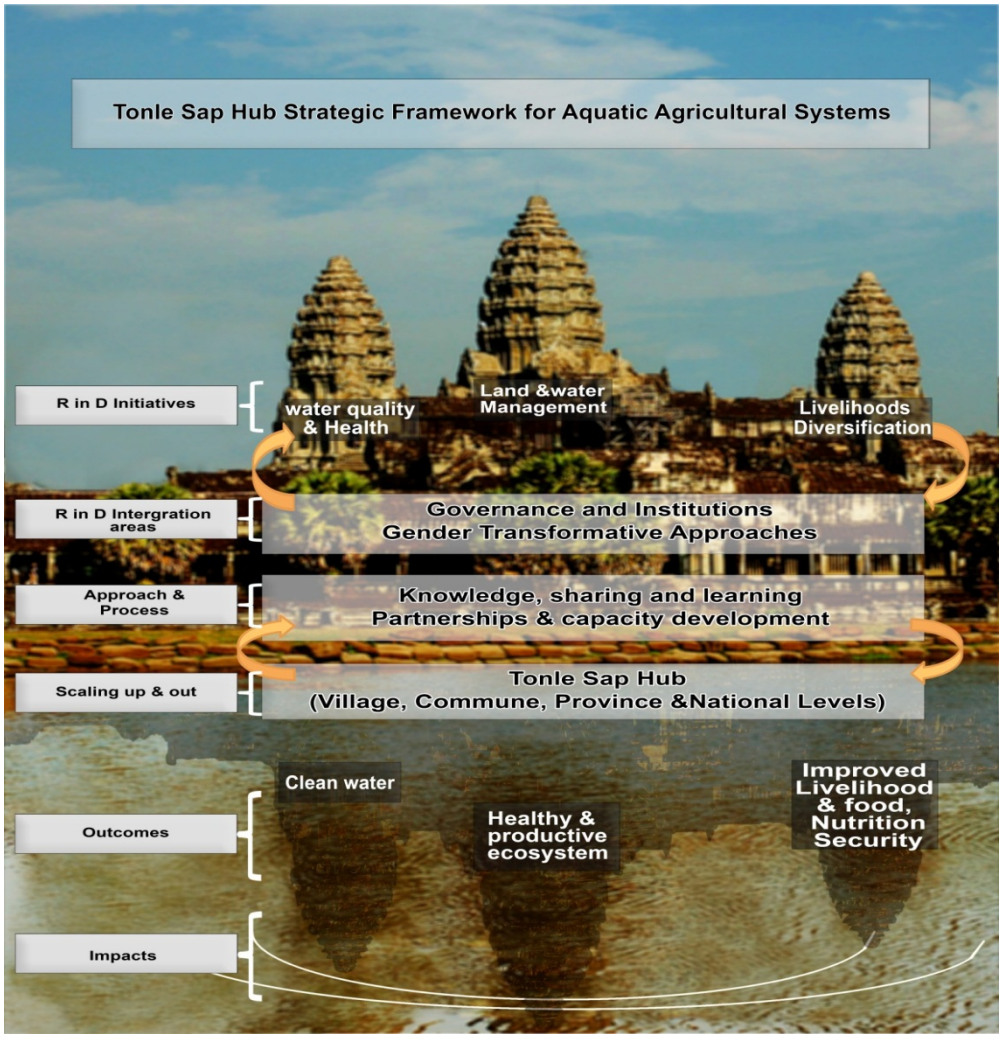
The hub development challenge was articulated as follows:

Box D-5: CAM – Development challenge of Tonle Sap Hub

"To make more effective use of knowledge networks and of practices for improving land and water management and value chains in order to optimize productivity from the flood pulses and assist the people that depend on the flood pulses to diversify their livelihoods, ensure food and nutrition security and maintain a healthy ecosystem."

The hub's "strategic framework" is depicted in Figure D-12.

Figure D-12: CAM - Tonle Sap hub strategic framework



Source: Slide presentation "AAS Programme Overvies, Tonle Sap, dated 14 Nov 2014

An important part of this framework is the three "RinD initiatives" identified as a result of the roll-out process: (a) Water Quality and Health, (b) Land and Water Management and (c) Diversified Livelihoods.

We will not comment in detail on the individual steps and stages of the roll out process including scoping, consultation, "community visioning" (dreaming), the development of action plans etc etc. These are documented and essentially the same as what was done in the other hubs.

What is worthy of note is the programme's collaboration the consultant Robert Nurick and the AAS Penang team aimed at putting some much needed methodological flesh on the AAS approach to participatory action research. A number of trainings, joint village visits and data analysis workshops have been held, with the focus being on capacity building of the village facilitators. Some of the information from these exercises helped inform the recent Theory of Change (TOC) workshop. In addition a detailed "guide for facilitators" has been drafted that is meant to provide "a roadmap for facilitators to support them to deliver a rigorous PAR process, providing them with guidance for effective facilitation that allows for critical reflection throughout the engagement process" (p.2). While the guide was written with a particular focus on Tonle Sap, the intention is that it is also relevant to other AAS Hubs.

The process followed in selecting particular districts and villages is described in detail in a briefing note prepared for the evaluation team (Box D-6) (taken from the briefing note "Village and NGO Selection for AAS

. Given the emphasis on "the presence of a high degree of poverty, marginalization and vulnerability" the team was surprised by the apparent wealth within the section of the land-based village of Santey that we were taken to (this is also the village visited by the WF Board of Trustees a week or so before the evaluation team). Most of the men we met reported owning a motorised two-wheel tractor, a motorbike and a motorised boat for fishing. Significant numbers of buffalo and cattle were also observed. It was also clear that the village had benefited (continues to benefit) from a series of NGO and other donor projects (including the Tonle Sap Sustainable Livelihoods Project). When we queried this, the AAS team suggested that we have not visited the poorer section(s) of the village.

Box D-6: CAM – AAS selection of villages

The selection of villages for the AAS program was based on a number of factors including the fishing dependency score (FDS) that currently acts as a proxy for AAS dependency in a community. Other factors that contribute to the selection of villages and their participation in the initial stages of AAS include the presence of development issues that are of wide concern across the hub; potential for partnerships and scaling up; potential to capitalize on current or planned development efforts; the presence of a high degree of poverty, marginalization and vulnerability. In addition, the geographical location of communities in the Tonle Sap and representation of the ecological zones (land-based, land-water based and water based villages) will play an important part in the selection criteria.

In target districts mentioned above, we have target villages based on the following criteria:

- issues that are of wide concern across the hub;
- potential for partnerships and scaling;
- potential to capitalize on current development efforts or planned;
- sites that present issues that can tap into AAS expertise;
- sites that present issues that are “doable”;
- sites that present the greatest degrees of asset and income poverty, marginalization and vulnerability;
- village-level variable which equals the probability that a randomly selected household engages in some level of fishing activity; and
- a high fish dependency score where it is more likely it is that a random household engages in fishing activity.

Outcome evidencing stories: The evaluation team was provided with twelve draft "outcome evidencing stories". It is clear that considerable work has gone into the development of these stories. However, some common characteristic of the stories raise questions about their potential value as an important component of a M&E system. Specifically:

- There is a strong suggestion that 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.
- The stories consistently refer to “the community” as if it is a homogeneous, united body without dissention or politics. There is no sense that within the community there might have been differential levels of interest, participation and benefit.

As a result the stories come across as very general, not very reflective, and naïve. These points are

illustrated by the following extracts from Story 003: "Local authorities participation in community development: A case study in Santey Village".

> "Learnings by these local authorities on the process of the CLCP approach and facilitating skill has shaped and improved their leadership capacities, attitudes and behaviour. The process helped them to improve their capacities through community meeting and applying the CLCP approach tool for community development."
>
> "According to the Santey community, local authorities are now more gentle and soft speaking to villagers when they are facilitating meetings. They are more active in participating in conflict solving amongst community members such as coordinating with land owners and the community for extending the canal (Canal Pol Pot 2), and the fish refuge conservation area. They have also become motivators and have encouraged the people to participate in discussions in village meetings and consultations. They are now more approachable and seek communities' ideas and consult with them on what they would like to do and what are their plans for individual households and the community. They are also are more proactive in promoting gender equality in the village and they encourage women to join development activities as well as participate in community visioning to create action plans in the community They also regularly attend and participate in community monthly meetings to monitor the progress of the village action plan (which combines the AAS and Rice Field Fisheries Project (RFFEP) activities). Lastly, they help in linking (cooperation with providers of technical assistance such as extension worker of Provincial Department of Agriculture) the community to different development partners such as the Provincial Department of Agriculture which provides extension opportunities to improve agricultural production in communities, microfinance to support the community investment fund, and NGOs which can provide potential markets for agricultural products".

➢ Key observations

- The rollout process has proceeded as per the AAS Rollout Manual
- Significant progress has been made in putting PAR on a solid methodological basis
- In the light of the emphasis on poverty and marginalisation we were surprised by what we saw at one of the villages we visited
- We were not convinced of the usefulness / value of the outcome evidencing stories

Activities at community level

During the course of the village visits we observed / were told about a number of different AAS and/or local economic activities that are worthy of note.

- **Community visioning exercise and action plans**: As part of the rollout process communities have gone through "community visioning" exercise. We saw flipcharts and other evidence of these exercises in the villages. Community-level action plans were also produced, which are currently being implemented and monitored with the help of the village facilitators. However, it was difficult to identify any interventions made by AAS. Most of the activities we observed seemed to have been started earlier by the communities with other NGOs or projects.
- **Fish Refuge Ponds:** In Santey village in Siem Reap, we were shown three earth refuge ponds (8 m

long, 6 m wide and 3 m deep) and three ditches made of small cement rings (1 m diameter, 2 m deep). A discussion with community members and the community facilitator suggested that eight earth refuge ponds and four cement refuge ponds were constructed during 2013-2014. The idea of having refuge pond where fish can find shelter during dry period is certainly sound. A larger community refuge pond (approximately half a hectare) was also observed. Snakehead fish (*Channidae* family), a highly carnivorous species, and other small indigenous fish were kept together in these ponds. The capture of wild fish has been banned from the rice field within 100 m around the periphery of that community pond. Two different signboards indicated that it was a collective effort of various development organizations including USAID, WorldFish, FAO and EU.

- Community members we met in the field mentioned that almost every rice farmer wants to have a refuge pond but they do not have money or do not want to invest on it. To dig a pond of 8 m x 6 m x 3 m costs about US$65. Whereas a farmer with a larger pond (approximately 15 m x 10 m x 4 m deep) reported that he found a way to dig his pond free of cost. He contacted a contractor who was looking for soil to raise land on which to build a house. The contractor dug the pond in exchange for the soil.
- **Catfish farming**: We observed catfish farming in the villages of Muk Wat and Peam Ta Ou. Cages were approximately 3 m x 2 m and 2 m deep. Community members reported that in the past they used to culture Pangasius but because of the slow growth of Pangasius (1 year vs 6 months for catfish) and unavailability of fry, they shifted to *Clarias* catfish. They used to buy Pangasius fingerlings from Vietnamese traders and even now buy *Clarias* catfish from them. This indicates that there may be some potential for a hatchery to supply catfish and/or Pangasius fingerlings. But the most important point is that farmers are feeding catfish by grinding up small fish caught from the lake, which is a disaster for biodiversity and ecosystem. Cambodian government has banned cage culture of snakehead because farmers used small fish for feed. Will a similar ban eventually be imposed on catfish production?
- The evaluation team visited Peam Ta Ou village in November (i.e. beginning of the dry season) and water was already so foul that fish other than catfish probably would not survive. It can be expected that water quality will deteriorate further as the dry season progresses. This whole area of water quality and its implications for aquaculture and wild fish populations is ripe for research.
- **WISH Pond**: The evaluation team was not able to visit the WISH Pond site in NE Cambodia. According to AAS/WF staff, there are 44 farmers supported by the WISH Pond project. Each farmer has a wish pond of 4 m x 3 m x 1.2 m deep stocked with 800 fingerlings of various fish species. The main purpose of this project is to help farmers generate income through small-scale fish farming. All the 44 farmers are following a set of standard guidelines. Whether such a small pond will generate substantial income is an open question.

➢ Key observations

- We saw little evidence of the village-based activities associated with action plans and "RinD initiatives"
- Farmers want fish for their families but they were catching very small fish (<5g) from rice fields. This indicates to the evaluation team that there is a dire need or the promotion of productive aquaculture technology
- Promotion of land-based snakehead fish farming utilizing fingerlings available in the rice field and using home-made feed or commercial pellets could be explored as an option. Catching snakehead fingerlings from the rice fields would also help increase abundance of other small indigenous fishes.

- There is clearly a role for research in identifying, testing and promoting more productive and more sustainable aquaculture systems.

Partnerships

The programme has established what appear to be a set of strong working relationships with key government partners including the Tonle Sap Authority and the Fisheries Administration. However somewhat less progress has been made in establishing partnerships with organisations or university departments that are primarily research oriented.

Much of the work in the villages is implemented, facilitated and monitored through a group of ten development-oriented NGOs [22] At the moment AAS has a one-year Memorandum of Agreement with each NGO (each NGO receives USD 3,000 from AAS), who together work with 24 community facilitators in 12 villages located in five provinces around the Tonle Sap. The NGOs provide supervision to the village facilitators.[23]

In recent months these NGOs have come together to form the Aquatic Agricultural Systems Association (AASA). At a discussion with AASA members its objective was described in terms of "creating a movement" around the local empowerment and the use of PAR. Members of the association are currently developing a proposal that they plan to present to potential funders. At the moment AASA has no legal status so any funded project would probably be managed through ADIC.

A list of all partners that were met is provided in Annex H of the evaluation report.

➢ Key observations

- The members of AASA appear to be developing a strong agenda that in the future may or may not serve the purposes of AAS.

Gender transformative approach

During the village visits we saw / heard of little that seemed to directly reflect the programme's Gender Transformative Approach. Cambodia was among the five countries included in an early review paper of gender relations (published before AAS activities were initiated in Cambodia).[24] A national partnership around gender has been established with the NGO Gender Development in Cambodia (GADC), and discussions with two GADC staff indicated a relatively well developed understanding of issues around gender, transformation and power relations. One staff member of GADC is considered part pf the core

[22] Analyzing Development Issues Centre (ADIC), Gender Development in Cambodia (GADC), Akphiwat Neary Khmer Organization (ANKO), Aphiwat Strey (AS), Cambodian Women Support Organization (COWS), Dai Kou Kaksekor (DKK), Human Resource and Rural Economic Development Organization (HURREDO), Ponleu Komar (PK), Trailblazer Cambodia Organization (TCO), Village Support Group (VSG)

[23] We note that at times these facilitators are described as volunteers, while at least some of them also receive a small monthly stipend and allowances when they attend workshops.

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

AAS team, covering gender. We were given copies of one draft document relating to gender in the Tonle Sap area, and another relating to gender and the WISH Pong programme.[25]

Bilateral projects

The major on-going bilateral project in the Tonle Sap area is Rice Field Fisheries Improvement Project (RFFP) funded by USAID. This is a large, four-year project (2013-17) that is operational in 40 villages around the Tonle Sap and aims to develop improved sustainable rice field fishery management practices for poor aquatic resource dependent households.

All indications are that while RFFP is "mapped" to AAS, it is not at all well integrated with it. Indeed, in 2014 in order to address this situation a "one programme" approach was developed and is currently being tested in Santey village. The hub's "must win" for 2014 was articulated as "develop one integrated CRP in Tonle Sap Hub". The issue of integration of RFFP with AAS will be explored further through the bilateral project case study.

Research

- During our interviews, discussions and field visits we saw little sign of / heard little reference to on-going research activities. This is despite the contribution of four PhD holders to the programme, a scientist-level Research Coordinator and an estimated total research effort of 10.5 FTE (excluding any research effort from WF HQ, partners or others).
- It was particularly striking that despite the fact of having on staff a PhD level researcher with 15 years of research experience (and two published books) on the political ecology of Tonle Sap, his experience and skills are apparently not being used in a research capacity.
- We were told there is a plan to look at the potential to produce eight indigenous species through aquaculture, and also to look at water quality issues.
- Nevertheless it is apparent that there is no lack of important researchable questions that could be addressed and that would map well to the AAS themes:
  - What have been the effects (on livelihoods, local politics and power relations, fish stocks etc) of the government's abolition of the fishing lot system on Tonle Sap lake? What new challenges and/or opportunities in terms of livelihoods and/or sustainability are associated with these changes?
  - How does water quality in villages like Peam Ta Ou vary over the year, and what are the implications for aquaculture?
  - What impacts do the fish refuge ponds have on ecosystem, biodiversity, food and nutrition security, and income of the people?

➢ Key observations

- While the programme has research capacity, and there is no lack of important, development-relevant researchable problems, AAS in Cambodia does not appear to be configured as a

[25] REPORT DRAFT, Aid Effectiveness on Gender-Based Approaches in Aquatic Agriculture Systems in the Tonle Sap Region. Incorporating Gender Methodologies into the AS for the Tonle Sap Area. [no authors, no date]; Chea, S. and Johnstone, G. The Role of Gender in the Development and Adoption of Small Scale Aquaculture: Case Study from Northeast Cambodia

research operation.

- We are left with a number of questions including: What is the role of the Research Coordinator? What is the process through which a coherent research programme is expected to emerge? Why is more effective use not being made of individuals who represent key research assets?

Outputs

To date the AAS programme in Cambodia has generated, contributed to or been associated with a number of publically available outputs (Annex). A small number of these relate directly to rollout activities. Given that AAS has been active in Cambodia just less than two years it should not be surprising that the number of outputs published in international journals that link to or draw from the AAS RinD approach, or that are based on methods associated with PAR, is very limited. A systematic assessment of outputs will be undertaken through other components of the AAS evaluation.

Management

- The most senior WF staff member in Cambodia is the Regional Director for the Greater Mekong Region. The AAS Country Leader (a 50% position) reports to the Regional Director, as does a Regional Programme Manager, Senior Scientist, Project Coordinator and Finance and Operations Manager. The reporting line from the AAS Country Leader to the AAS Director appears to be through the Regional Director.

WF Cambodia tripled in size the last three years (from 13 to 31 staff members). This growth was driven by AAS. There appear to be some issues between payment of old staff and new staff, since new staff are better paid.

The hub office in Siem Reap opened in 2013 and there are currently five staff based there. The most senior staff based at Siem Reap is the Hub Manager (Masters level), who spends an estimated 40% of his time on research. No other research staff are based at this office. We were told that it is difficult to recruit senior staff to be based in Siem Reap because of the availability of schools for children. It is important to note that some villages in the Tonle Sap hub are more easily reached from Phnom Penh (where all the researchers are based) than from Siem Reap.

➢ Key observations

- It is difficult to understand the logic of having the AAS Country Leader report to the AAS Director through the Regional Director.
- Why is the AAS Country Leader only a 50% position?
- If the programme cannot recruit and maintain a significant cadre of research staff to be based at the Siem Reap hub, the rationale for keeping it open should be examined.

D.5.4. Overall assessment

- The rollout process has taken place as per the AAS Rollout Manual.
- The programme has established strong relations with development partners, but less so with research partners.
- While the Siem Reap hub office was only recently established, without a significant cadre of research staff being based there in the near future, the rational for keeping the office open is difficult to see.
- It will be important to monitor the development of AASA – at what point might its interest in developing a "movement" be in conflict with AAS objectives?
- The programme has taken the initiative in fleshing-out the PAR approach. This is very positive.
- There would appear to be a disconnect between the stated deployment of staff time to research, and the evidence of on-going research that was observed by the evaluation team.
- Limited research capacity appears to be distributed over too many themes – there is a need to prioritise.
- There would appear to be clear opportunities to introduce highly productive technologies / practices that have the potential to generate substantial income for farm families, but this will require a systematic research effort.
- It would appear that some key in-house research expertise is not being used to best effect.
- We were not able to develop a clear view of the contribution of WF HQ staff, or the staff of Bioversity and IWMI, to the orientation and or implementation of the programme's the research effort.
- It is too early to tell if the AAS RinD approach in Cambodia will result in high quality research outputs.
- The use of "outcome evidencing", which relatively recently introduced, should be re-thought.

D.5.5. Annexes for case study

Table D-24: CAM – Schedule of visit

Date	Activity
Monday, 17 Nov	Sophie arrives in Siem Reap
Tuesday, 18 Nov	Individual interviews with administrative staff Ram arrives in Siem Reap
Wednesday, 19 Nov	Individual interviews with staff and partners at TOC workshop Jim arrives in Siem Reap Attendance at TOC workshop Logistics meeting with Gareth, Ram and Sophie

Thursday, 20 Nov	Briefing session with Gareth, Ram and Sophie Individual interview staff and partners at TOC workshop
Friday, 21 Nov	Session with members of the Aquatic Agricultural Systems Association (AASA) Visit to Santey village (land-based) Visit to Muk Wat village (land and water-based) Jim and Ram have dinner with Oeur Il of the *Analyzing Development Issues Centre* (*ADIC*) and AASA
Saturday, 22 Nov	Visit to Peam Ta Ou village (water-based) Evaluation team meeting to discuss emerging observations and questions in preparation for debrief session
Sunday, 23 Nov	Debrief session at Hub office Staff interview 1700 – Jim, Ram and Sophie leave hotel for airport

Publically available outputs of AAS Cambodia

Agriculture, irrigation and poverty reduction in Cambodia: Policy narratives and ground realities compared. de Silva, S.; Johnston, R.; Senaratna Sellamuttu, S. (2014) CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Working Paper: AAS-2014-13. (Publication Type: Working Paper)

Collaborating for resilience: conflict, collective action, and transformation on Cambodia's Tonle Sap Lake. Ratner, B.D.; Mam, K.; Halpern, G. (2014) Ecology and Society, 19(3): 31 [open access] (Publication Type: Primary Science Publication Journal article (Refereed))

Dialogue to address the roots of resource competition: Lessons for policy and practice. Ratner, B.D.; Burnley, C.; Mugisha, S.; Madzudzo, E.; Oeur, Il; Mam, K.; Rüttinger, L.; Chilufya, L.;Adriázola, P. (2014) Program Report. Collaborating for Resilience. (Publication Type: Progam report)

Fish resources in Cambodia (2001-2011) Baran, E.; Chheng Phen; Ly Vuthy; Nasielski, J.; Saray Samadee; Touch Bunthang; Tress, J.; Kaing Khim; Tan Sokhom. (2014) Chapter 4 (p. 37-48) in: Atlas OF Cambodia: Maps on socio-economic development and environment. Save Cambodia's Wildlife, Phnom Penh, Cambodia. 178 pp. (Publication Type: Book Chapter)

Fishing for justice: Human rights, development, and fisheries sector reform. Ratner, B.D.; Åsgård, B.; Allison, E.H. (2014) Global Environmental Change, 27: 120-130 [open access] (Publication Type: Primary Science Publication Journal article (Refereed))

Innovations to strengthen aquatic resource governance on Cambodia's Tonle Sap Lake. Oeur,IL; Mam, K.; Sour, K.; Ratner, B.D. (2014) Program Report. Collaborating for Resilience. (Publication Type: Program report)

Building resilient community fisheries in Cambodia. European Initiative for Agriculture Research for Development (EIARD); WorldFish. (2013) (Publication Type: Working paper)

Collaborating for resilience in complex aquatic resource commons: Lessons for policy and practice. Ratner, B.D.; Burnley, C.; Mugisha, S.; Madzudzo, E.; Oeur, I.; Kosal, M.; Rüttinger, L.; Adriazola, P. (2013) WorldFish. Penang, Malaysia. White Paper: 2013-62. (Publication Type: Working paper)

Governance of aquatic agricultural systems: Analyzing representation, power, and accountability. Ratner, B.D.; Cohen, P.; Barman, B.; Mam, K.; Nagoli, J.; Allison, E.H. (2013) Ecology and Society, 18(4): 59 [open access] (Publication Type: Primary Science Publication Journal article (refereed))

Tonle Sap scoping report. Johnstone, G. et al. (2013) CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2013-28. (Publication Type: Working paper)

Community fish refuges in Cambodia: Lesson learned. Joffre, O.; Kosal, M.; Kura, Y.; Pich, S.; Nao, T. (2012) Lessons Learned Brief 2012-03. The WorldFish Center. Phom Penh, Cambodia. 16 p. Available also in Khmer version [2012-23]: http://www.worldfishcenter.org/resource_centre/WF_3147b.pdf. (Publication Type: Program brief)

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

ANNEX E. BILATERAL PROJECT CASE STUDIES

E.1 Methods

A project case refers to an individual research project undertaken by AAS with bilateral funds. These projects typically have specific documentation depending on the requirements of the funding agency (proposals, contracts, reports, etc., referring to objectives, methods, inputs and outputs). There are currently some 53 active bi-lateral projects, the many of which were designed before the initiation of AAS. These projects account for a substantial share of AAS activities and funding.

Four bilaterally funded research projects – one from each hub visited – were selected for study (Table E-1below). In selecting these projects the team was concerned to include:

- Projects that were identified by AAS management and staff as being particularly important, innovative and representative of the AAS approach;
- Projects that reflected the portfolio of different activities carried out in AAS with different funding sources

Large projects that account for a substantial share of AAS funding

Table E-1: Bilateral projects selected as case study

Research Theme	Project Title	Hub	Budget	Funder	Start date	End date
Productivity, Income and Nutrition	FTF: Aquaculture for Income and Nutrition (AIN) (some part of budget is in Value chain Theme)	BAN	4.750	USAID	1-Oct-11	30-Sep-14
Productivity, Income and Nutrition	Rice field fisheries improvement project	CAM	0.609	USAID	18-Apr-12	17-Apr-16
Global & Regional Scaling	Pacific fisheries (BU10275-278)	SOL	1.37	ACIAR	1-Jul-13	30-Jun-17
Improved agricultural and NRM value chains AND Knowledge sharing and learning	Harnessing Aquatic Agricultural Systems for Livelihoods and Nutrition Security in Northern Province Zambia	ZAM	0.420	IRISH AID	1-Sep-13	31-Aug-18

Documentation relating to the selected projects was collected through the AAS Project Manager Database / Proposal System Database and through correspondence with relevant project leaders and researchers. A standard protocol was developed), and each case was assigned to an evaluation team member.

Box E-1: Project case study outline guide

Step 1. Establish the basic facts of the case

Project information

- Project name:
- Start date:
- End date:
- Funder:
- Total planned budget:
- Principal Investigator(s):
- Other key researchers:
- Partners:
- Country(ies) and/or hubs in which research was undertaken:
- Relates to AAS theme:

1. What did this project set out to do? What outcomes are specified?
2. Where any specific research questions articulated in the proposal? If so, what were these?
3. How was the project framed and/or justified (scientifically and/or developmentally)?
4. Did this project build on previous WorldFish work? If so, what and how?
5. What if anything about the project changed during the course of implementation?
6. What were (are) the main findings / results / conclusions?
7. What outputs have been (are being) produced?
8. Have / how have gender and/or equity concerns been dealt with in the research?

Step 2: Evaluative questions

1. Was / is the research coherent with the AAS approach?
2. Was / is the research relevant to the AAS research programme?
3. What contribution did this research make (is it making / is it likely to make) to thinking about / the implementation of the AAS approach or any other aspects of AAS?
4. Is there evidence that the research findings have been (are being) integrated / incorporated into any or all AAS research initiatives?
5. What is the quality of the research outputs? [see below for further guidance on quality of research outputs will be provided]
6. Were staffing and partnerships appropriate?
7. What contribution has this research made (is this research likely to make) to international public goods?

Part 3. Conclusions

With a specific emphasis on

- research methodology
- results
- dissemination
- interactions with communities and partners
- links / synergies / tensions between bilateral projects and the AAS RinD approach

Part 4. List of documents consulted

E.2 Zambia – NOTHERN PROVINCE

PART 1: Establish the basic facts of the case

Table E-2: Zambia project overview

Project name:	Harnessing Aquatic Agricultural Systems for Livelihoods and Nutrition Security in Northern Province Zambia
Start date:	1 Sep 2013
End date:	31 Aug2018
Funder:	IRISHAID
Total planned budget:	$0.420 million (total budget for development component is EUR 2,500,000
Principal Investigator(s):	WorldFish, CIFOR, Harvest Plus
Partners:	Self-Help Africa, Zambia
Country(ies) and/or hubs in which research was undertaken:	Zambia
Relates to AAS theme:	Mapped to Productivity, value chain and knowledge sharing clusters the project relates well to the AAS theme but it is being carried out in a completely different part of the country and does not seem to have strong AAS input, at least not at this early stage.

1. What did this project set out to do? What outcomes are specified?

This project is a research activity that complements a larger development project, Local Development Initiatives, being implemented by Self-Help Africa. The research is intended to develop technologies that can be used by Self-Help Africa to improve livelihoods, food and nutrition, productivity, and access to markets and finance. Self Help Africa is working with 16 communities in Northern Province, Zambia and aims to reach 16,000 households.

The overall goal for the research project is to contribute to improved livelihoods, health status, food and nutrition security of poor households in Northern Province, with a particular focus on women and vulnerable groups; through the generation and provision of evidence based information, and scientifically developed and tested technologies and livelihood solutions that can trigger community and farmer innovations to bring positive change within the IALDP and relevant Provincial district and ward programmes.

Objectives:

- To generate evidenced based information to inform Northern Province local development program and private sector on the best practices that creates economic growth and improves livelihoods.
- To identify/develop and pilot appropriate and relevant agricultural technologies for poor households.
- To establish, pilot and recommend appropriate agricultural and natural resources value chains that enhance benefits to women, youth and vulnerable groups.
- To improve local partners' capacities in effective agricultural research in development for effective service delivery

Key Outcomes:

- Evidence based information generated and informing the IALDP and other relevant development programmes
- Appropriate and relevant technologies for increased farm production, dietary diversity and livelihood diversification tested and recommended to IALDP and provincial, district and ward structures
- Utilization of newly developed biofortified food crops, fish and forest foods to improve nutrition

2. Where any specific research questions articulated in the proposal? If so, what were these?

The overarching research question is:

How can research in integrated rural development accelerate progress and trigger innovations that improve livelihoods, food and nutrition security in Mbala and Luwingu districts?

The specific research questions are:

- What opportunities exist to improve food and nutrition security through integration of aquaculture, crops, livestock and forestry?
- What do communities see as the best combinations and their potential contribution to food and nutrition security?
- What information gaps exist on the current production systems of the Northern Province including: forestry resources, food and nutritional status of people and indigenous knowledge?
- What are the direct and indirect benefits of the production systems and processing technologies on livelihoods strategies of the marginal groups, (e.g. wood use in fish production, etc.).
- What is the potential contribution of conservation farming to improved productivity for marginal groups?
- What role do forests in Luwingu play in the performance of wetland based capture fisheries?
- How can the productivity of integrated livelihood systems be improved?
- How can the integration of aquaculture, agro-forestry and forest resources-using indigenous knowledge and modern science be achieved at household level to improve livelihoods?
- Which locally available secondary crop products can be harnessed for incorporation into locally produced fish feed to promote sustainable aquaculture especially among marginalized groups?
- How can women's participation in production systems such as NRM based enterprises (e.g cosmetics, wild fruits and kapenta) be facilitated?
- Which innovations and practices will improve utilization of farm, fish and forestry products particularly for women and children, to enhance nutrition security?
- How can newly introduced bio-fortified food crops be integrated into rural livelihoods?
- Based on an understanding of the consumption of bio fortified food crops and Kapenta/other fish products, how can these foods contribute to dietary diversification and improve nutrition of lactating mothers and children during the first 1000 days of life?
- How can wetland management, food production and processing technologies enhance use of forest resources (e.g. wood, products, etc.) to improve nutritional status of marginal groups?

3. How was the project framed and/or justified (scientifically and/or developmentally)?

This project has brought together three CGIAR centres to provide evidenced based rural development solutions, livelihood options and information in Northern Province. The participating centres include

Worldfish, which specialises in community driven research in aquatic agricultural systems, fisheries management and aquaculture, gender transformation approach and processes, and high quality partnerships to tackle compelling development challenges; the Centre for International Forestry Research (CIFOR) with expertise in the management of forests, trees and wild genetic resources; and HarvestPlus, a crop bio fortification challenge program jointly convened by the International Food Policy Research (IFPRI) and the International Centre for Tropical Agriculture (CIAT). The collaborative framework designed for this project will draw on the strength of each partner to bring and apply its global expertise to produce the outcomes.

A scoping study determined that although the region had optimal agro-ecological conditions, productivity was very low. There are critical dietary gaps and deficiencies and there is a lack of available food for the poor. Traditional ways of post-harvest processing, preserving and preparing nutritious foods are no longer being used. There is a need to find ways of effectively harnessing aquatic systems, forest resources and agriculture. To achieve accelerated development and improve the livelihoods, health status, food and nutrition security of poor households in Northern Province, with a particular focus on women and vulnerable groups in Mbala and Luwingu districts, a strong supportive Research in Development initiative is needed to better understand local practices and constraints and to undertake analytical comparative research that will develop and deploy technologies and innovations that will improve livelihood systems and make sure that people have access to nutritious foods

4. Did this project build on previous WF work? If so, what and how?

There was a pre-project Scoping Study in 2012, led by WorldFish but the proposal makes no other specific references to earlier WF work. The project was developed by Irish Aid with Self-Help Africa. The CG centres were brought in to generate research outputs to be used in the development work of Self-Help Africa.

5. **What if anything about the project changed during the course of implementation***?*

The project is still at an embryonic stage so it is too early to say that there have been changes during the course of implementation. Three different versions of the research proposal had to be submitted before it was accepted by Irish Aid in March 2014. The main interest for Irish Aid is small fish (kapenta) utilization and the earlier version of the proposal was not strong in this area. Irish Aid provided Eu120,000 to pay for the scoping study that fed into the revised proposal.

WorldFish has had staff on the ground in Northern Province since June 2014 (only three months before the Evaluation Team visited Zambia). According to Irish Aid, the CGIAR research component work is supposed to be slightly ahead of the development component but this was not the case in October 2014.

6. What were (are) the main findings / results / conclusions?

There are no findings, results or conclusions as the project has just started.

7. What outputs have been (are being) produced?

Irish Aid hopes that outputs will be available by mid-2015. By October 2014, Harvest Plus had done field trials on orange maize but they had not shared the assessment results with Irish Aid (which was problematical for Irish Aid as they were preparing for a mid-term evaluation in 2015.) Similarly, the AAS team has carried out a number of baseline studies but the reports have not been shared with Irish Aid.

8. Have / how have gender and/or equity concerns been dealt with in the research?

Gender was integrated into the research design and two of the research questions specifically relate to the needs of women. Efforts were made to ensure both women and men participated in community visioning and discussion exercises. The proposal also notes that gender analysis will be undertaken to better understand and positively impact women's participation in production systems.

However the first nine months of the project seem not to have included gender in any meaningful way. The three quarterly reports make no mention of research on gender, although lack of representation of women was mentioned as an issue of concern in one village visited during the scoping study.

Self-Help Africa delivers its programs through Livelihood Enhancement Groups (LEGs) in each of its target communities. Each group comprises 45 members, both men and women, drawn from the poorest segments of the community.

PART 2: Evaluative questions

1. Was / is the research coherent with the AAS approach?

Overall, the approach to the research is coherent with the AAS approach. However the methodology being used to deal with gender issues is more conventional than the transformative approach promoted by AAS. The primary concern in this project is to ensure that women are included and to address some of the specific needs of women, both in productivity and in nutrition. There is no stated attempt to address the balance of power in gender relations.

2. Was / is the research relevant to the AAS research programme?

The proposed research is very relevant but it is unclear how the results from this project will be integrated into the AAS work. Also, the outputs of the AAS program are expected to be relevant to the Irish Aid project. Self-Help Africa ultimately aims to influence 16,000 households in Northern Province and is expecting WorldFish and its CG partners to generate technology that can be passed on in the development program.

3. What contribution did this research make (is it making / is it likely to make) to thinking about / the implementation of the AAS approach or any other aspects of AAS?

One potential benefit for implementation of the AAS approach will be the large number of households reached by Self-Help Africa. Ultimately, AAS, like other CGIAR CRPs is expected to have a significant development outcome and this partnership will help them to meet the objective of achieving impact at scale. A second benefit will be the potential to test newly-developed technologies or approaches in Northern Province where Self-Help Africa's work is further advanced than in the AAS projects in the Barotse Floodplains.

4. Is there evidence that the research findings have been (are being) integrated / incorporated into any or all AAS research initiatives?

This is certainly anticipated but to date there is no evidence that it has occurred, probably because the partnership with Self-Help Africa is still at an early stage.

5. What is the quality of the research outputs?

There are no research outputs yet but the information gathered through the scoping study is helping both the WF/CIFOR/HarvestPlus group and Self-Help Africa to target their interventions more appropriately.

6. Were staffing and partnerships appropriate?

At this early stage in the project the partnerships seem appropriate although Self-Help Africa has spoken to Irish Aid about lack of regular communication from AAS. The partnerships with HarvestPlus and CIFOR seem to be going smoothly.

7. What contribution has this research made (is this research likely to make) to international public goods?

The project expects to create knowledge on integrated aquaculture-agriculture-forestry livelihoods opportunities, and the basic parameters on how to establish and manage smallholder fish farming, crop production and the use of forest and agro forest resources to increase nutrition and income benefits. This information will be made available to farmers, households and decision makers for improved planning, decision making and effective implementation of local and district plans. It will also be synthesised to produce international public goods, contributing to the national, regional, and global body of knowledge.

PART 3: Conclusions

The rationale for this research project relates generally to the overall objectives of AAS. The proposal was rewritten several times at the request of Irish Aid in order to ensure greater focus on small fish and eventually an MOU was signed with Self-Help Africa. As part of the project design, the CGIAR team collectively undertook a Stakeholder Consultation and Community Engagement mission to Mbala and Luwingu districts in Northern Province in October 2013. The Community Life Competence process (CLCP), a strength based approach which is premised on the understanding that every community has the capacity to respond to its challenges, was used in the community consultation process. Through two consultation field missions, the CGIAR, with the support of Self Help Africa interacted with Livelihood Enhancement Groups and other stakeholders to solicit their aspirations, interests and priorities, as well as to assess and determine attitudes towards the project. This community based approach is consistent with the overall approach of AAS and the same methodology has been used successfully in other AAS activities in Zambia.

The stakeholder consultation differentiated between the perspectives and needs of women and men and analysed the different work done by each. It identified target areas for research which ultimately will be beneficial to both sexes. The scoping study was participatory and consistent with the AAS emphasis on PAR. However the GTA approach promoted by AAS is not being implemented. Although some women farmers participate in the LEGs – and specific efforts have been made to ensure they are included – the careful training elaborated within the GTA is not being followed, which means that the communities will probably not be dealing with the difficult issues of gendered power relations.

Since the research component has just started, it is too early to judge relevance. However, the Evaluation Team did find that some early nutrition-related products coming out of the Barotse

Floodplains AAS project (e.g. agricultural calendars and recipe books) had not been shared with the Irish Aid project although they would have been of relevance.

Although AAS has been faulted by Irish Aid for not sharing information in a timely manner, the overall feeling is that the partnership is working reasonably well. Overall, the project has the potential to have a positive impact.

PART 4: Documents Consulted

Irish Aid, Zambia. Country Strategy Paper 2007-2010.

http://www.oecd.org/derec/ireland/zambia-csp-2007-2010-evaluation.pdf

CGIAR. Integrated Research in Development for improved Livelihoods in Northern Province, Zambia. Final Project Proposal. (Revised).

First Quarter 2014 Progress Report. Integrated Research in Development for improved Livelihoods in Northern Province, Zambia. April 2014.

Second Quarter 2014 Progress Report. Integrated Research in Development for improved Livelihoods in Northern Province, Zambia. June 2014.

Third Quarter 2014 Progress Report. Integrated Research in Development for improved Livelihoods in Northern Province, Zambia. September 2014.

Interview with Mwiya Mundia, Irish Aid, Zambia, 9 October 2014.

E.3 Bangladesh – FTF AIN

PART 1: The basic facts of the case

Table E-3: FTF AIN Overview

Project name:	FTF: Aquaculture for Income and Nutrition (AIN)
Start date:	01 Oct 2011
End date:	30 Sep 2013
Funder:	USAID
Total planned budget:	USD 8,000,000
% mapped to AAS Productivity (1.1) Value chains (1.3)	75% USD 4,083,844 USD 666,156
Principal Investigator(s):	Keus, Jan Hendrik (97 % of time)
Other key researchers:	Karim, Manjurul (97 % of time)
Partners:	Bangladesh Fisheries Research Institute (BFRI) Department of Fisheries (DoF) Bangladesh NGOs: Codec, SpeedTrust, Save the Children Private sector hatcheries and nurseries Note: The 2013-14 Annual report mentions 20 partnerships
Country(ies) and/or hubs in which research was undertaken:	Bangladesh
Relates to AAS theme:	Productivity, part also mapped to value chains

1. What did this project set out to do? What outcomes are specified?

According to the project proposal, the "project is a 5-year transformative investment in aquaculture focused on 20 southern districts in Barisal, Khulna and Dhaka divisions, Bangladesh. The project contributes to achieving the Feed the Future goal of sustainably reducing poverty and hunger through four objectives", which correspond to the four components of the project. They are displayed in Table E-4.

Table E-4: Components and Objectives of the Project

No.	Project Components	Objectives
1	Fish and shrimp seed	Dissemination of improved quality lines of fish and shrimp seed
2	Household aquaculture	Improving the nutrition and income status of farm households
3	Commercial aquaculture	Increasing investment, employment and fish production through commercial aquaculture
4	Institution and policy	Policy and regulatory reform and institutional capacity building to support sustainable aquaculture growth

Source: Draft Annual Progress Report Oct 2013-Oct 2014

Four each component, a set of output goals were specified. They are included in Tables below.

The staff that is assigned to AIN is listed below in Table E-5:

Table E-5: FTF AIN staffing

Total staff members	47
Total number of PhD level	3
Percent PhD level	6%
Percent M.Sc. level	94%
Percent B.Sc. / Diploma level	-
Percent interns	-
Percent of PhD/M.Sc. female	4%
Percent of B.Sc./interns female	n.a.
Percent of staff with degree in aquaculture/fisheries	96%
Percent of total staff time allocated to themes • Productivity • Markets • Resilience • Gender • Governance • KS&L	 76% 3% 0% 10% 0% 11%

Source: Staff data base provided by AAS

2. Where any specific research questions articulated in the proposal? If so, what were these?

No research questions were specified in the proposal. The original project proposal is rather short and the proposal is clearly written for a development project. The word "research" does not even appear in the proposal document.

From the annual reports, one can derive that some applied research has been conducted, for example, on nutrition and on diseases resistance. The on-farm research by AAS on shaded ponds is mapped to this AIN. Moreover, Andrew Thorne-Lynam was planning a randomized control trial related to AIN at the time of the evaluation (interview information). This activity is not mentioned in the available project reports, therefore, it might be funded from different sources.

In principle, the project would offer ample scope for research, including participatory action research. Moreover, large-scale surveys are conducted under this project for M&E purposes, which generate data that could be analysed (see Baseline Final Survey Report, 2013). However, as pointed out in the interview with the Deputy Director of AIN, the staff capacity is not appropriate to make use of this opportunity, because most of the staff members do not have the skills and experience in publishing research papers.

3. How was the project framed and/or justified (scientifically and/or developmentally)?

The original proposal did not include a detailed justification for the project. Since it was not formulated as a research project, there is no scientific justification. The development justification would be to harness the high potential that aquaculture has both for income and nutrition, but no project document was available where this justification is elaborated in detail, e.g., by identifying different impact pathways.

4. Did this project build on previous WF work? If so, what and how?

The project falls into the core area of expertise of WorldFish. Since it is a "classic" technology promotion project, it could draw on the prior research of WorldFish in technology development, and also on earlier project that aimed at promoting aquaculture technologies using extension approaches. The project has some horticultural components, such as promoting orange-fleshed sweet potato, which are outside the area of expertise of WorldFish.

5. What if anything about the project changed during the course of implementation?

Since the original proposal was not very detailed, it is difficult to track whether the actual activities correspond to the initial plans. No major changes in the structure of the program and the activities pursued under the four components could be observed. The due dates for the completion of some tasks were postponed in the course of the project, which is not unusual for such large projects. One may assume that the participatory action research on the shaded ponds was not originally planned, but introduced as a consequence of AAS. Still, this is a rather small component of the overall program (12 farmers participated, conducting 3 treatments with four replications).

6. What were (are) the main findings / results / conclusions?

Since the project did not formulate research questions, it is not possible to report findings, results or conclusions in this respect. Otherwise, the results are reported in the tables below.

7. What outputs have been (are being) produced?

The Annual Report for 2013-2014 lists the outputs for the first three components of the project in form of tables. These tables include the outputs for the reporting year and for the entire project period. Since 2013-2014 was the last year of the project, the columns "grand total" capture the outputs of the entire project.

It can be derived from the tables incuded in the Annual Report for 2013-2014 that the program was targeting 65,000 households for fish production. The program reached almost the target number in providing training, and according to the project report, more than 90% of the targeted farmers adopted the technologies that were promoted. For shrimp farming, the target was 50,000 households, and the achievement rates were similarly high. The nature of the evidence for these success rates is not entirely clear. It was apparently based on a surveys that captured whether participants in the program adopted the technology. Whether counterfactuals and sample selection bias were considered is not clear. One may ask what the justification for the AAS RinD approach actual is, if a "conventional" approach is so successful.

Table E-6: FTF AIN Component-1: Key targets and achievements of seed production and distribution

Indicators	Achieved		Targeted	
	Reporting year (Oct 2013- Sep 2014)	Grand total (Oct 2011-Sep 2014)	Reporting year (Oct 2013- Sep 2014)	Grand total (Oct 2011-Sep 2014)
No. of total hatcheries	30	124 (94 old)	45	139 (94 old)
No. of carp hatcheries	15	69 (54 old)	19	73 (54 old)
No. of tilapia hatcheries	4	16 (12 old)	7	26 (19 old)
No. of carp cum tilapia hatcheries	1	8 (7 old)	-	-
No. of brackish water carp hatchery	-	1 (1 old)	-	1 (1 old)
No. of shrimp hatcheries	5	23 (18 old)	5	23 (18 old)
No. of prawn hatcheries	4	6 (2 old)	13	15 (2 old)
No. of hatcheries worked for SPF certified shrimp	1	1	1	1
No. of carp, tilapia and shrimp nurseries	133 (12 old + 121 new)	363 (242 old)	131 (125 carp and 6 shrimp)	177 (old-108)
No. of cages	-	380	-	380
No. of PCR tested shrimp PL delivered (million)	448.54	901.54	250	750
Quality carp brood stock distributed (MT)	21.91	57.71	19.4	60.4
Amount of carp spawn produced (kg) at project supported hatcheries	23,873.7 (Jessore 19120, Khulna 310.5, Barisal 2287.90 and Faridpur 2155.75)	51,339.7	15,000	21,500
No. of tilapia fry produced (million)	44.90 (Jessore 40.67, Khulna 1.98, and Faridpur 2.25)	45.31 (2.35 million in FY2013 and no fry produced FY2012)	40.00	40.00

Source: Draft Annual Progress Report Oct 2013-Oct 2014

Table E-7: FTF AIN Component-2: Key targets and achievements of household fish farming

Indicator	Achieved		Targeted	
	This year (Oct 2013-Sep 2014)	Grand total (Oct 2011-Sep2014)	This quarter (Oct 2013-Sep 2014)	Grand total (Oct 2011-Sep 2014)
No. of training household fish farmers	14,448	64,638	14,000	64,000
No. of households with Small Indigenous Species (SIS)	12,527	20,698	-	9,600 (20% of total)
No. of household level demo	62	162 (100 old)	62	191 (129 old)

fish farmers				
No. of cages	-	380	-	380
Partial household fish yield (Kg/ha)	223 (Oct 2013 to Jun 2014)	1,778	-	2,500
No. of farmers receiving training (based on actual attendance)	14,448 (100%) (Oct 2013 to Jun 2014)	63,475 (98.20%)	14,000	65,000
No. of farmers adopting new technology	13,231 (91.58%)	58,989 (91.26%)	14,000	65,000

Source: Draft Annual Progress Report Oct 2013-Oct 2014

Table E-8: FTF AIN Component-3: Key targets and achievements

Indicators	Achieved		Targeted	
	This year (Oct 2013-Sep 2014)	Grand total (Oct 2011- Sep2014)	This quarter (Oct 2013-Sep 2014)	Grand total (Oct 2011-Sep 2014)
No. of commercial shrimp households	10,060	50,510	10,000	50,000
No. of commercial fish households	4,610	14,531	5,000	15,000
No. of commercial shrimp demo	60	138	60	139 (79 old + 60 new)
No. of commercial fish demo	63 (62 new)	90 (62 new)	63	83 (34 old + 49 new)
No. of commercial shrimp nursery	-	10 (new)	6	16 (6 old + 10 new)
No. of commercial fish nursery	133 (new)	334 (201 old)	125	320 (195 old + 125 new)
Shrimp harvest by shrimp farmer (kg/ha)	335 (Oct 2013 to Jun 2014)	335	0	380
Fish harvest by commercial fish farmer (kg/ha)	2,694 (Oct 2013 to Jun 2014)	2,694	4,356	4,850
No. of shrimp farmers received training	10,060 (100%)	49,399 (97.8%)	10,000	50,000
No. of fish farmers received training	4,610 (100%)	14,306 (98.45%)	5,000	15,000
No. of shrimp farmers who have adopted new technology	9,696 (96.39%)	48,560 (96.14%)	15,000	50,000
No. of fish farmers who have adopted new technology	4,392 (95.28%)	13,783 (94.85%)	5,000	15,000

Source: Draft Annual Progress Report Oct 2013-Oct 2014

Component 4

For the fourth project component (Institutions and Policy), no table was produced. It can be derived from the project reports, that the project was active in the following areas:

- Support to the implementation of the Fish Hatchery Act 2010 and Fish Hatchery Rules 2011;
- Support to the implementation of the Feed Quality Act;
- Support to the Fish Inspection and Quality Control (FIQC) Service of the Department of Fisheries;
- Development of certification systems, standards, training manuals/tools in collaboration with DoF;
- Initiation of Aquaculture-nutrition linkages policies and strategies in relation to the Country Investment Plan
- Support to generating statistics (e.g., in 2013/14, implementation of the Union Level Aquaculture Resource Survey (ULARS) in selected regions);
- "Rohu Carp Genetic Improvement Program" run by AIN
- Preparation of an MOU with BFRI ("An MOU between WorldFish and the Bangladesh Fish Research Institute (BFRI) that specifies that BFRI and WorldFish will work together in aquaculture research related to genetics, disease, feed and others has been approved by both parties. The MOU has now also been approved by the Ministry of Fisheries and Livestock, and will be signed soon." Quote from the Annual Report 2013/14, p. 5). [*Note: Given the long history of WorldFish in Bangladesh, it is surprising that that such an MoU has not already been signed long ago*];
- Import of SPF (Specific Pathogen Free) shrimp brood from Moana Shrimp Hatchery, Hawaii, by the MKA Hatchery in Bangladesh;
- Cooperation with the SAFAL project to identify methods to improve the marketing of fish and shrimp; (SAFAL is the 'Sustainable Agriculture, Food Security and Linkages' project operated by the NGO Solidaridad);

8. Have / how have gender and/or equity concerns been dealt with in the research?

The term "gender" did not appear in the original project proposal. As the tables above show, none of the indicators above is gender-disaggregated. USAID has some gender-disaggregated indicators for monitoring of Feed the Future projects, to which AIN belongs, but these indicators are not available from the project reports.

Table E-9: FTF AIN - Adoption rate of improved fish and shrimp farming technologies by project farmers

	Before (% of farmer)			After (% of farmer)		
	Good	Satisfactory	Poor	Good	Satisfactory	Poor
Pre-stocking	2.2	19.3	78.5	51.4	33.7	14.9
Post stocking	3.3	20.7	76.0	37.4	38.7	23.9
Dike cropping	2.5	19.4	78.1	37.5	36.2	26.3
Gender and nutrition	4.6	36.9	58.5	54.4	36.6	8.9

Note: Good (marks obtained ranging 70-89%), Satisfactory (marks obtained ranging 60-69%) and Poor (marks obtained below 60%).

Source: Draft Annual Progress Report Oct 2013-Oct 2014

The field observations during the country visit indicated that the program has been working with women's groups, and that nutrition training was targeted to women. AIN was also partnering with NGOs

that focus on women and children in their nutrition programs, such as SAVE. The Baseline Survey for the project published in 2013 displayed some tables with gender-disaggregated data, e.g., for diet diversity. However, this disaggregation was not consistently done for all data collected. The table above, which is taken from the 2013/14 Annual Project Report, shows that "Gender and nutrition" is apparently treated in the same category as "improved fish and shrimp farming technologies" by project staff.

As indicated in Table E-5 above, only two of the 47 staff members listed under this project were female, one of whom was a lab assistant. This may also be seen as an indication that the project did not place emphasis on gender.

According the interview with USAID Bangladesh, USAID does not expect any targeting to particularly poor or vulnerable groups in this project. There is also no evidence from the project reports or the field observations that such targeting is pursued by AIN.

PART 2: Evaluative questions

1. **Was / is the research coherent with the AAS approach?**

This project is not a research project. It is a technology promotion projects with some small research components. It may be considered to be "conventional" in all aspects. In fact, it is not different from, for example, a typical World Bank project, operating in the agricultural sector. In this sense, the project is not coherent with the AAS approach. Some activities that the AAS country team has pursued under this project, such as the on-farm research on shaded ponds, can be considered to be coherent with the AAS approach.

2. **2. Was / is the research relevant to the AAS research programme?**

The area of operation of this project is highly relevant to the AAS programme. The project would offer significant scope for pursuing participatory action research that is relevant for AAS. However, such research has only be pursued on a small scale, so far (shaded ponds). The project would also offer the opportunity to pursue that GTA on a much larger scale than is possible within the AAS villages. Based on the field visits and the available documentation, there is no evidence that this has been pursued, so far.

3. **What contribution did this research make (is it making / is it likely to make) to thinking about /the implementation of the AAS approach or any other aspects of AAS?**

Due to the massive scale of the program (see tables above), substantial experience has been generated on technology promotion using "conventional" approaches. The lessons learnt may be very important for AAS to identify alternative "Research in Development" approaches. To what extent there is an effort to derive lessons from AIN for the RinD approach is, however, unclear. Moreover, as indicated above, one may ask whether there is a need for an AAS RinD approach if the conventional approach is as successful as the project reports suggest.

4. **Is there evidence that the research findings have been (are being) integrated / incorporated into any or all AAS research initiatives?**

There is no concrete evidence, so far, but it is very likely that insights on technological aspects generated by AIN, e.g., on shaded ponds and home-made feed, will be used in the AAS villages. To what extent insights on the intuitional aspects, e.g., extension methods, will be used is less clear.

5. **What is the quality of the research outputs?**

The project documents only list the outputs indicated in the tables above. Therefore, it is difficult to assess what "research outputs" could be assigned to AIN. There is a Baseline Survey Report published in 2013, which documents a large-scale data collection effort, but apart from this report, which mainly presents descriptive statistics and cross-tabs, no other analysis could be found.

One may also assign the papers authored or co-authored by AIN project staff to this project. A search in the publications database provided by AAS indicated that there are seven publications, which are authored or co-authored by the M. Karim, one of the two PhD level scientists in AIN. These publications are listed in the Annex. Five of the publications are journal papers that have been published in renowned international journals, one is a book chapter and one a working paper. Overall, the quality of these publications can be considered to be high. Considering that the project was not planned as a research project, it is remarkable that such publications were produced, at all. However, considering the total amount of funding that was spent, one would expect a higher output of international publications from a project run by a CGIAR center.

6. **Were staffing and partnerships appropriate?**

Table E-5 above shows the staffing of this project, which is obviously reflecting the nature of this project as a development project. How appropriate the staffing is from a development perspective is beyond the scope of this review. One might expect a larger spread of different levels of qualifications, a larger number of disciplines involved and a larger share of female staff. The staffing might reflect WorldFish's own expertise, and complementary expertise might be contributed by the 20 partner organizations in fields not covered by the expertise of AAS staff. The available documentation does not make it possible to assess the extent to which this is the case. From a research perspective, the ratio of PhD level researchers to M.Sc. level researchers is certainly considered to be a constraint.

The available documentation is also not sufficient to assess the appropriateness of all the 20 partnerships, which are mentioned in the last Annual Report. The partnership with the Bangladesh Fish Research Institute (BFRI) could be considered as a key partnership. As noted above, an MoU had not been signed at the time of the evaluation, which may be seen as a constraint. One wonders why WorldFish has not have an MoU with BFRI for many years. One could also observe that important AIN activities, such as the Rohu Genetic Improvement Program, were organized entirely independently from BFRI, even though they clearly fall under the mandate of BFRI. This focus on setting up parallel implementation structures is understandable from a management perspective, especially considering USAID's focus on reaching quantitative targets in a relatively short time. Still, the sustainability of this approach and its consistency with the mandate of the CGIAR is highly questionable.

7. What contribution has this research made (is this research likely to make) to international public goods?

The publications in Table E-10 can be considered as public goods that were produced by the project. The research that is currently underway (participatory on-farm research on ponds; randomized control trials on nutrition) has the potential to be turned into international public goods, as well. Still, considering the large scale of the project and the intensive data collection that has been going on (see Baseline Survey Report 2013), the potential of this project to produce international public goods remains largely underutilized.

Table E-10: FTF AIN publications

Year	Authors	Title	Outlet	Type
2011	Karim, M. ; Little, D.C. ; Kabir, M.S. ; Verdegem, M.J.C. ; Telfer, T. ; Wahab, M.A.	Enhancing benefits from polycultures including tilapia (Oreochromis niloticus) within integrated pond-dike systems: a participatory trial with households of varying socio-economic level in rural and peri-urban areas of Bangladesh	Aquaculture 314(1/4): 225-235	Journal
2011	Belton, B. ; Karim, M. ; Thilsted, S. ; Murshed-E-Jahan, K. ; Collis, W. ; Phillips, M.	Review of aquaculture and fish consumption in Bangladesh	Studies and Reviews 2011-53. The WorldFish Center. Penang, Malaysia. 71 p.	Working paper
2011	Karim, M. ; Sarwer, R.H. ; Brooks, A.C. ; Gregory, R. ; Jahan, M.E. ; Belton, B.	The incidence of suspected white spot syndrome virus in semi-intensive and extensive shrimp farms in Bangladesh: implications for management	Aquaculture Research [online first]	Journal
2013	Debnath, P., Karim, M., Belton, B	Comparative Study of the Reproductive Performance and White Spot Syndrome Virus (WSSV) Status of Black Tiger Shrimp (Penaeus monodon) Collected from the Bay of Bengal.	Aquaculture. 424–425: 71–77.	Journal
2013	Karim, M., Sawyer, R., Phillips, M., Belton, B.	Profitability and adoption of improved shrimp farming technologies in the aquatic agricultural systems of Southwestern Bangladesh.	Aquaculture, online first 5 March	Journal
2013	Karim, M., Meisner, C. and Phillips, M.	Shrimp (Penaeus monodon) farming in the coastal areas of Bangladesh: challenges and prospects towards sustainable development	In: Shrimp: Evolutionary History, Ecological Significance and Effects on Dietary Consumption. Ed. C.A.Delany. Nova Publishers.	Book chapter
2013	Rashid, M. Belton, B., Phillips, M., Karim, M	The Current Status of Aquaculture and Aquafeed Production in Bangladesh	World Aquaculture. 44(4): 23-27	Journal

Source: Derived from publications database provided by AAS

PART 3: Conclusions

This project raises a fundamental question that goes beyond the scope of the evaluation of AAS: What is the justification for a CGIAR center to take on a large-scale project that is conceptualized entirely as a development project? Should the CGIAR set up its own extension machinery in parallel to the respective government extension services? Responding to this question, the DG of WorldFish explained that in order to ensure that the technologies developed by WorldFish are adopted and have an impact, projects such as AIN are necessary. This proposition is debatable, because—as indicated above—one could well argue that "pure extension activities" are outside the mandate of the CGIAR and that they also undermine the incentives of the respective countries to strengthen their own innovation systems. However, this question is beyond the scope of the evaluation of AAS.

From an AAS perspective, the question arises as to whether this project could have been used more effectively to apply the RinD approach on a much larger scale than is possible with W1/W2 funding. For example, the project might have been used to compare and test different ways of engaging with communities in a PAR mode. The tight time frame of the project and the focus on a large set of very specific indicators was certainly a constraint to this approach. The fact that the nutrition theme leader was, however, able associate a randomized control trial with the project indicates that there may well be room for linking far-reaching research efforts with this project.

In future negotiations with USAID, it might be worthwhile to integrate a stronger PAR component into such programs. W1/W2 funding could then be used strategically to support this integration. The staff composition would have to be adjusted accordingly. Moreover, the collaboration with national research organizations may also have to be adjusted, e.g., by including local researchers who have the capacity to cover the social sciences dimension of the PAR research.

PART 4: List of documents consulted

- World Fish Project Manager database
- USAID-Bangladesh Feed the Future –Aquaculture for Income and Nutrition (AIN) – Project Document (2011)
- WorldFish Summary Proposal Document (2011)
- Draft Annual Progress Report, USAID-Aquaculture for Income and Nutrition (USAID-AIN), October 2013 to September 2015
- USAID, Data Management Aid and WorldFish (2013): Baseline Survey Final Report Aquaculture for Income & Nutrition Project.

Other sources of information

- During the AAS country case study of Bangladesh, the evaluation team visited two villages, in which the AIN program was implemented.
- The Deputy Program Leader of AIN was interviewed.
- One evaluation team member interviewed the person in USAID who is responsible for the AIN project.

E.4 Solomon islands – COMMUNITY BASED FISHERIES

PART 1: Establish the basic facts of the case

Table E-11: CBFM

Project name:	Improving Community-based Fisheries Management in Pacific Island Countries (FIS/2012/074)
Start date:	1 June 2013 (proposed); mid-June 2013 (actual)
End date:	31 May 2017 (proposed)
Funder:	ACIAR
Total planned budget:	AUS$ 3.776 million
Principal Investigator(s):	Dr Neil Andrew, WF Regional Director, based in Australia
Other key researchers:	Dr Philippa Cohen (scientist based JCU, Australia) Dr Anne-Maree Schwarz (senior scientist based Honiara, SI) Dr Jessica Blythe (post-doc employee of and based at JCU, but works 50% time on this project) Dr Greg Bennett (post-doc based Gizo, Western Province)
Collaborating scientists:	Mike Batty, Secretariat of the Pacific Community Quentin Hanich, Australian National Centre for Ocean Resources and Security (ANCORS)
Partners:	Rosalie Masu, Ministry of Fisheries and Marine Resources, SI
Country(ies) and/or hubs in which research was undertaken:	Solomon Islands, Kiribati and Vanuatu
Relates to AAS theme:	Resilience, NRM, productivity

1. What did this project set out to do? What outcomes are specified?

The project seeks "to improve rural lives through the vehicle of community-based fisheries management (CBFM)" (project document)

The aim of the project is "to develop and nurture the structures, processes and capacity to implement and sustain national programmes of CBFM in Kiribati, Solomon Islands and Vanuatu" (project document)

The project document lists six objectives: [those in bold relate to / draw from the work in the SI]

- Critically analyse CBFM and related interventions as used in the Pacific region.
- Design and implement CBFM in Kiribati communities in collaboration with Island Councils and national agencies.
- Strengthen and enhance CBFM in Western Province of Solomon Islands in collaboration with provincial government and national agencies.
- Design and implement CBFM in Vanuatu coastal communities in collaboration with provincial government and national agencies.

- Enhance understanding and mechanisms to accelerate scaling-out of CBFMin the Pacific region.
- Design and implement an impact assessment programme to evaluate progress against AusAID and ACIAR indicators.

2. **Were any specific research questions articulated in the proposal? If so, what were these?**

The project document lists six research questions:

1. In each country, what are the critical success factors in implementing CBFM?
2. In each country, how does CBFM interact with the broader livelihood choices made by men and women?
3. What contribution does CBFM make to broader development outcomes outside the fisheries sector and what are the constraints and opportunities to improve that contribution? (e.g. how can that be integrated into the national development agenda?)
4. What constraints are there to gender equity in decision making around CBFM and related livelihood choices and what innovations and interventions are most effective in addressing these constraints to reduce gender inequality and enhance the productivity and diversity of women's livelihoods?
5. How can the successes from work done in communities and with national agencies in the three partner countries be spread through the region?
6. What are appropriate indicators of success for national CBFM programmes and what does an impact assessment programme 'look like'?

3. **How was the project framed and/or justified (scientifically and/or developmentally)?**

From a **development perspective** the project uses a "crisis" framing: inshore fisheries are central to rural economies and food supplies… but natural resources are degrading and the fishery under threat, especially from climate change… in the short term no other production sector can fill this protein shortfall… therefore there is a need to transform coastal fisheries… by developing and nurturing "the structures, processes and capacity to implement and sustain national programmes of CBFM".

From a **scientific perspective** the project is framed in terms of adaptive co-management, resilience, and innovation:

Adaptive co-management is widely promoted as an appropriate model for learning and governance… yet there have been few critical tests of co-management effectiveness anywhere… therefore the project will allow empirical tests of the fisheries management benefits and limitations of co-management models at village, provincial and national scales and in so doing make important contributions to the scientific literature. This project will also identify factors which promote adaptation as a process of deliberate re-assessment and adjustment of management arrangements given new knowledge or changed circumstances. Adoption of methods and approaches from this project will have impact on scientific methods, both in Melanesia and in other parts of the world.

Resilience in practice: the project will provide a case study in practical implementation of resilience thinking… publication of results from this study will contribute to social science understandings of resilience theory and empirical practice.

Innovation systems and achieving impact "at scale": diffusion of local social innovations is critical in the shift from village or project-scale research to durable governance models at provincial and national… but these processes are poorly understood… project will provide insights into the roles of brokering organizations, social networks, cross-sectoral, cross-scale institutions and leadership in the spread of innovation…adoption of methods will contribute to more effective networks and theory and practice in co-management of fisheries.

4. **Did this project build on previous WF work? If so, what and how?**

Yes. WF in the SI and the Pacific Region more generally has had an active research interest in CBFM for some years. The project document indicates:

The approach to CBFM developed, and tested and modifed in FIS 2007/116 [Improving resilience and adaptive capacity of fisheries-dependent communities in Solomon Islands] and FIS 2010/056 [Scaling-out community-based marine resource governance in Solomon Islands, Kiribati and Vanuatu] (Andrew et al. 2007[26], Cohen et al. 2012, Boso et al. 2010[27], Andrew et al. in prep) are has proving to be a good fit to the Solomon Islands context (Alexander et al. 2011).

A number of WF staff in SI also did PhD thesis work relating to CBFM (including Bennett, Sulu and Cohen).

As indicated above the project builds directly on the ACIAR-funded WF project "Scaling-out community-based marine resource governance in Solomon Islands, Kiribati and Vanuatu" (FIS/2010/056) [2011-2015, AUS$ 1.15 million], and before that "Improving resilience and adaptive capacity of fisheries-dependent communities in Solomon Islands" (FIS/2007/116) [2008-2011, AUS$ 0.899 million].

5. **What if anything about the project changed during the course of implementation?**

Other than the late starting of some activities, no major alterations are reported (or anticipated) in the 1st Annual Report (1 July 2013 to 15 April 2014).

What research methods are used? (based on correspondence with Neil Andrew)

"In the field-based work a range of methods are used […] These are well-established social science methods. […] As a flavour, and biased toward WorldFish work in Solomons, in the community-based case studies […] we use:

- Household surveys
- Focus groups (including tools developed by AAS benchmarking)
- Landings surveys (explained in PacFish update 2.3.2)
- Semi-structured interviews including (but not limited to) outcome evidencing and most

[26] Andrew, N., C. Bene, S. Hall, E. Allison, S. Heck, and B. Ratner (2007). Diagnosis and management of small-scale fisheries in developing countries. *Fish and Fisheries* 8: 1-14.

[27] Boso, B., Paul, C., Hilly, Z. and Pita, J. (2010). Community-based adaptive resource management in Solomon Islands: Lessons Learned 2122. The WorldFish Center, August 2010.

significant change interviews – methods described elsewhere. Other interview tools for 2.3.1 and 2.3.2 for example are based on those used for Cohen et al. 2013.

- Panel data (households within villages employing community based fisheries management, and fishers within those villages)
- Participant observation and unstructured interviews (particularly for 2.3.1 and 2.4.1)"

"Also you will see from the proposal that there are a number of reviews. […] The systematic review work on livelihood diversification in fisheries and aquaculture takes methods from medical research (see outputs 1.2.1)."

"Because this bilaterally funded project resides within AAS we have taken their lead in using, as much as makes sense, same or similar questionnaires and approaches to maximize the changes of cross-geographic comparisons."

6. What were (are) the main findings / results / conclusions?

It is still too early in the project to report on main findings, results and/or conclusions.

7. What outputs have been produced (as of December 2014)?

Type	No.
Journal articles (published or in press)	4
Journal articles (in review)	1
Project reports	2
Policy briefs (in press)	1
Total	8

Albert, J. A.., D. Beare, A.M. Schwarz, S. Albert, R. Warren, J. Teri, F. Siota, N.L. Andrew. (in press). Nearshore Fads for Food Security and Livelihoods in Solomon Islands. *PlosOne*.

Bell J.D., J. Albert, S. Andrefouet, N.L. Andrew et al. (in press). Investments to Optimise the Use of Nearshore Fish Aggregating Devices for Food Security in the Pacific Islands. Marine Policy

Bell, J.D. et al. (2015). Diversifying the use of tuna to improve food security and public health in Pacific Island countries and territories Marine Policy 51: 584–591.

Bennett, G., Cohen, P., Schwarz, A.M., Rafe, M., Teioli, H., Andrew, N. (2014). Solomon Islands: Western Hub scoping report. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2014-14

Bennett, G., Cohen, P., Schwarz, A.M., Albert, J., Lawless, S., Paul, C., Hilly, Z. (2014). Solomon Islands: Western Province situation analysis. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2014-15.

Cohen, P.J., Jupiter, S.D., Weeks, R., Tawake, A., Govan, H. (in review). The Multiple Objectives and Diverse Strategies of Locally-managed Marine Areas. *SPC Traditional Marine Resource Management and Knowledge Information Bulletin*.

Jupiter SD, Cohen PJ, Weeks R, Tawake A, Govan H (2014) Locally-managed Marine Areas: Multiple Objectives and Diverse Strategies. *Pacific Conservation Biology* 20: 165-179.

Community-Based, Co-Management or Governing Small-Scale Fisheries Of The Pacific; A Solomon Islands' Case Study. Policy Brief (in press)

A whole range of other outputs are planned.

8. **Have / how have gender and/or equity concerns been dealt with in the research?**

Gender equity is central to the way the research is laid out as seen in research question number 4:

> What constraints are there to gender equity in decision making around CBFM and related livelihood choices and what innovations and interventions are most effective in addressing these constraints to reduce gender inequality and enhance the productivity and diversity of women's livelihoods?

The project document suggests that: "The project also contributes to the CAPF strategic goal 'Empowering women to participate in the economy, leadership and education' and to sectoral objective 3 'Women's economic empowerment and livelihood security' of the Gender Thematic Strategy".

PART 2: Evaluative questions

1. **Is the research coherent with the AAS approach?**

Yes. The same arguments and language used in the AAS proposal are also used in the project document. The use of PAR and a concern with gender equity are very much highlighted in project proposal (although these elements are not yet very prominent in the journal publications). Neither is the PAR orientation very evident in the research methods used in the community-based studies.

2. **Is the research relevant to the AAS research programme?**

Yes, with its focus on resilience, natural resource management and governance the research undertaken through this project is highly relevant to the AAS research programme.

3. **What contribution is it making (is it likely to make) to the implementation of the AAS approach or any other aspects of AAS?**

Better resource management is an important plank of AAS, so a more empirically grounded understanding of the conditions and circumstances of successful CBFM should be a very significant contribution to AAS. Both PAR and gender equity are central to the project. If these are approached critically, this project should have the potential to help AAS move beyond aspiration and rhetoric in both of these domains.

4. **Is there evidence that the research findings have been (are being) integrated / incorporated into any or all AAS research initiatives?**

n/a

5. **What is the quality of the research outputs?**

The quality of the research outputs appears to be high. Four research outputs have been published in respected international refereed journals. The two project reports are of a different nature, but appropriate.

6. **Are staffing and partnerships appropriate?**

Yes. This is a research field in which the key staff already have significant experience. In relation to the work in the SI, some of the key staff are not based in the hub, but e.g. the arrangement having staff based at JCU seems to work well. Because of limited local research capacity, local research partnerships and collaboration are limited.

7. **What contribution is this research making (is it likely to make) to international public goods?**

After 18 months the project has produced a number of papers in international journals, and all indications are that this will continue. The research is rooted in real problems and engages with current debates. This, combined with the empirical and comparative orientation (across three countries) of the research, bodes well for the production of international public goods.

PART 3: Conclusions

This relatively large bilateral project is very clearly a research oriented project. It rooted in current scientific debates and uses current theory and concepts. It is directed and staffed by qualified researchers. It is producing outputs that are finding their way into international refereed journals. All indications are that this success will continue.

At least rhetorically the project appears to be closely integrated with AAS in terms e.g. of the use of PAR and the focus on gender equity. However, this alignment is not so apparent in the research methods that are being used. It is of course true that while this project is only 18 months old, WF has worked on and promoted CBFM in SI through ACIAR funding for many years. It would therefore be very odd indeed if the project was not very closely aligned with the broader thrust of AAS work. In sum there does not appear to be any serious tension between the project and the AAS RinD approach.

It is perhaps not so much a case of this bilateral project contributing to or complimenting the AAS research programme – in Western Province of SI, to a large extent tis bilateral project is the AAS research programme.

PART 4: List of documents consulted

Albert, J. A.., D. Beare, A.M. Schwarz, S. Albert, R. Warren, J. Teri, F. Siota, N.L. Andrew. (in press). Nearshore Fads for Food Security and Livelihoods in Solomon Islands. PlosOne.

Bell, J.D. et al. (2015). Diversifying the use of tuna to improve food security and public health in Pacific Island countries and territories Marine Policy 51: 584–591.

Bennett, G., Cohen, P., Schwarz, A.M., Rafe, M., Teioli, H., Andrew, N. (2014). Solomon Islands: Western Hub scoping report. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2014-14

Bennett, G., Cohen, P., Schwarz, A.M., Albert, J., Lawless, S., Paul, C., Hilly, Z. (2014). Solomon Islands: Western Province situation analysis. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2014-15.

Improving Community-based Fisheries Management in Pacific island countries (FIS/2012/074). Project Document.

Improving Community-based Fisheries Management in Pacific island countries (FIS/2012/074). Annual Report, 1 July 2013 to 15 April 2014.

ACIAR website (for background on FIS/2010/056 and FIS/2007/116).

E.5 Cambodia – RFF ENHANCEMENT PROJECT

PART 1: Establish the basic facts of the case

Table E-12: RFF Enhancement overview

Project name:	Rice Fields Fisheries (RFF) Enhancement Project
Start date:	23 April 2012
End date:	17 April 2016 (proposed)
Funder:	USAID
Total planned budget:	Total estimated = USD 1,998,762 (Indirect cost =$ 323,494) Total obligated = USD 532,070 (based on the signed contract)
Principal Investigator(s):	Alan Brooks (50 days per year) and Eric Baran (15 days per year)
Other key researchers:	Chea Sheila, two other research assistants
Partners (confirmed)	Trail Blazer Cambodia Organisation (TCO) Cambodia Organisation for Women support (COWS) ANKO (no full name available)
Partners (proposed)[28]	Action For Development (AFD) Poor Family Development (PDF) AphatSvrey (AS) Village Support Group
Country(ies) and/or hubs in which research was undertaken:	Cambodia
Relates to AAS theme:	Productivity, Income and Nutrition

1. **What did this project set out to do? What outcomes are specified?**

The project is to develop improved sustainable rice field fishery management practices, mainly for poor aquatic resource dependent households.

The project has set to do activities to get the following 3 main outputs:

1) **Output 1**: Existing rice field fisheries environments and management approaches fully characterised and up to 5 categories of rice field fishery systems described (20%). Steps are:

    a. Stakeholder workshops and expert consultations
    b. Literature review
    c. Field survey and
    d. Recommendations in the form of reports and publication as outcome

2) **Output 2:** Best practice and most promising rice field fisheries enhancement models validated for future scale out (60% emphasis)

[28] AFD, PDF, AS and VSG were listed in the proposal but are not seen in any report.

a. Select 9 to12 sites for initial study
b. Detailed action plan
c. Baseline survey to quantify production
d. Training for local communities and NGO partners
e. Implement improved management approaches for 2-3 production cycles
f. Establish monitoring procedures to assess biological indicators
g. Develop methodology for and conduct baseline, monitoring and evaluation surveys
h. Arrange for students at national universities to undertake their Master thesis studies at project sites

3) **Output 3:** Best practices in rice field fisheries enhancement for broader adoption promoted for scale out by the government and development agencies (20% emphasis)

a. Work out the potential increase in rice field productivity based on the data collected / monitored
b. Develop guidelines on best practice approaches
c. Produce communication materials and disseminate project

Expected Outcomes:

- Clearer understanding about rice field fisheries which helps integrate it into national agriculture and water management planning, particularly irrigation development and rice farming expansion and intensification.
- Better approaches to the enhancement of rice field fisheries are adopted by a wide range of implementing agencies
- A short-term impact will be increased yields up to 50 project sites to benefit 100,000 people.
- Potential longer term impacts - average production of fish from 2 million hectares of rice fields increases by 50 kg/ha/year, equivalent to a total output of an additional 100,000 tons or 2.5 million people consuming 40 kg fish/person/year
- Demonstrable benefits in nutritional wellbeing due to improved mechanisms to increase the availability of more nutrient dense species.

2. Where any specific research questions articulated in the proposal? If so, what were these?

- What types of enhanced CFR (Community Fish Refuge) habitats are more productive in terms of fish catch and the biodiversity of the fish catch e.g. brush parks or other submerged structures, partial cover with macrophytic vegetation, CFR bathymetry and channel depth and seeding‘ with indigenous species?
- What are the best CFR design and practices suitable for enhancing productivity of different rice field agro-ecosystems in Cambodia?
- What relationships exist between different aspects of the ecosystem domains and their impact upon one another (e.g. ratio of CFR area to rice field area, number and size of trap ponds on the rice fields, best yielding fish assemblages especially predator prey populations)?
- What are the impacts of habitat enhancement within CFRs and benefits to households accessing fish in the rice fields and seasonally flooded surrounding wetlands
- How to effectively design and manage these CFRs and associated rice field fisheries according to local conditions to increase productivity and equitably distribute benefits?
- What is the best size ratio in area between the CFR and rice field fisheries?
- What is the impact of CFR clusters within rice field fisheries watersheds‘ compared to singleton CFR?
- What size should the interconnecting channels be and how many should link to the rice fields?

- What is the best ratio of trap pond or number of cement rings to rice field fisheries area?
- Does the timing of opening the CFR channels to the rice field impact yield in the rice fields?
- In an enhanced natural ecosystem how can the population of food or prey fish be increased so that the more sought- after populations of mainly predator black fish may also increase (e.g. catfish, snakehead fish etc.)?
- How can the populations of micro-nutrient rich species (e.g. Changwa" Esomuslongimanus and "Sloeukrussey" Paralaubucatypus) be enhanced in a modified natural ecosystem?
- What is the effect and impact of use of pesticides and what is the potential to promote IPM?
- What will be the likely impact of rice intensification (e.g. SRI) and irrigation?

3. How was the project framed and/or justified (scientifically and/or developmentally)?

- Rising population, increased fishing pressure, intensification of rice farming, and erosion of the natural ecosystem habitat all contribute to declining fish yields and species biodiversity; therefore, fish refuges were needed to support the communities who depend largely on wild fish catch for their daily diet where fish contributes up to 90% of the total protein intake.

- If just half of the wetland area, especially rice fields, increased fish yield by 50 kg/ha/year, an additional output of 87,500 tonnes could be achieved, which was possible to increase fishery production in Bangladesh, the same came be done in Cambodia (AAS Team is calling it roll-out program)

4. Did this project build on previous WF work? If so, what and how?

Although, AAS reports and working papers indicate that it is a project that builds on WF work in Bangladesh, the Philippines, Solomon Islands, or it's a roll-out project, in fact, Cambodia had rice field fisheries research focused on productivity which was initiated in mid-90s by Aqua-Outreach of Asian Institute of Technology jointly launched with the Cambodian government. The project actually aims to complement the plan of the government in promoting a large number of Community Fish Refuges (CFRs) and the CFR approach (http://worldfishcenter.org/resource_centre/WF_3147.pdf). These were mentioned in the project description attached to the signed agreement and also in concept note and various working papers as follows: "Currently the FiA has embarked on a programme to promote Community Fish Refuges (CFRs) in 1200 communes by 2019, intended to increase productivity of flooded wetlands and rice fields through interconnecting channels."

5. What if anything about the project changed during the course of implementation?

- Initially they planned to work in 50 sites, but monitoring has been done in 40.
- Stakeholders' workshop was delayed about a year. It was planned during Q2-3 of 2013 but actually held in Q1 of 2014.
- Change of staff might have forced change in several activities, but it is not clear from project reports
- Student recruitment to carry out research was planned from Q1 of 2013 but actually occurred in Q1 of 2014 and until the time of Evaluation Teams visit, there was only one student recruited but another three were under the process.
- Change of partners, initially they listed about six NGOs, but actually only three NGOs can be seen from the report. There is no explanation for this change.

6. What were (are) the main findings / results / conclusions?

Based on data from 40 CFRs and 640 families monitored, the latest report (Oct 2013 – March 2014) showed increase in catch but decrease in biodiversity as shown in the tables below:

Table E-13: RFF Enhancement - Average catch per gill net per set

Indicators	Baseline survey	After 1 year	% change
Catch per gill net (kg)	331	461	39.3% increase
Catch per gill net (# fish)	44	64	39.3% increase

Biodiversity index in various category of rice fisheries sites – Except Category 3, indicators show decreased biodiversity. Report has not given the reason.

Table E-14: RFF Enhancement - Biodiversity index in various category of rice fisheries sites

Years	Category 1	Category 2	Category 3	Category 4
Nov 2012	3.76	2.93	3.09	3.19
Nov 2013	2.83	2.94	3.28	3.11

Similarly, whether fish consumption and income per family have increased or not after the intervention, has not yet been answered. Graphs except seasonal variations (Table E-13 and Table E-14 show in the latest report i.e. 4_Semi_Annual_Report_Oct_2013-March_2014.pdf

Observation during the visit of Evaluation Team in November 2014:

In Santey village in Siem Reap, three earth refuge ponds (8m long, 6m wide and 3m deep) and three cement rings (1 m diameter, 2m deep) were observed. According to the farmers or the community facilitator, only eight earth refuge ponds and four cement refuge ponds have been constructed during 2013-2014. Unfortunately, the cement rings are too small to hold fish and other aquatic animals. A community pond and the other ponds constructed in private lands seem to be working to provide refuge to the wild fish during dry season; however, presence of excessive number of snakehead fish, which is highly carnivorous, has drastically reduced the abundance of other fishes. Separating snakehead fish and keeping separately in a pond could enhance the productivity of those ponds. To do that encouraging few farmers to start commercial farming of snakehead fish would help. Villagers whoever catch live snakehead fingerlings could sell to those commercial farmers to use as seed. Snakehead fish has high demand; therefore, there is a very good potential of developing its farming using pellet feed.

7. What outputs have been (are being) produced?

Output 1: Literature review, understanding of Rice fish systems and Tonle Sap fisheries and so on.

- National Consultation Workshop
- Rice field fisheries category handbook
- Working papers: 2
- Project reports: 4 semi-annual reports

Output 2:

- 40 sites, 400 or 600 families were monitored for baseline survey
- 140 (planned 186) fish refuges ponds and 136 (planned 96) cement rings have been constructed
- 176 markers and signboards install/replaced for demarcation of fish catch prohibited areas.
- Research output – by M.Sc. students from national universities who undertake their Master thesis studies at project sites (8 were planned; 1 from Royal University of Agriculture has done this so far, 3 more were being contracted at the time of the evaluation)
- Best practices in RFF enhancement tested and provided the training (capacity building) to the following number of people:

Table E-15: RFF Enhancement – capacity building

1	Training	As of Oct'3-Mar'14
	No. of events	28
	No. of events	543
	No. participants	321
	Male	242
	Females	
2	Awareness raising	As of Oct'3-Mar'14
	No. of events	46
	No. of participants	1,394
	Male	686
	Females	708

Output 3:

- 2 working papers
- 1 video clip (https://www.youtube.com/watch?v=PHMNKidflec)
- Lessons learned sharing workshops and participants

Table E-16: RFF Enhancement – workshop participants

SN	Participants	Total	Men	Women
1	Commune Council & Village Chiefs	59	51	8
2	District councillors	2	1	1
3	Fishery cantonment	12	12	0
4	CFR Communities	117	108	9
5	Monks	2	2	0
6	Policemen	1	1	0
7	NGO Staff	30	22	8
	Total	223	197	26

8. Have / how have gender and/or equity concerns been dealt with in the research?

- Some attention to gender can be seen in the segregation of training participants by gender. It is not clear whether there will be more data on women involved in wild fish catching, grading, and also in project meetings / workshops.
- It is not clear whether gender segregated data are maintained. If yes, then they should be analyzed and reported.

PART 2: Evaluative questions

1. **Was / is the research coherent with the AAS approach?**

- Yes, research questions look quite coherent.
- The project emphasizes mainly on productivity of rice field fisheries but there is little mention about income and nutrition.

2. **Was / is the research relevant to the AAS research programme?**

- Research questions are very relevant but a clear research design was not apparent.

3. **What contribution did this research make (is it making / is it likely to make) to thinking about / the implementation of the AAS approach or any other aspects of AAS?**

- If appropriate data are collected systematically, this research may provide insight as to if and how productivity of rice field fishery can be increased..

4. **Is there evidence that the research findings have been (are being) integrated / incorporated into any or all AAS research initiatives?**

- WF has other projects either started earlier or later, funded by various organizations, as shown in the list below. However, they have their own set of objectives and framework. Activities might have been shared; even the beneficiary farmers might have been overlapped, but results are not yet ready to share.

    a. Fisheries Valuation Project
    b. Strengthening Aquatic Resource Governance
    c. Wetlands Alliance
    d. Homestead food production project

5. **What is the quality of the research outputs?**

- Limited research outputs can be seen to date. However, the project sites provide abundant opportunities to carry out very good research. The quick staff-turn over in the project and the weak research capacity of remaining staff may limit the quality of the research output. Better guidance from external (headquarters or part-time consultant) may help a lot in this regard.

6. **Were staffing and partnerships appropriate?**

- Project supports the Country Director's salary for 50 days per year
- Only one staff (Chea Seila) has been hired (as seen in the project costing sheet) as Research Assistant who is also working for other projects. Therefore, human resource for research looks inadequate
- Although, in a report staff changes has been mentioned but it was not clear whether they were particularly hired for this project or for others.

- For Research portion, there was a plan to involve four students from RUA. It was planned to start form Q1 of 2013 but it happened only in Q1 in 2014. According the interview with a concerned person, only one student was involved.
- **Project partners** are mainly NGOs, which have developmental focus and research is not their major focus, nor do they have any/much research background.
- Originally 6 NGOs were planned for partnership but it looks like not all of them are working with WF.
- Turn over of staff has been high e.g. seven staff including National Project Coordinator resigned during May – August 2013s. In March 2014, two more staff in COWS resigned.

7. What contribution has this research made (is this research likely to make) to international public goods?

a. There are good lessons learned on the level of potential contribution of rice fishery enhancement program for the other countries, if data are collected systematically, especially, on how the unique and declining flood plain fisheries can be revived using fish refuges through community mobilization.
b. There are some working papers, project reports and a video clips. IPGs are likely to be produced but as the program is still in implementation phase and peer reviewed publication process takes some time.

PART 3: Conclusions

- **Research methodology** : Based on the field observations comparison between two types of fish refuges in various agro-ecological zones, could be done if they collect data systematically with certain time intervals

- **Results**: concrete results (data) are not available yet to support all the hypotheses. Although, some indications have been found that Community Fish Refuges increased fish abundance or catch, but may not increase the fish biodiversity (actually has decreased). Not clear about nutrition and income of the people. Therefore, it is likely that the project may not adequately address these questions.

- **Dissemination**: WF has started already via video clips and working papers making them online available and organizing stakeholders workshop/seminar etc, although, scientific base / data are still to compile to demonstrate. Reports do not clearly substantiate the increments in terms of biodiversity (actually has decreased), income and nutrition.

- **Interactions with communities and partners**

    - While interaction with the communities, project staff and partners, this project has created awareness about working together in the community and has been able to raise their enthusiasm and ambitions.

    - In Santey village in Siem Reap visited, earth refuge ponds appeared to be working. The evaluation team had concerns about the cement rings: because of their small size, many fish including snakeheads, frogs, crabs etc. are crammed in a small space.

- A larger community refuge pond might be a better option.
- In these refuge ponds, there are a lot of snakehead fish, which can eat small fish. If snakehead fish and other carnivorous fish could be separated, more fish could remain in the refuge ponds so that more fish would be available to spread during the summer. One of the best ways to improve existing system would be development of snakehead farming in land in this area collecting the fingerlings from the wild engaging communities in collecting snakehead fingerlings live from their rice fields and sell to those commercial farmers so that communities also get benefits

- **Links / synergies / tensions between bilateral projects and the AAS RinD approach** – This project is quite relevant to AAS, but main weakness is in implementation, especially in planning and designing for scientific research.

PART 4: List of documents consulted

Documents provided during the Field observation

- YouTube video (https://www.youtube.com/watch?v=PHMNKidflec)
- Concept note
- Project Proposal (Cooperate Agreement 2012.pdf)
- Project Reports
  - 1_semi_annual_report Apr-Oct 2012.pd
  - 2_semi_annual_report_april_to_october_2012.pdf
  - 3_ semi annual report Nov 2012-Mar 2013 V3.pd
  - 4_Semi_Annual_Report_Oct_2013-March_2014.pdf
  - Project costing.xls

Working papers:

- Increasing productivity and improving livelihoods in aquatic agricultural Systems – A review of Interventions. By Castine, S.A.; Sellamuttu, S.S; Cohen, P; Chandrabalan, D.; Phillips, M. [http://www.worldfishcenter.org/resource_centre/WF_3147.pdf]

- Community fish refuges in Cambodia – lessons learned by Joffre, O. ; Kosal, M. ; Kura, Y. ; Pich, S.; Nao, T. Lessons Learned Brief 2012-03. WorldFish. Phom Penh, Cambodia. 16 p

ANNEX F. PUBLICATIONS ASSESSMENT

The analysis of publications conducted for the AAS evaluation consists of two components:

(1) a review of a sample of publications by the evaluation team, and

(2) a bibliometric analysis conducted by a consultant. The methods and findings for both components are described in this Annex.

F.1 Publications review by evaluation team

As outlined in the Inception Report, a review of a sample of publications by the evaluation team was one of the evaluation methods applied for this evaluation.

F.1.1.Review Methodology

This section describes the methodology that was used for the publications review, covering both the sampling and the assessment approach.

Sampling

The evaluation team (hereafter referred to as team) used a database of WorldFish/AAS publications that was compiled in December 2014. The database covered the years 2009 through 2014. There were 599 entries in this database distributed over years and publication types as shown in Table F-1: AAS Publications by type and year. The team assumed that the database covered the majority of all published outputs during this period and that there was no systematic bias regarding the publications that may have been missed. Considering the available resources, it was estimated that each team member had time to assess between 15 and 20 publications. On this basis, the sampling scheme described in the following was developed.

Since the focus of this review was on science quality, it was decided to place considerable emphasis on journal articles and working papers. Journal articles and working papers account for 36% and 13% respectively of all publications over the entire period. Given that some of the AAS work is still in the form of reports and working papers, publications in this category also were included into the assessment. Since the evaluation team had a responsibility to look at “legacy” research, it was decided to consider two publication periods: 2009 – 2011 and 2011 – 2014. Considering both periods, 25% of the publications for review were selected from the former period, and 75% from the latter period. This distribution of publications for review over three publication types and two time periods resulted in a selection that is shown in Table F-2: Number of reviewed publications by type and time period. Originally, 85 publications were sampled using stratified random sampling based on the above categories. Minor adjustments had to be made during the review process, e.g., because it turned out that a Working Paper was a preliminary version of a journal publication that was also included into the review. The publications were assigned to the team member according to area of expertise.

Table F-1: AAS Publications by type and year

	Year of publication							
Publication type	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**Total**	**%**
Journal article	51	55	41	7	21	39	214	36%
Working paper	32	17	7	3	11	6	76	13%
Book chapter	18	16	21	3	4	1	63	11%
Report	4	5	9	1	8	11	38	6%
Fact sheet	10	4	10			5	29	5%
Program brief	7	9	9			4	29	5%
Conference proceedings	6	9	5	1	3	1	25	4%
Needs clarification				15	4		19	3%
Magazine article	4	5	4		3	1	17	3%
Policy Brief	1	2	5	2		7	17	3%
Manual	5	2	7		1	1	16	3%
Brief	3	2	2	3	3	1	14	2%
Brochure	1		1			4	6	1%
Postcard	5						5	1%
Annual report	1	1	1			1	4	1%
Catalogue	1	1	1				3	1%
Compendium	3						3	1%
Newsletter						3	3	1%
Poster	1		2				3	1%
Workshop report				3			3	1%
Strategic plan	1		1				2	0%
White paper					2		2	0%
Audio/Visual	1						1	0%
Bibliography		1					1	0%
Bulletin					1		1	0%
Discussion Note			1				1	0%
Guidance Note					1		1	0%
Guidelines					1		1	0%
Outcome story				1			1	0%
Presentation		1					1	0%
Total	**155**	**130**	**127**	**39**	**63**	**85**	**599**	100%

Table F-2: Number of reviewed publications by type and time period

		Time period		
		2009-2011	2012-2014	**Total**
Publication Type	Peer reviewed journal	9	32	**41**
	Book chapter	3	5	**8**
	Report	6	10	**16**
	Working Paper	2	13	**15**
	Other	1	2	**3**
Total	**Total Number**	**21**	**62**	**83**
	Percent	**25%**	**75%**	**100%**

Review methods

The team devised a rating scheme for the publications that is presented in the Appendix to this report. For the papers that were published in journals, the quality of the journal is considered to be a major criterion of the quality of science. The impact factor of the journal was considered as one, but not the only indicator for the quality of the publication. The team also took into account that the impact factors differ across disciplines. Other criteria included assessments of originality, sophistication of methods and overall quality of the publications by the team members. An additional set of criteria was used to classify the publications with regard to their links to the goals and characteristics of the AAS program, including systems approach, gender, poverty/marginalization and participatory action research. The team members provided not only a categorical rating of the publications, but also provided comments explaining each rating.

F.1.2.Inter-rater Reliability

Considering the trade-off between having each publication reviewed by two team member versus reviewing a larger number of publications, the following procedure was applied. The publications were reviewed by one team member, based on the match of the team member's area of expertise with the nature of the publication. To assess the reliability of the ratings, a random sample of eleven publications out of the entire sample was reviewed by two team members. The comparison of the ratings showed that for most criteria, not more than one or two papers were rated differently, and in all of these cases, the ratings did not differ by more than one level. For those ratings, the assessment was considered to be robust to the extent that this is possible within the scope of such an evaluation. With regard to the following criteria, there were larger differences, as follows:

- Discipline: The comparison showed that there were considerable differences across raters in identifying the academic discipline with which the paper was most closely associated, indicating that the discipline could not easily be derived from the publications. However, the raters did select disciplines of the same group (e.g., a publication attributed to "sociology" by one rater was assigned to "other social science" by the other rater.) Therefore, the disciplines were collapsed into four major groups for the analysis (social sciences, natural sciences – fisheries/aquaculture, other disciplines, inter/transdisciplinary).
- For the criteria "poverty link" and participatory action link", there was disagreement among raters whether or not this category was applicable, considering the nature of the paper. Therefore, the two categories were merged when reporting the findings.
- For the criterion "originality", the rater who was closer to the discipline concerned tended to rate the paper one level lower than the other rater. While this can be expected, it was decided to interpret this criterion with care and place more emphasis on other quality criteria.
- There was more than 20% disagreement on the criterion of "practical relevance", i.e. the assessment on whether the paper included specific implications or recommendations or policy and practice of practical relevance based on the findings of the paper. The results are still included here for information, but the findings on this criterion have not been used in the main report.

F.1.3.Findings

The following sections present the findings from the review. Cross-tabs or bar charts are used to display the results. Percentages presented in cross-tabs always add up to 100% in the respective columns, not in

the rows. Reference is made to the comments provided by the team members where this appeared useful to interpret the findings presented in the tables and figures.

In some cases, the findings are disaggregated by the two time periods (2009-2011 and 2012-2014) that were used for the sampling. When interpreting the results of this disaggregation, one has to keep in mind that not all publications of the second time period can be attributed to AAS. Especially in case of journal publications in the social sciences, the review and revision process often takes more than one year. Therefore, some of the publications of the 2012-2014 period may well have been in the pipeline prior to AAS.

F.1.4. Classification of the reviewed publications

Table F-3 shows the classification of the publications sampled for the review by discipline group and by time period. One can see that the share of publications that fall under economics and social sciences has increased, while the share of publications in fisheries and aquaculture has declined. This trend can be expected given the nature of the AAS program.

Table F-3: Classification of reviewed publications by discipline group and time period

		Time period		
		2009-2011	2012-2014	**Total**
Discipline group	Economics and social sciences	32%	44%	**41%**
	Fisheries / aquaculture (natural sciences)	29%	16%	**19%**
	Other disciplines	10%	19%	**17%**
	Inter/Transdisciplinary	29%	21%	**23%**
Total		**100%**	**100%**	**100%**

Figure F-1: Classification of reviewed publications by AAS theme

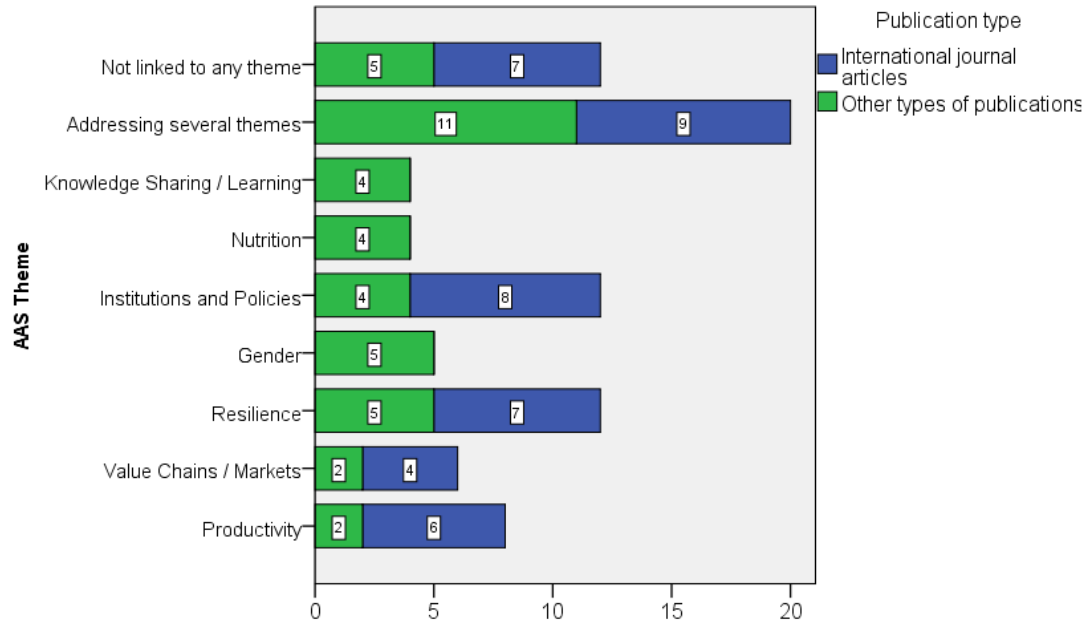


Figure F-1 displays the classification of the publications by AAS theme and publication type. For three themes (nutrition, gender and knowledge sharing & learning), the number of publications was relatively small, and no international journal publication appeared in the sample. This may be due to the fact that these themes were mainly introduced with AAS and were not central to earlier research by WorldFish.

Figure F-2 displays the ratings of reviewed publications by the countries in which the AAS hubs are located. The figure also indicates the time period of the publication.

Figure F-2: Classification of reviewed publications by AAS hub country

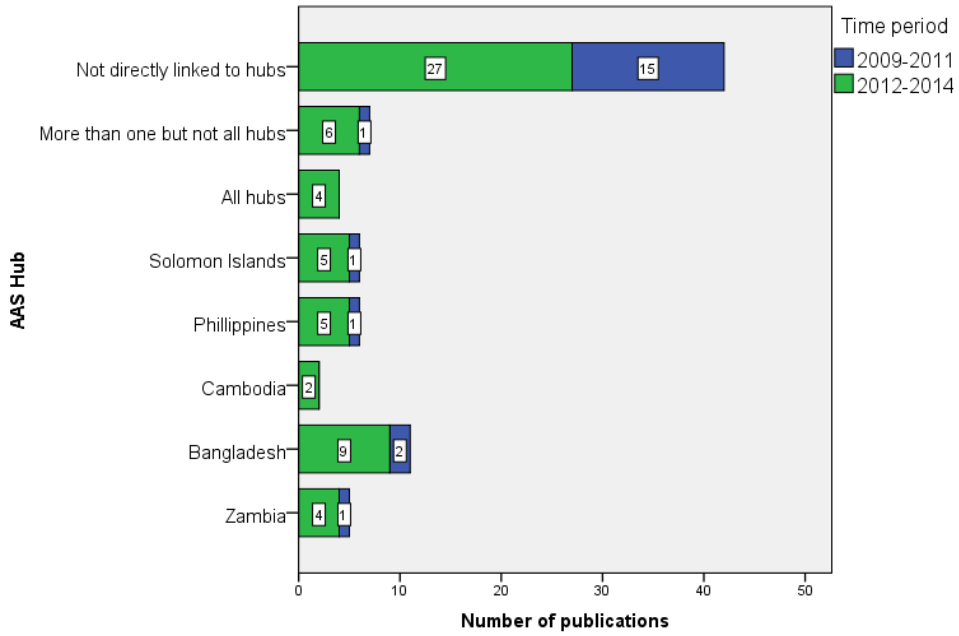


Figure F-2 shows that there was clearly a shift in publication activities towards the countries in which the AAS hubs are located. The table also shows that Cambodia is the only hub country that did not have a publication in the first review period within the sampled publications. The table also indicates that a considerable share of the publications under review that appeared in the second time period do not refer to the countries in which the AAS hubs are located. This is to be expected since many publications of the earlier period may have been in the publication pipeline and only appeared in the second time period. Moreover, there was research outside the hub countries that continued in the second time period.

Figure F-3: Classification of reviewed publications by type

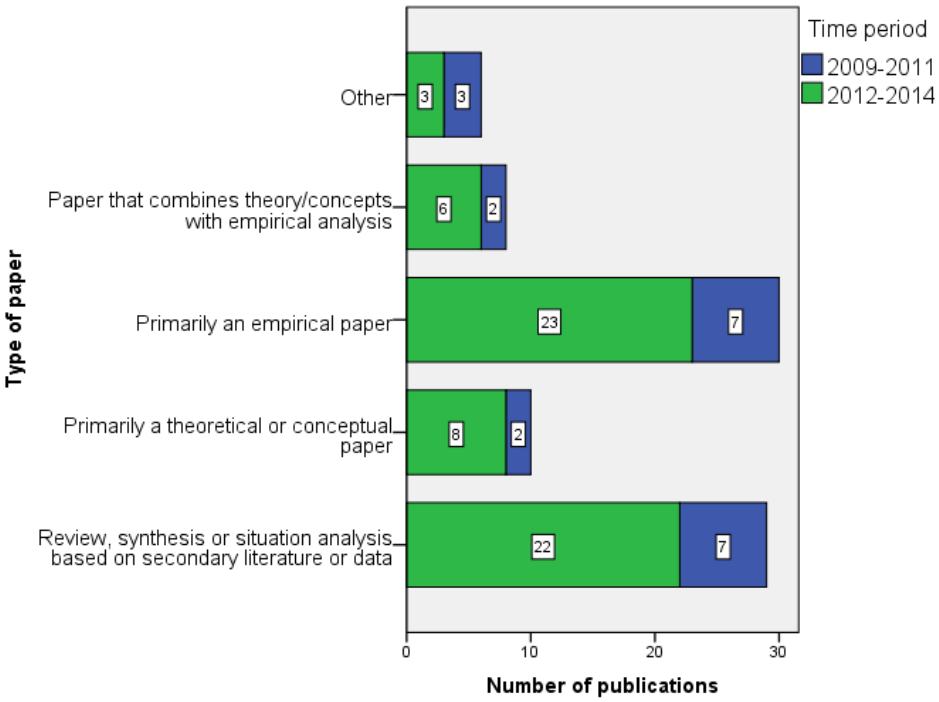


Figure F-3 classifies the publications by type. The majority of the publications fell into two categories: (1) reviews and situational analyses and (2) empirical papers. The number of primarily theoretical or conceptual papers and the number of papers that combine theoretical concepts with empirical analysis was considerably smaller.

F.1.5.Co-authors from developing countries

Publishing with co-authors who are members of national research organizations in developing countries was considered as an indicator of partnerships with NARS and, at the same time, as an indicator of contributing to capacity development. Almost half of the peer reviewed journal articles included in the sample had such co-authorships, which can be seen as comparatively high in the CGIAR context. Overall, more than a third of the publications under consideration had national co-authors, which is also a positive result.

Table F-4: Co-authorship from developing countries

		Percent of publications with co-author from developing country		
		yes	no	cannot be determined
Publication Type	Peer reviewed journals	44%	56%	-
	Book chapters	12%	38%	50%
	Reports	38%	50%	12%
	Working Papers	27%	47%	26%
	Others	33%	67%	-
Total		**36%**	**52%**	**12%**

F.1.6.Quality of publications

As indicated above, one factor among others used for assessing quality of science was the impact factor of the journals in which the research was published. Table F-5 displays the impact factors of the journal publications by time period.

Table F-5: Impact factors of reviewed journal publications, by time period

		Time period		
		2009-2011 (n=9)	2012-2014 (n=32)	Total (n=41)
Impact factor group	No impact factor	11%	3%	5%
	up to 1.00	22%	3%	7%
	1.01 to 2.00	11%	34%	29%
	2.01 to 3.00	22%	25%	24%
	3.01 to 4.00	11%	9%	10%
	4.01 to 5.00	11%	3%	5%
	above 5.00	11%	22%	20%

Impact factors have to be interpreted with care because they differ considerably across disciplines. Moreover, it is often difficult to publish particularly innovative papers in respected journals since there is a tendency to publish mostly papers that conform with the established mainstream. Taking these caveats into account, the finding can be interpreted as follows:

The percentage of publications in journals with no impact factor and with an impact factor of less than one has diminished in the second time period, while the share of publications in journals with impact factors between one and two and those above five increased considerably. This finding points to an overall increase in the quality of journal publications in the latter time period. Interpreting this result, one has to take into account, however, that the sample for the first time period was comparatively small. For an overall assessment, one also has the analysis of all journal publications reported under Section 2 into account.

The majority of the publications fall into two groups of disciplines: (1) economics and social sciences with focus on development, and (2) natural sciences with focus on fisheries and aquaculture. In both fields of research, most journals that are well respected have impact factors in the range between one and three. The majority of the reviewed publications fall in this category. Considering the journals in more detail, the following assessment was made based on the expertise of the different team members:

- Articles in economics and social sciences have been published in journals such as Ecology and Society (Impact Factor (IF) 2.7), Ecological Economics (IF 2.5), Food Policy (IF 2.3) and World Development (IF 1.7). All of these journals are highly respected in the respective disciplines are widely read within the development-oriented research community.
- Articles natural sciences with focus on fisheries and aquaculture have been published in journals such as Ocean and Coastal Management (IF 1.8) and Aquaculture Research (IF 1.3). These are well respected journals in the respective research areas. Three of the publications under review were published in the journal Fish and Fisheries, which has a rather high Impact Factor of 8.7 and is ranked as number one among the journals in the field of fisheries (see Section 2 below).
- Articles or papers classified as inter-and transdisciplinary have also been published in respected

journals, such as the Journal of Environmental Management (IF 3.2) and Marine Policy (IF 2.6). Two articles in this category have been published in journals with comparatively very high impact factors: PNAS (IF 9.8) and PLoS Biology (IF 11.7).

Overall, one can conclude from the review of the sampled publications that they have been published in highly-respected international journals in their fields. Moreover, some interdisciplinary publications have been published in top general journals. This assessment is consistent with the bibliometric analysis of the full set of journal publications presented in Section 2.

As a further criterion to assess the quality of the publications, the overall assessment of the sampled publications by the evaluation team members is taken into consideration. This assessment is shown in Figure F-4. More than two thirds of the journal publications were rated to be excellent. As the comments made by the evaluators show, the papers were rated as excellent for a variety of reasons, ranging from innovative methods in the case of empirical papers to providing much needed overviews in case of review papers. Reports and working papers have a higher share of publications rated as average, which is to be expected, since they typically undergo further refinement before being submitted to journals. Very few publications were considered to be of poor quality. In most cases, the lack of any analysis was mentioned as reason for this rating.

Figure F-4: Overall assessment by type of publication

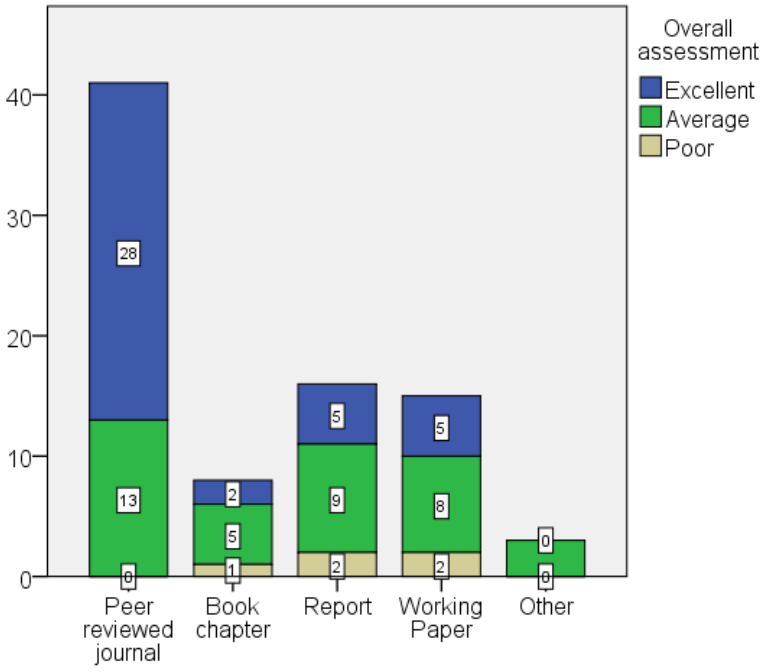
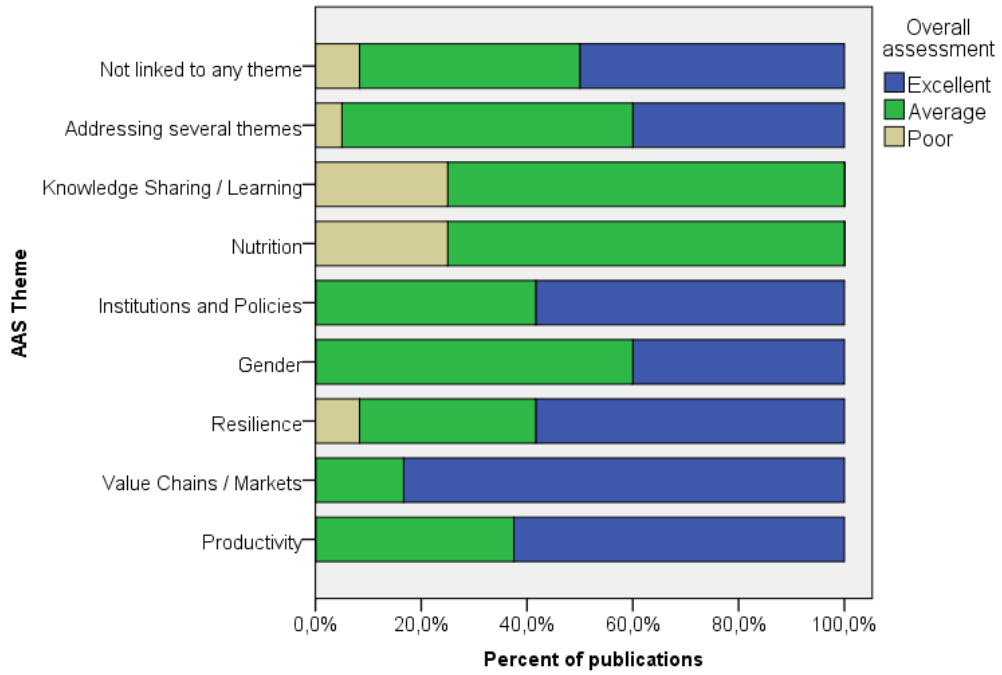


Figure F-5 displays the overall rating of the publication by AAS theme. The publications associated with the theme “values and market chains” received the highest ratings. The ratings for the themes “nutrition” and “knowledge sharing and learning” were lower, but one has to take into account that there few publications in the sample for these two themes, and these were not journal publications.

Figure F-5: Overall rating by AAS theme



The data were also disaggregated by discipline group (not displayed here). There were no major differences in the ratings among discipline groups and inter-/transdisciplinary publications. Only publications in the category (other disciplines) tended to receive lower ratings.

A related quality criterion is “originality”. Papers were rated as “very original” if they explored new research areas, developed new theoretical/analytical concepts or research methods and/or created important new insights. Papers were rated as “not very original” if they used standard methods to mostly confirm already established knowledge. Papers could also be rated in between these two categories as “somewhat original.” As described above, the ratings have to be considered with care since the ratings differed depending on closeness of the rater with the field of research concerned. Taking this caveat into account, more than half of the journal publications were considered to be very original, as shown in Table F-6. Twenty percent of all publications were considered to be not very original. The comments made by the evaluators to explain their ratings indicate that papers were often rated as “very original” because they developed a new conceptual framework or addressed topics that had not received much attention before. The review papers that were considered to be “very original” were rated in this category because they were seen to fill important knowledge gaps.

Although good benchmarks for the “originality” criterion are not readily available, the results of the rating are considered to be a favorable outcome, considering that large research organizations with a focus on applied research can be expected to have a considerable share of “normal science” (research using established methods and remaining within established paradigms) in their publications portfolio, especially if they also have incentives to produce large numbers of publications. Moreover, it is also to be expected that other outputs than journal publications, such as working papers, receive lower ratings on originality than journal papers, since the focus on the innovative and original results is usually sharpened in the process of turning those publications into journal papers. In the second time period, one might have expected an increase in the share of outputs rated as “very original” considering the ambitions of AAS, but comparing the ratings for originality across the two time periods, no major change

could be observed. Likewise, a disaggregation of the ratings by discipline group (not displayed as a table here) showed that there were no major differences when comparing the ratings across discipline groups.

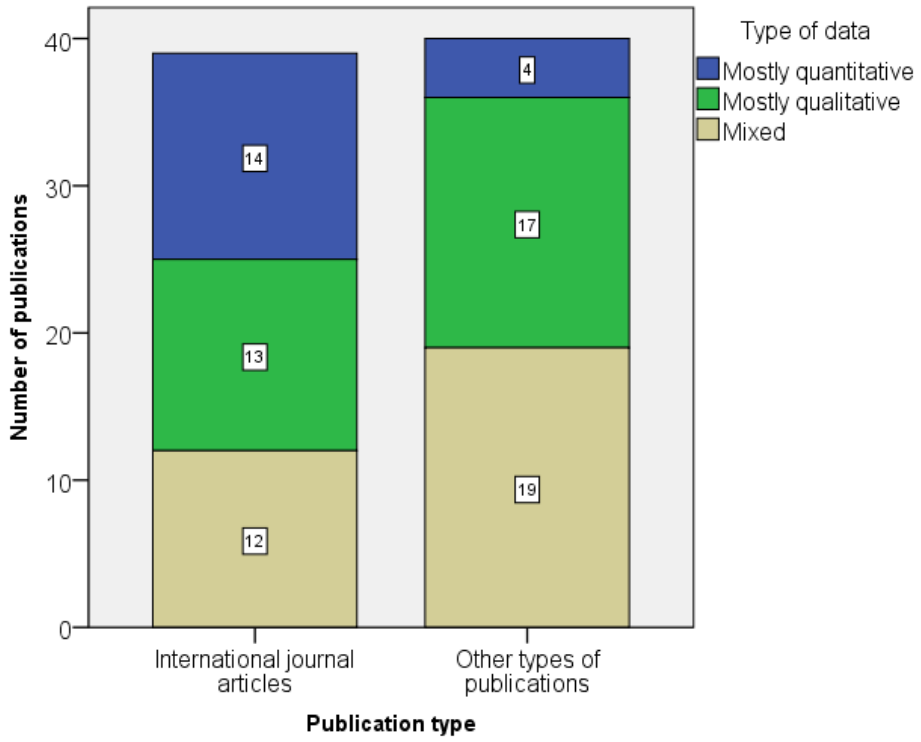
Table F-6: Assessment of originality of reviewed publications

Rating	Publication type		Total
	International journal articles	Other types of publications	
Very original	22 (54%)	8 (20%)	30 (37%)
Somewhat original	11 (27%)	24 (60%)	35 (43%)
Not very original	8 (20%)	8 (20%)	16 (20%)
Total	41 (100%)	40 (100%)	81 (100%)

Another indication of quality of science is the sophistication of the analysis, even though this criterion has to be interpreted with regard to the nature of the paper and in connection with other criteria. The assessment was made separately for papers based on mostly quantitative data and papers based on mostly qualitative or mixed data. Figure F-6 displays the publications by type of data.[29] For the journal publications, the shares of mostly quantitative, mostly qualitative and mixed papers are almost equal. The other publications have larger shares of papers based on mostly qualitative or mixed data.

[29] In principle, it would be necessary to distinguish types of data and types of analysis, since qualitative data can be used for a quantitative analysis, e.g., in case of a quantitative content analysis based on coding of qualitative data. However, such cases were not found in the sample.

Figure F-6: Classification of reviewed publications by type of data



For the papers that are primarily based on qualitative data, an assessment was made of whether the paper was mostly analytical or mostly descriptive. The results are reported in Table F-7.

Table F-7: Type of analysis of qualitative papers

		Publication type		
		International journal articles	Other types of publications	Total
Type of analysis	Mostly analytical	11 (61%)	3 (11%)	14 (32%)
	Mostly descriptive	7 (39%)	23 (89%)	30 (68%)
Total		18 (100%)	26 (100%)	44 (100%)

As can be seen from the table, around 60% of the qualitative papers published in journals were rated as mostly analytical. In contrast, the large majority of the other publications (almost 90%) were rated as mostly descriptive. The fact that a qualitative paper presents a mostly descriptive analysis is not necessarily an indication of low quality, since a descriptive presentation of data can also provide important evidence for new insights or arguments. However, one can derive from the above ratings of overall quality that was not generally the case for those publications that were not published in journals. For those papers, lack of analysis was a major reason for low ratings in the overall assessment.

The comments made by the evaluators to explain the ratings indicate that papers were rated as mostly analytical because they applied conceptual frameworks for analysis and interpretation, or because they used specific analytical techniques for qualitative data analysis, such as causal diagrams.

For quantitative papers, an assessment was made regarding the level of the analysis. The level of analysis was rated as "simple", if only descriptive statistics without further statistical analysis was applied. The level was rated as "intermediate" if methods such as ordinary least square (OLS) regressions or probit models were used. The level was rated as "sophisticated" if more advanced statistical methods were used, such as structural equations or advanced modeling techniques. The use of sophisticated methods, which requires special skills, may be seen as a comparative advantage of international research organizations, such as the CGIAR. However, as in case of the qualitative papers, the level of sophistication of the analysis alone is an indication of quality, since intermediate or descriptive analyses can also provide important evidence for new insights. Moreover, for review papers, this criterion was not considered to be applicable.

As Table F-8 shows, the number of publications in the sample that used sophisticated quantitative analytical methods was comparatively small. This indicates that most of the high-level journal publications were not published in top journals because of the use of sophisticated quantitative methods, but for other reasons. For example, all three publications included in the sample that were published in the leading journal "Fish and Fisheries," were reviews or synthesis papers and, hence, not included in this rating.

Table F-8: Level of quantitative analysis

	International journal articles	Other types of publications	Total
Sophisticated	3 (14%)	2 (12%)	5 (13%)
Intermediate	9 (43%)	3 (18%)	12 (32%)
Simple	9 (43%)	12 (71%)	21 (55%)
Total	21 (100%)	17 (100%)	38 (100%)

F.1.7.Links to AAS Goals

To assess if the publications are related to the goals of AAS, the team members assessed to what extent the papers addressed poverty and gender, whether they applied a farming systems perspective, and whether they were based on the use of participatory methods and/or participatory action research.

Poverty and marginalization

To assess the extent to which poverty was considered in the publications portfolio, the publications in the sample were divided in the following categories:

(1) Poverty/marginalization is central to this paper (e.g., because the paper focuses specifically on poor or marginalized groups or treats poverty and/or marginalization systematically as a cross-cutting issue.)

(2) Poverty/marginalization is somewhat important to this paper (e.g., because it makes reference to poverty and/or marginalized groups, but not in a cross-cutting or systematic way)

(3) The paper does not refer to poverty or marginalized groups in any way.

(4) The criterion is not applicable.

As explained above, the categories (3) and (4) were combined for the analysis. As can be seen in Table F-9, a quarter of the publications in the sample had a specific focus on poverty, and another third referred to poverty aspects in some form. Examples of publications that focus specifically on poverty include a study on poverty and vulnerability of small fishing communities in Congo and a study on the question of whether aquaculture can benefit the extreme poor in Bangladesh. Most studies on policies and institutions fell into the second category as they considered poverty implications of the topic under consideration without specifically focusing on poverty. Comparing the two time periods, one can observe an increase in the share of papers that included poverty aspects, but a decrease in the share of papers that specifically focused on poverty. When disaggregating the reviewed papers by themes (not reported in form of a table here), one can observe a stronger specific focus on poverty among the publications in the resilience and gender themes than in the other themes. Distinguishing between poverty and marginalization, one can note that very few publications specifically focused on the topic of marginalization. An example is a study on landless and socially marginalized Adivisi (ethnic) communities in Bangladesh, which has been published in the journal “Aquaculture”.

Table F-9: Poverty link of reviewed publications

		Time period		
		2009-2011	2012-2014	Total
Poverty link	Paper focuses specifically on poverty	8 (38%)	13 (21%)	21 (25%)
	Paper refers to poverty	3 (14%)	24 (39%)	27 (33%)
	Paper does not refer to poverty or not applicable	10 (48%)	25 (40%)	35 (42%)
Total		21 (100%)	62 (100%)	83 (100%)

Gender and GTA

To assess the extent to which gender was addressed, the sampled publications were grouped into four categories using the following criteria.

(1) The paper deals specifically with gender or systematically applies a gender perspective (e.g. it integrates gender into the analytical framework or it analyzes findings disaggregated by gender in a way that provides important insights).

(2) The paper makes reference to gender, but not in a cross-cutting or systematic way.

(3) The paper does not refer to gender issues in any way, even though gender aspects could have been addressed, considering the nature of the paper.

(4) The nature of this paper does not allow for integration of gender aspects (e.g., because it has a purely natural science focus, such as analyzing a fish disease). In these cases, the criterion was considered to be not applicable, and the paper was not included in the analysis below

Table F-10 indicates that the focus on gender increased during the review period. All papers that specifically focus on gender were published in the second time period, and the share of papers that address gender issues in some from increased in that period. Examples of publications that specifically focus on gender include two AAS reports, one of which reviews the literature on communication interventions for gender equity and social equality in aquatic agricultural systems. The other one deals with gender-equity or gender-equality scales and indices for potential use in aquatic agricultural systems. Examples of papers that could have addressed gender, but did not, include a paper published in Food Policy on aquaculture food value chains in Asia and two project reports on collective action and resource governance in Zambia and Uganda.

Table F-10: Gender link of reviewed publications

		Time period		
		2009-2011	2012-2014	Total
Link to gender	Paper focuses specifically on gender	0 (0%)	7 (12%)	7 (9%)
	Paper refers to gender	4 24%	19 32%	23 30%
	No link to gender (even though applicable)	13 76%	33 56%	46 61%
Total		17 100%	59 100%	76 100%

The 30 publications in the sample that either focused on gender or referred to gender in some form were then analysed to see whether they applied a Gender Transformative Approach. This rating was based on the AAS definition of GTA as an approach that focuses explicitly on power relations between men and women and aims to change norms, attitudes and practices that underlie gender inequalities. It was found that six out of these 30 publications applied a GTA, all of which were published in the second time period. One of the six publications was an article published in the journal Fish and Fisheries, which examined “Small-scale fisheries through the well-being lens.” The other five include three working papers and two reports. These results indicate that a good start has been made in addressing GTA in the program’s publications activities.

Systems Focus

Since AAS is a systems program, the review also aimed at identifying to what extent the publications reflect a systems perspective. The papers were divided into the following three categories:

(1) The paper applies a systems approach that addresses different aquatic agricultural systems in a comparative perspective.

(2) The paper applies a systems approach that contributes to a better understanding of a particular aquatic agricultural system (i.e. the paper goes beyond addressing just one particular aspect of that system).

(3) The paper does not apply a systems approach or it is not applicable.

Table F-11: Systems link of reviewed publications

		Time period		Total
		2009-2011	2012-2014	
Link to Systems Research	Comparative perspective on different aquatic agricultural systems	1 (5%)	13 (21%)	14 (17%)
	Contribution to a better understanding of one particular aquatic agricultural system	5 (24%)	18 (29%)	23 (28%)
	Not applying a systems perspective	15 (71%)	31 (50%)	46 (55%)
Total		21 (100%)	62 (100%)	83 (100%)

As shown in Table F-11, the share of papers in the first two categories increased substantially in the second review period, which indicates a move towards publications that use a systems perspective. Approximately one third of the papers in the first category and two thirds of the papers in the second category were published in peer-reviewed journals. A disaggregation of the findings by AAS Theme (not shown in a table here) indicated that a comparative systems perspective has mostly been applied in papers that fall under the AAS Themes "Markets and Value Chains" and "Institutions and Policies." A comparative systems perspective was not applied in any of the papers in the sample that fall under the themes of "Productivity", "Nutrition" and "Knowledge sharing and learning." Neither was there any paper in the sample that further developed the concept of aquatic agricultural systems. However, outside the sample, the team identified two publications that are important for the cross-cutting systems perspective. One is a review of productivity-related interventions in the five hub countries,[30] and another one is a report that estimates the number of poor people that live in areas classified as aquatic agricultural systems[31]. Both publications are important and well done, and they are referred to in the main report.

Still, taking a closer look at the methods used in the publications under review, one can note some deficits regarding the systems approach. The publication by Béné and Teoh mentioned above is the only one that could be found that identifies the geographic location of aquatic agricultural systems according to the AAS criteria, using georeferenced data. Other references to the literature on farming systems or agro-ecological systems were rare. Studies aiming to develop a typology and a characterization of aquatic agricultural systems using biophysical and socioeconomic criteria (a classical farming systems approach) were not found among the publications. Likewise, there seems to be little attention to the use of systems approaches to identify linkages between agricultural and aquatic components of aquatic agricultural systems, or to the use of the agro-ecosystems approaches to analyze productivity and environmental dimensions of aquatic agricultural systems.

[30] Castine, S.A., Sellamuttu, S.S., Cohen, P., Chandrabalan, D. and M. Phillips (2013): Increasing Productivity and Improving Livelihoods in Aquatic Agricultural Systems: A Review of Interventions Working Paper: AAS-2013-30.

[31] Béné, C. and Teoh, S. J. (2014): Estimating the Numbers of Poor Living in Aquatic Agricultural systems. Final Report dated April 2014. Unpublished.

Participatory Methods and Participatory Action Research

Participatory Action Research is one of the cornerstones of AAS. Therefore, the review identified to what extent this research approach has already been addressed in the publications portfolio. The following classification criteria were used:

(1) The paper is directly based on Participatory Action Research (i.e. it is based on data generated through PAR or information about PAR processes).

(2) The paper is based on the use of participatory methods (e.g., Participatory Rural Appraisal), but not directly on Participatory Action Research (i.e., there was no "action" by the community beyond participating

(3) The paper is not linked in any way to PAR. This category includes cases where PAR is not applicable, e.g., because the paper is a review.

Table F-12: PAR link of reviewed publications

		Time period		
		2009-2011	2012-2014	Total
PAR link	Paper based on PAR	1 5%	3 5%	4 5%
	Participatory methods used, but not PAR	3 14%	8 13%	11 13%
	No relation to PAR/not applicable	17 81%	51 82%	68 82%
Total		21 100%	62 100%	83 100%

Table F-12 shows that only 5% of the reviewed publications were based on PAR. Another 13 % were based on participatory methods, but not PAR. There was no change in these shares between the first and the second time period. In view of the time required to complete at least one full PAR cycle, empirical publications based on AAS funding cannot be expected at this point. However, one could have expected more publications using participatory methods (i.e. papers in the second category), as well as reviews or conceptual papers on PAR.

In view of the role of PAR in AAS, the publications using PAR or participatory methods are briefly described here. Two of the four papers that were based on PAR deal with cases of collective action and resource governance (Uganda and Zambia), and both were rated as excellent. The third paper analyzed dialogue processes to resolve resource use conflicts in a comparative perspective, it was rated as average. The fourth paper dealt with integrating of aquaculture in HIV/AIDS affected households. It was found to be rather descriptive without offering an analysis. Out of the eleven papers that used participatory methods, but not PAR, two were published in international journals; the others were project reports or working papers. Four of these eleven publications were rated as excellent by the evaluators, five were rated as intermediate and two received a low rating due to lack of analysis.

Taking a closer look at the methods used in the respective papers, the evaluators noted that the papers mostly applied established methods. Specific attention to methods and efforts to refine existing methods or develop new methods for participatory research and PAR were not evident in the papers

under review. It cannot be judged on the basis of the publications review whether such efforts are underway and might be published in the future.

Focus on implications for policy and practice

With regard to this criterion, the papers were classified into the following three categories:

(1) The paper includes practically relevant/specific implications or recommendations (useful for development practice or policy) that are specifically based on the findings of the paper.

(2) The paper includes only very generic implications or recommendations, not necessarily based on the findings of the paper.

(3) The paper does not include any substantive implications or recommendations for development practice or policy.

Table F-13 displays the results for this rating. As indicated above, the inter-rater reliability for this criterion was not very high, therefore, the findings are described here only for the purpose of information, but not used in the main report. One can positively note that almost half of the journal publications and more than 70% of the other types of publications derived specific implications or recommendations for policy and practice, which is certainly to be seen as a favorable result for a research organization that is focused on impact. Many journals do not place much emphasis on practical or policy implications, and due to the word limits, these aspects are often only referred to briefly. Against this background, the result of almost 50% of the journal publications with specific implications or recommendations for policy and practice can be considered as a favorable result.

Table F-13: Focus on implications for policy and practice

		Publication type		
		International journal articles	Other types of publications	Total
Practical relevance	Specific implications or recommendations for policy and practice	18 (47%)	23 (72%)	41 (59%)
	Generic implications or recommendations	9 (24%)	5 (16%)	14 20%
	No implications or recommendations	11 (29%)	4 (13%)	15 21%
Total		38 (100%)	32 (100%)	70 (100%)

F.1.8.Publications selected for the review

Abernethy, K.E., Bodin, Ö., Olsson, P., Hilly, Z., Schwarz, A. (. 2014. Two steps forward, two steps back The role of innovation in transforming towards community-based marine resource management in Solomon Islands. Global Environmental Change, 28: 309-321.

Agnese, J.F., Brummett, R., Caminade, P., Catalan, J., Kornobis, E. 2009. Genetic characterization of the Aphyosemion calliurum species group and description of a new species from this assemblage: A.

campomaanense (Cyprinodontiformes: Aplocheiloidei: Nothobranchiidae) from Southern Cameroon. Zootaxa 2045: 43-45

Ahmed, N., Troell, M., Allison, A.H., Muir, J.F. 2010. Prawn postlarvae fishing in coastal Bangladesh: challenges for sustainable livelihoods. Marine Policy 34(2):218-227

Allison, E.H., Béné, C., Andrew, N.L. 2011. Poverty reduction as a means to enhance resilience in small-scale fisheries. p. 216-237. In: Pomeroy, R.S., Andrew, N.L. (eds.) Small-scale fisheries management: frameworks and approaches for the developing world. Cabi, UK. 247 p.

Andersen, A.B., Pant, J., Thilsted, S.H. 2013. Food and Nutrition Security in Timor-Leste. Project Report: AAS-2013-29.

Asian Development Bank. 2014. State of the Coral Triangle Reports. ADB.

Badjeck, M.C., Mendo, J., Wolff, M., Lange, H. 2009. Climate variability and the Peruvian scallop fishery: the role of formal institutions in resilience building. Climatic Change 94:211-232

Baidu-Forson, J.J., Phiri, N., Ngu'ni, D., Mulele, S., Simainga, S., Situmo, J., Ndiyoi, M., Wahl, C., Gambone, F., Mulanda, A., Syatwinda, G. 2014. Assessment of agrobiodiversity resources in the Borotse flood plain, Zambia. CGIAR Research ProgRam on Aquatic Agricultural Systems. Penang, Malaysia. Working Paper AAS-2014-12.

Banda-Nyirenda, D., Hüsken, S.M.C., Kaunda, W. 2009. Impact of nutrition and fish supplementation on the response to anti retroviral therapy, Zambia: a literature review. The WorldFish Center Project Report 1985. Penang, Malaysia. 25 p

Baran, E., Chheng Phen, Ly Vuthy, Nasielski, J., Saray Samadee, Touch Bunthang, Tress, J., Kaing Khim, Tan Sokhom. 2014. Fish resources in Cambodia (2001-2011). Chapter 4 (p. 37-48 in Atlas oF Cambodia Maps on socio-economic development and environment. Save Cambodia's Wildlife, Phnom Penh, Cambodia. 178 pp.

Belton, B., Azad, A. 2012. The characteristics and status of pond aquaculture in Bangladesh. Aquaculture 358-359: 196-204.

Belton, B., van Asseldonk, I.J.M., Thilsted, S.H. 2014. Faltering fisheries and ascendant aquaculture Implications for food and nutrition security in Bangladesh. Food Policy, 44: 77-87. 2.331.

Béné, C. 2009. Are fishers poor or vulnerable? Assessing economic vulnerability in small-scale fishing communities. Journal of Development Studies 45(6): 911-933

Beveridge MCM, Thilsted SH, Phillips MJ, Metian M, Troell M, Hall SJ. 2013. Meeting the food and nutrition needs of the poor: the role of fish and the opportunities and constraints emerging from the rise of aquaculture. Journal of Fisheries Biology, 83(4), 1067-1084.

Blythe, J.L. 2014. Resilience and social thresholds in small-scale fishing communities. Sustainability Science, online first July.

Brummett, R.E., Beveridge, M.C.M., Cowx, I.G. 2013. Functional Aquatic Ecosystems, Inland Fisheries and the Millennium Development Goals. Fish and Fisheries, 14(3): 312-324.

Burke, L., Reytar, K., Spalding, M., Perry, A. 2011. Reefs at risk revisited. World Resources Institute, Washington D.C. 114 p.

Burnley, C., Adriázola, P., Comardicea, I., Mugisha, S.,Mushabe, N. 2014. Strengthening community roles in aquatic resource governance in Uganda. Program Report. Collaborating for Resilience.

CGIAR Research Program on Aquatic Agricultural Systems. 2012. Building coalitions, creating change: An agenda for gender transformative research in agricultural development. CGIAR Working Paper: AAS-2012-20

CGIAR Research Program on Aquatic Agricultural Systems. 2012. Resilient livelihoods and food security in coastal aquatic agricultural systems: Investing in transformational change. Project Report: AAS-2012-28

CGIAR Research Program on Aquatic Agricultural Systems. 2013. Learning from Implementation of Community Selection in Zambia, Solomon Islands, and Bangladesh AAS hubs. Evaluation and Learning Series Paper: AAS-2013-24.

Cleasby, N., Schwarz, A.M., Phillips, M., Paul, C., Pant, J., Oeta, J., Pickering, T., Meloty, A., Laumani, M., Korr, M. 2013. The Socio-economic Context for Improving Food Security Through Land Based Aquaculture in Solomon Islands: A Peri-urban Case Study. Marine Policy, 45: 89–97.

Cohen, P.J., Alexander, T.J. 2013. Catch Rates, Composition and Fish Size from Reefs Managed with Periodically-harvested Closures. PLoS ONE, 8(9):e73383.

Cohen, P.J., Cinner, J.E., Foale, S. 2013. Fishing Dynamics Associated with Periodically Harvested Marine Closures. Global Environmental Change, 23(6): 1702-1713.

de Verdal, H., Rosario, W., Vandeputte, M., Muyalde, N.,Morissens, P., Baroiller, J.F., Chevassus, B. 2014. Response to selection for growth in an interspecific hybrid between Oreochromis mossambicus and O. niloticus in two distinct environments. Aquaculture, 430: 159-165.

Descheemaeker, K., Molden, D., Bunting, S., Bindraban, P., Muthuri, C., Sinclair, F., Beveridge, M., 2012. Increasing water productivity in agriculture. In: Boelee, E. (ed.). Managing Agroecosystems for Sustainable Water and Food Security. CABI. Cambridge p. 140-164

Dey, M.M., Kuman, P., Paraguas, F.J., Chen, O.L., Khan, M.A., Srichantuk, N. 2010. Performance and nature of genetically improved carp strains in Asian countries. Aquaculture Economics & Management 14: 3-29

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. Working Paper.

Dugan, P., Apgar, M., Douthwaite, B. 2013. Research in Development: The Approach of AAS. Working Paper.

Dugan, P., Delaporte, A., Andrew, N., O'Keefe, M., Welcomme, R. 2010. Blue harvest: inland fisheries as an ecosystem serviceThe WorldFish Center, Penang, Malaysia. 63 p.

Evans, L., Cherrett, N., Pemsl, D. 2011. Assessing the impact of fisheries co-management interventions in developing countries: a meta-analysis. Journal of Environmental Management 92(8): 1938-1949

Finegold, C. 2009. The importance of fisheries and aquaculture to development. p. 353-364. In: Wramner, P., Cullberg, M., Ackefors, H. (eds.) Fisheries, sustainability and development. The Royal Swedish Academy of Agriculture and Forestry, Stockholm.

Foale, S., Adhuri, D., Aliño, P., Allison, E.H., Andrew, N., Cohen, P., Evans, L., Fabinyi, M., Fidelman, P., Gregory, C., Stacey, N., Tanzer, J., Weeratunge, N. (. 2013. Food Security and the Coral Triangle Initiative. Marine Policy, 38: 174-183.

Garces, L.R., Pido, M.D., Tupper, M.H., Silvestre, G.T. 2013. Evaluating the Management Effectiveness of Three Marine Protected Areas in the Calamianes Islands, Palawan Province, Philippines: Process, Selected Results and Their Implications for Planning and Managemen. Ocean & Coastal Management, 81: 49-57.

Goulden, M.C., Adger, W.N., Allison, E.H., Conway, D. 2013. Limits to Resilience from Livelihood Diversification and Social Capital in Lake Social–ecological Systems. Annals of the Association of American Geographers, 103(4): 906-924.

Govan, H., Schwarz, A.M., Boso, D. 2011. Towards integrated island management: lessons from Lau, Malaita, for the implementation of a national approach to resource management in Solomon Islands: final report. WorldFish Center report to SPREP. Penang, Malaysia. 69 p.

Jespersen, K.S., Kelling, I., Ponte, S., Kruijssen, F. 2014. What shapes food value chains? Lessons from aquaculture in Asia. Food Policy, 49(Part 1): 228-240.

Joffre, O.M., Sheriff, N., Ngai, H.H., Hao, N.V. 2011. Community-based fish culture: a viable coping strategy for farmers in the Mekong Delta? Stewart, M.A., Coclanis, P.A. (eds.) Environmental Change and Agricultural Sustainability in the Mekong Delta.

Johnston, R., Lacombe, G., Hoanh, C.T., Noble, A., Pavelic, P., Smakhtin, V., Suhardiman, D., Kam, S.P., Choo, P.S. 2010. Climate change, water and agriculture in the Greater Mekong Subregion. IWMI research report 136. International Water Management Institute, Colombo, Sri Lanka. 60 p.

Kabahenda, M.K., Omony, P., Hüsken, S.M.C. 2009. Post-harvest handling of low-value fish products and threats to nutritional quality: a review of practices in the Lake Victoria region. Regional Programme Fisheries and HIV/AIDS in Africa: Investing in Sustainable Solutions. The WorldFish Center. Project Report 1975

Kantor, P., Kruijssen, F. 2014. Informal fish retailing in rural Egypt Opportunities to enhance income and work conditions for women and men. WorldFish. Penang, Malaysia. Project Report 2014-51.

Karim, M., Sawyer, R., Phillips, M., Belton, B. 2013. Profitability and adoption of improved shrimp farming technologies in the aquatic agricultural systems of Southwestern Bangladesh. Aquaculture, online first 5 March

Karim, M., Castine, S., Brooks, A., Beare, D., Beveridge, M., Phillips, M. 2014. Asset or liability? Aquaculture in a natural disaster prone area. Ocean & Coastal Management. 1.769.

Kura, Y., Joffre, O., Laplante, B., Sengvilaykham, B. 2014. Redistribution of water use and benefits among hydropower affected communities in Lao PDR. Water Resources and Rural Development.

Liao, Y.C., Reyes, R.B. Jr., Shao, K.T. 2009. A new bandfish, Owstonia sarmiento (Pisces: Perciformes: Cepolidae: Owstoniinae), from the Philippines with a key to species of the genus. The Raffles Bulletin of Zoology 57(2):521-525

Little, D.C., Bush, S.R., Belton, B., Nguyen, T.P., Young, J.A. 2011. Whitefish wars: Pangasius, politics and consumer confusion in Europe. Marine Policy 36(3): 738-745

Longley, C., Thilsted, S.H., Beveridge, M., Cole, S., Nyirenda, D.B., Heck, S., Hother, A.L. 2014. The Role of Fish in the First 1,000 Days in Zambia. IDS Bulletin September 27-37

Madzudzo, E., Mulanda, A., Nagoli, J., Lunda, J., Ratner, B.D. 2013. Governance Analysis of the Barotse Floodplain System, Zambia: Identifying Obstacles and Opportunities. Project Report: AAS-2013-26.

Madzudzo, E., Chilufya, L., Mudenda, H.G., Ratner, B.D. 2014. Strengthening collective action to address resource conflict in Lake Kariba, Zambia. Program Report. Collaborating for Resilience.

McClanahan, T., Allison, E.H., Cinner, J.E. 2013. Managing Fisheries for Human and Food Security. Fish and Fisheries. 8.755.

Mills, M., Álvarez-Romero, J.G., Vance-Borland, K., Cohen, P., Pressey, R.L., Guerrero, A.M., Ernstson, H. 2014. Linking Regional Planning and Local Action: Towards Using Social Network Analysis in Systematic Conservation Planning. Biological Conservation, 169: 6-13. 4.036.

Mora, C., Aburto-Oropeza, O., Ayala Bocos, A., Ayotte, P.M., Banks, S., Tupper, M. et al. 2011.Global human footprint on the linkage between biodiversity and ecosystem functioning in reef fishes. PLoS Biology 9(4): e100060611.771

N. Tran, C. Crissman, A. Chijere, M.C. Hong, S. J. Teoh, and R. O. Valdivia. 2013. Ex-ante Assessment of Integrated Aquaculture-agriculture Adoption and Impact in Southern Malawi. Working Paper: AAS-2013-03.

Nagoli, J., Phiri, E.M., Kambewa, E., Jamu, D. 2009. Adapting integrated agriculture aquaculture for HIV and AIDS-affected households: the case of Malawi. WorldFish Center working paper 1957. The WorldFish Center, Penang, Malaysia. .

Oeur,IL, Mam, K., Sour, K., Ratner, B.D. 2014. Innovations to strengthen aquatic resource governance on Cambodia's Tonle Sap Lake. Program Report. Collaborating for Resilience.

Oliver, J.K., Berkelmans, R., Eakin, C.M. 2009. Coral bleaching in space and time. p. 21-37. In: van Oppen, M.J.H. and J.M. Lough (eds.). Coral bleaching: patterns, causes and consequences. Ecological Studies 205, Springer-Verlag, 2009

Pant, J., Barman, B.K., Murshed-E-Jahan, K., Belton, B., Beveridge, M. 2013. Can Aquaculture Benefit the Extreme Poor? A Case Study of Landless and Socially Marginalized Adivasi (Ethnic) Communities in Bangladesh. Aquaculture, 418-419:

Perry, R.I., Ommer, R.E., Allison, E.H., Badjeck, M.C. et al. 2010. Interactions between changes in marine ecosystems and human communities. p. 221-251. In: Barange, M. et al. Marine ecosystems and global change. Oxford University Press.

Ponte, S., Kelling, I., Jespersen, K.S., Kruijssen, F. 2014. The Blue revolution in Asia Upgrading and governance in aquaculture value chains. World Development, 64: 52-64.

Ratner, B.D., Allison, E.H. 2012. Wealth, rights, and resilience: An agenda for governance reform in small-scale fisheries. Development Policy Review 30(4): 371-398.

Ratner, B.D., Barman, B., Cohen, P., Mam, K., Nagoli, J., Allison, E.H. 2012. Strengthening governance across scales in aquatic agricultural systems. Working Paper: AAS-2012-10.

Ratner, B.D., Cohen, P., Barman, B., Mam, K., Nagoli, J., Allison, E.H. 2013. Governance of Aquatic Agricultural Systems: Analyzing Representation, Power, and Accountability. Ecology and Society, 18(4): 59-

Ratner, B.D., Meinzen-Dick, R., May, C., Haglund, E. 2013. Resource Conflict, Collective Action, and Resilience: An Analytical Framework. International Journal of the Commons, 7(1): 183-208.

Ratner, B.D., Oh, E.J.V., Pomeroy, R.S. 2012. Navigating change: Second-generation challenges of small-scale fisheries co-management in the Philippines and Vietnam Journal of Environmental Management 107: 131–139.

Ratner, B.D., R. Meinzen-Dick, J. Hellin, E. Mapedza, J. Unruh, W. Veening, E. Haglund, C. May, and C. Bruch. 2013. Natural resource conflict and collective action: A synthesis of experience and principles for intervention. Collective Action and Property Rights Working Paper Series. Washington, DC: International Food Policy Research Institute.

Ratner, B.D., Burnley, C., Mugisha, S., Madzudzo, E., Oeur, Il,Mam, K., Rüttinger, L., Chilufya, L., Adriázola, P. 2014. Dialogue to address the roots of resource competition Lessons for policy and practice. Program Report. Collaborating for Resilience.

Salayo, N.D., Perez, M.L., Garces, L.R., Pido, M.D. 2012. Mariculture development and livelihood diversification in the Philippines. Marine Policy 36(4): 867-881

Sheriff, N., Schuetz, T. 2010. Benefits and challenges of applying outcome mapping in an R4D project. CBFC Working paper no. 6. WorldFish Center, Penang. 8 p.

Sheriff, N., Schuetz, T. 2010. Benefits and challenges of applying outcome mapping in an R4D project. CBFC Working paper no. 6. WorldFish Center, Penang. 8 p.

Subade, R.F., Francisco, H.A. 2014. Do non-users value coral reefs? Economic valuation of conserving Tubbataha Reefs, Philippines. Ecological Economics, 102: 24-32. 2.517.

Thilsted S.H. 2013. Fish diversity and fish consumption in Bangladesh. pp 270-282. In: J Fanzo, D Hunter, T Borelli, F Mattei (eds.) Diversifying Food and Diets: Using Agricultural Biodiversity to Improve Nutrition and Health. Routledge.

Tran, N., Bailey, C., Wilson, N., Phillips, M. 2013. Governance of Global Value Chains in Response to Food Safety and Certification Standards: The Case of Shrimp from Vietnam. ISSN 0305-750X. World Development, 45: 325-338.

Tran, N., Wilson, N., Hite, D. 2013. Choosing the Best Model in the Presence of Zero Trade: A Fish Product Analysis. In: Beghin, J.C. (ed.) Nontariff Measures with Market Imperfections: Trade and Welfare Implications. (Frontiers of Economics and Globalization) 12: 127-148.

Troell, M., Naylor, R.L., Metian, M., Beveridge, M. et al. 2014. Does aquaculture add resilience to the global food system?. PNAS. 9.809.

Underwood, C.R., Hendrickson, Z. 2014. Communication interventions for gender equality and social equity in aquatic agricultural systems A review of the literature. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Program Report AAS-2014-36.

Underwood, C.R., Leddy, A.M., Morgan, M. 2014. Gender-equity or gender-equality scales and indices for potential use in aquatic agricultural systems. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Program Report AAS-2014-37.

Wahab, M. A , Phillips,M.J. and Essam Yassin Mohammed . 2013. Payments for Hilsa Fish (Tenualosa ilisha) Conservation in Bangladesh. In: Economic Incentives for Marine and Coastal Conservation: Prospects, Challenges and Policy Implications. Edited by Essam Yassin Mohammed. Routledge. 280 pages.

Waite, R., Beveridge, M., Brummett, R., Castine, S.,Chaiyawannakarn, N., Kaushik, S., Mungkung, R.,Nawapakpilai, S., Phillips, M. 2014. Improving productivity and environmental performance of aquaculture. Working Paper, Installment 5 of Creating a Sustainable Food Future. Washington, DC World Resources Institute.

Weeratunge, N., Chiuta, T.M., Choudhury, A., Ferrer, A., Hüsken, S.M.C., Kura, Y., Kusakabe, K., Madzudzo. 2012. Transforming aquatic agricultural systems towards gender equality: a five country review. Working Paper: AAS-2012-21

Weeratunge, N., Béné, C., Siriwardane, R., Charles, A.,Johnson, D., Allison, E.H., Nayak, P.K., Badjeck, M.C. 2014. Small-scale fisheries through the wellbeing lens. Fish and Fisheries, 15: 255-279.

White, A.T., Aliño, P.M., Cros, A., Fatan, N.A., Green, A.L.,Teoh, S.J., Laroya, L., Peterson, N., Tan, S., Tighe, S.,Venegas-Li, R., Walton, A., Wen, W. 2014. Marine Protected Areas in the Coral Triangle Progress, Issues, and Option. Coastal Management, 42(2): 87-106.

Wise, R.M., Fazey, I., Stafford Smith, M., Park, S.E., Eakin, H.C., Archer Van Garderen, E.R.M., Campbell, B. 2014. Re-conceptualising adaptation to climate change as part of pathways of change and response. Global Environmental Change.

Witt, R., Pemsl, D.E., Waibel, H. 2010. Collecting data for poverty and vulnerability assessment in remote areas in Sub-Saharan Africa. Survey Methodology 36(2): 217-222

Zak, T., Deshev, R., Benet-Perlberg, A., Naor, A., Magen, I., Shapira, Y., Ponzoni, R.W., Hulata, G. 2014. Genetic improvement of Israeli blue (Jordan tilapia, Oreochromis aureus (Steindachner, through selective breeding for harvest weight. Aquaculture Research, 45(3): 546-557. 1.32.

F.2 Bibliometric Analysis

This section presents the findings of the bibliometric analysis.

F.2.1.Methodology

The analyses below were conducted based on a list of publications provided by WorldFish. The list included publications produced pre-CRP (2009-11) and post CRP (2012-14). The 2014 publication list which was used, was updated with more recent figures for the year of 2014 after the selection of

sample publications for the review by team members was conducted. Therefore the numbers of publications for 2014 are slightly higher.

Citations were sought using Google Scholar for Journal articles published in 2012 and 2013 only. An Affiliation search for WorldFish was run in Scopus to determine the Center's collaboration in terms of institutions. The search was run for the years 2009 to 2013 to check for any change in the level of collaboration. The search was run for WorldFish and therefore the results are not limited to the AAS CRP.

F.2.2.Annual number of journal publications and citations since 2009

Table F-14 displays the types of publications for the two time periods that were included in the bibliometric analysis. One can note a sharp decline in the number of publications of all types, except reports in the second period. Table F-15 shows that there was a sharp drop between 2011 and 2012, and that the number started to increase again afterwards.

Table F-14: Types of publications produced under the AAS CRP

Publication Type	2009-11	2012-14	2012-14 as % of 2009-11
Journal Article	147	67	46%
Working Paper	56	21	38%
Book Chapter	55	8	15%
Report	18	20	111%
Conference Proceedings	20	5	25%
Other	116	66	57%
Total	**412**	**187**	**45%**

Table F-15: Number of publications by year and publishing period

Publishing Period	Number
2009	155
2010	130
2011	127
Total	412

Publishing Period	Number
2012	38
2013	64
2014	85
Total	187

There may be several reasons for the sharp decline. One may have to do with the construction of the database. From 2012 onwards, the database only includes publications that are attributed to AAS, whereas the numbers before 2012 may have captured all publications, including those on fish genetics, which were subsequently attributed to the Livestock and Fish CRP. Moreover, with a major change in the research program, as was the case for AAS, one can expect a drop in publications since there was no continuation of "business as usual." Depending on the nature of the research, it often takes more than three years until research results are produced and published in journals. Hence, the increase in the number of publications since 2012 can be seen as a positive sign. Moreover, under AAS, substantial numbers of new staff were hired. Papers that they had in their publications pipeline may not necessarily appear under AAS or WorldFish.

To assess the productivity in terms of publications activity, a typical indicator is the number of peer-reviewed journal publications per PhD-level staff member. A value of two publications per researcher can be seen as a benchmark for the CGIAR. Based on the available data (see main report), it was estimated that at the beginning of 2015, AAS employed 31 PhD level Full-Time-Equivalent (FTE)

researchers. This corresponds to a number of 2.7 publications per PhD FTE, if all publications are taken into account. If only the journal publications are considered, which were 42 in 2014, the value is 1.3 publications per PhD level FTE. This value is comparatively low against the benchmark of 2.0, but there has been an increasing trend since 2012.

F.2.3.Citation analysis

The number of citations is an important indicator of the impact a researcher has in the research community, even though this criterion has to be interpreted with care, since particularly innovative papers that fall outside the established paradigm may not get many citations in the first years after publication. Moreover, citation rates vary considerably across disciplines and are generally substantially higher in the natural sciences than in economics and the social sciences. Further, they are generally higher if they apply to a discipline in general than to a specialized field in which fewer researchers are active.

Table F-16 presents the citations that were found in GoogleScholar for all publications published in 2012 and 2013, but not those published in 2014, considering the time lag involved in citations. Seven journal articles were published in 2012 and 21 were published in 2013.

Table F-16: Number of citations for articles published in 2012 and 2013

	Number of journal articles by year of publication		
Number of citations (GoogleScholar)	2012	2013	Total
0	0	6	6
1 to 10	4	10	14
11 to 20	2	2	4
21 to 30	0	3	3
31 to 40	1	0	1

An interpretation of the figures displayed in Table F-16 is difficult, since for economics and social sciences, a time period of one or two years is generally too short to expect a large number of citations, considering that the time period between submission of a paper and its publication is considerably longer than in the natural sciences. The majority of the papers had received 1-10 citations after one year. For papers in economics and social sciences, this can be considered to be a respectable result. Overall, however, it is too early for drawing conclusions based on a quantitative citation analysis.

Table F-17: The ten most cited articles since 2009

Year	Authors	Title	Source title	GS cites
2009	Armitage, D.R. ; Plummer, R. ; Berkes, F. ; Arthur, R.I. ; Charles, A.T. ; Davidson-Hunt, I.J. ; Diduck, A.P. ; Doubleday, N.C. ; Johnson, D.S. ; Marschke, M. ; McConney, P. ; Pinkerton, E.W. ; Wollenberg, E.K.	Adaptive co-management for social-ecological complexity	Frontiers in Ecology and the Environment 7(2):95-102	440
2009	**Allison, E.H.** ; Perry, A.L. ; Badjeck, M.C. ; Adger, W.N. ; Brown, K. ; Conway, D. ; Halls, A.S. ; Pilling, G.M. ; Reynolds, J.D. ; Andrew, N.L. ; Dulvy, N.K.	Vulnerability of national economies to the impacts of climate change on fisheries	Fish and Fisheries 10(2):173-196	342
2009	Bell, J.D. ; Kronen, M. ; Vunisea, A. ; Nash, W.J. ; Keeble, G. ; Demmke, A. ; Pontifex, S. ; Andréfouët, S.	Planning the use of fish for food security in the Pacific	Marine Policy 33:64-76	188
2010	**Béné, C.** ; Hersoug, B. ; Allison, E.H.	Not by rent alone: analysing the pro-poor functions of small-scale fisheries in developing countries	Development Policy Review 28(3): 325-358	126
2010	Badjeck, M.C. ; **Allison, E.H**. ; Halls, A.S. ; Dulvy, N.K.	Impacts of climate variability and change on fishery-based livelihoods	Marine Policy 34(3): 375-383	117
2010	Dugan, P.J. ; Barlow, C. ; Agostinho, A.A. ; Baran, E. ; Cada, G.F. ; Chen, D.Q. ; Cowx, I.G. ; Ferguson, J.W. ; Jutagate, T. ; Mallen-Cooper, M. ; Marmulla, G. ; Nestler, J. ; Petrere, M. ; Welcomme, R.L. ; Winemiller, K.O.	Fish migration, dams, and loss of ecosystem services in the Mekong Basin	Ambio 39: 344-348	75
2009	**Béné, C.** ; Steel, E. ; Luadia, B.K. ; Gordon, A.	Fish as the "bank in the water" - evidence from chronic-poor communities in Congo	Food Policy 34(1):108-118	67
2011	Mora, C. ; Aburto-Oropeza, O. ; Ayala Bocos, A. ; Ayotte, P.M. ; Banks, S. ; Tupper, M. et al.	Global human footprint on the linkage between biodiversity and ecosystem functioning in reef fishes	PLoS Biology 9(4): e1000606	66
2009	Baran, E. ; Myschowoda, C.	Dams and fisheries in the Mekong Basin	Aquatic Ecosystem Health and Management 12(3): 227-234	61
2012	**Allison, E.H**.; Ratner, B.D.; Åsgård, B.; Willmann, R.; Pomeroy, R.; Kurien, J.	Rights-based fisheries governance: from fishing rights to human rights.	Fish and Fisheries 13(1): 14-29.	59

Table F-17 displays the ten most cited articles that have been published since 2009. The most cited article is an important contribution to the literature on the management of social-ecological systems, which was essential in developing and promoting the concept of "adaptive co-management." The paper was written by ten authors from different research institutions, one of whom was a WorldFish staff member. Adaptive co-management is a strategy applied to different resource system, and an important contribution of WorldFish can be seen in integrating fisheries management into this important debate.

The other nine articles all deal specifically with fisheries topics, covering both natural sciences aspects, especially focusing in environmental issues, as well as socio-economic, institutional and policy aspects. They clearly reflect the strength of WorldFish in addressing fisheries management from a holistic perspective. The publications also indicate the ability of WorldFish to take leadership in globally important debates, such as placing rights-based fisheries in the broader context of human rights, highlighting the role of climate-change for the vulnerability of fishery-dependent populations, and challenging conventional wisdom, such as the mainstream view that capture fisheries should be managed by the principle of maximizing economic rent.

Interpreting the results from Table F-17, one needs to note that five of the ten publications were authored or co-authored by two persons, C. Béné and E.H. Allison, who have both left WorldFish. Béné has an h-index of 17 according to Scopus, and Allison has an h-index of 16, which can be considered top in the fields in which they publish. Researchers with similarly high h-index values are currently not among the AAS staff. Therefore, it is difficult to make projections based on past performance regarding the future ability of AAS to continue to play a similar role of global leadership in important debates.

F.2.4.Journal Frequency Analysis

Table F-18 displays the journals in which the papers in the data base considered here were published, ordered by journal impact factor. The guideline for interpreting journal impact factors discussed in Section 1 above need to be considered when interpreting the results of the table. Overall, the table confirms the finding from the review of sample publications that WorldFish/AAS staff members have been able to publish their work in leading journals of their respective fields, and that they have also been able to publish papers in two top general journals, Science and PNAS.

The table also indicates that the majority of the papers have been published in three categories of journals: fisheries journals (21 publications), environmental journals (21 publications, out which 8 have a policy or management focus), and development-oriented social science journals (9 publications). Only two papers have been published in agriculture-oriented journals. The focus on fisheries and environment is understandable considering the orientation of the past work of WorldFish. Under AAS, one can expect that a broader set of journals will be targeted in the future, including agricultural and agro-ecosystems journals, as well as journals in areas such as gender studies.

Table F-18: Journals in which articles were published

Journal	N. of articles published in 2012-14	JCR Impact Factor 2013*	Category
Science	1	31.027	Multidiscplinary
PNAS	1	9.809	Multidiscplinary
Fish and Fisheries	4	5.855	Fisheries
Global Environmental Change	5	5.236	Environmental sciences
Biological Conservation	2	4.036	Environmental sciences
Genetics Selection Evolution	1	3.747	Agricultural & animal sciences
PLoS ONE	2	3.730	Multidiscplinary
Environmental Research Letters	1	3.582	Environmental sciences
Developmental & Comparative Immunology	1	3.238	Zoology
Journal of Environmental Management	1	3.188	Environmental sciences / Policy & management
Ecological Economics	1	2.855	Economics / Ecology
Ecology and Society	2	2.831	Sociology / Ecology
Marine Policy	4	2.621	Environmental sciences
Food Policy	4	2.212	Economics / Development
Sustainability Science	1	2.189	Environmental sciences
Aquaculture	10	2.009	Fisheries
Journal of Fisheries Biology	1	1.834	Fisheries
World Development	3	1.733	Economics / Development
Ocean and Coastal Management	3	1.597	Environmental sciences / Policy & management
Aquaculture Research	3	1.422	Fisheries
J. World Aquaculture	1	0.933	Fisheries
Development Policy Review	1	0.861	Planning / Development
Coastal Management	2	0.814	Environmental sciences / Policy & management
Agribusiness	1	0.763	Agricultural economics
Journal of Applied Aquaculture	2	NT	Fisheries
Annals of the Association of [American] Geographers	1	NT	Geography
Asian Journal of Agriculture and Development	1	NT	Agriculture and animal sciences
Children's Geographies	1	NT	Geography
Global Food Security	1	NT	Food security
IDS Bulletin	1	NT	Planning / Development
International Journal of River Basin Management	1	NT	Environmental sciences / Policy & management
International Journal of the Commons	1	NT	Planning / Development
Pacific Conservation Biology	1	NT	Environmental sciences
Water Resources and Rural Development	1	NT	Environmental sciences / Policy & management

F.2.5. Affiliations

Table F-19 displays a list of the affiliation of the authors, who co-published with WorldFish/AAS researchers. The table shows a strong focus of collaboration with the Universities of East Anglia and James Cook, as well as WAU. The list also contains a wide range of other research organizations located in industrialized countries, as well as three other CGIAR centres, the World Bank and FAO. This points to a wide and diversified network of research collaboration, which can certainly be considered as an asset. Two national research organizations located in a developing country feature strongly, the Bangladesh Agricultural University and a research center in Malaysia.

Table F-19: Affiliation of co-authors

	2009	2010	2011	2012	2013	Total
Uni East Anglia	6	3	2	8	4	23
James Cook Uni			7	8	8	23
WAU	8			4	8	20
Uni Conneticut			5	8		13
Uni Stirling		4	3		4	11
Bangladesh Ag Uni		4			6	10
IWMI	4	5				9
IRRI	4	4				8
IFPRI				4	4	8
FAO			3	4		7
Simon Fraser Uni	6					6
Secretariat of the Pacific Community Noumea	6					6
GEOMAR-Helmholtz Zentrum für Kiel	6					6
Uni Sunshine Coast					6	6
CP Water&Food		5				5
Uni Bremen	4					4
Southern Cross Uni				4		4
Uni Florida				4		4
Centre for Environment Fisheries and Aquaculture Science (CEFAS)				4		4
Research Institute for Aquaculture No2 (RIA 2)					4	4
Queensland Uni Technology					4	4
Auburn Uni					4	4
Stockholm Uni					4	4
National Prawn Fry Production & Research Center, Kedah, Malaysia		3				3
Uni British Columbia		3				3
Uni Hawaii		3				3
World Bank			3			3
Institut d'Economie Rurale			2			2
Uni Minnesota			2			2
IRD Montpellier			2			2
Uni Queensland			2			2

The findings from this list are somewhat surprising, since the review of sample of publications indicated that at least 44% of the journal publications had co-authors from developing countries. This does not seem to be captured in the table.

F.2.6.Conclusions

The team concludes from the review of the sampled publications that the overall quality of the types of publications included (journal publications, working papers, book chapters and reports) is high, and well in line with the quality that can be expected from a CGIAR center. This assessment is based on an analysis of the journals in which the research has been published and on the team's own assessment of the overall quality and the originality of the publications under review. Expectedly, quality was higher for journal publications than for the other types of publications. The review suggests that the quality of publications further increased in the second review period. Overall, WorldFish/AAS researchers were able to target high quality international journals in their respective fields. Some papers were also published in top general journals, which is a remarkable achievement.

The bibliometric analysis, which covers the entire publications portfolio rather than a sample only, fully confirms this assessment. It is too early for a quantitative citation analysis of the publications produced under AAS, but a review of the most cited publications indicates that WorldFish researchers have been able to exercise intellectual leadership in important global debates related to fisheries and its role for pro-poor development. It is, however, a matter of concern that two of the authors who accounted for half of the ten most frequently cited publications have left AAS, and it remains to be seen whether a similar level of leadership will emerge from the researchers now working under AAS. One also needs to note that AAS, given its focus on aquatic agricultural systems, faces the challenge to establish itself in fields outside its core area of expertise, which is fisheries.

The review of sample publications indicates that there is a relatively large share of journal publications as well as other publications that are co-authored by researchers based in national research organizations in developing countries, which is an indication of strong partnerships with national research organizations. The affiliations review included in the bibliometric analysis did, however, not confirm this finding for reasons that are unclear. The affiliations review included in the bibliometric analysis points to wide global network of research organizations, which is certainly an asset for AAS. Still, new partnerships may have to be developed to address the agricultural side and the systems aspects of aquatic agricultural systems, and to address the PAR nature of AAS research.

The analysis of sample publications shows that the types of papers indicated that the journal publications were based, in almost equal shares, on quantitative research, qualitative research, and research that draws on both qualitative and quantitative methods. There is also a strong focus on review and synthesis papers in the publications portfolio, the share of which was almost equal to the share of empirical papers among the publications under review. Reviews and syntheses can be seen as an important area of work of CGIAR centers, for which they have a comparative advantage, especially if the reviews and syntheses provide global perspectives that are relevant to CGIAR goals. This publications review indicates that WorldFish/AAS researchers have been very active in this field, and that they were to publish reviews and syntheses in leading international journals.

The review of the sampled publications also suggests that it is an important strength of the WorldFish/AAS researchers to identify knowledge gaps and important topics and to provide insights into such topics that are valued by the respective research communities. This appeared to be the

case both for research focusing on natural sciences (fisheries, aquaculture) as well as economics and social sciences and also for in interdisciplinary work. In the qualitative research included in the review, a focus on developing conceptual tools and frameworks was identified as another strength. The use of sophisticated or advanced analytical methods, however, was not prominent in either the qualitative or the quantitative papers included in the sample. A considerable share of the qualitative papers was assessed to be primarily descriptive rather than analytical, and only few of the quantitative papers included in the review applied sophisticated analytical techniques of data analysis. This deficit does not seem to have affected success in terms of publications in the past, as it was apparently compensated by the strengths in other areas identified above. Still, AAS may consider further enhancing the methodological skills of the team, since the development and use of advanced methods for data collection and analysis (quantitative, qualitative or mixed) is a comparative advantage of the CGIAR and an important public good that they can provide.

In terms of links between the publications and the key areas of AAS, including poverty, systems, gender and the use of PAR, the review of sample publications found a mixed picture. With regard to poverty, one can note that the share of papers that specifically focused on poverty was lower in the second time period than in the first time period, but one could see a considerable increase in publications that addressed poverty aspects even though they primarily focused on other topics. This can be seen as indication of mainstreaming of poverty as a cross-cutting concern. A specific focus on marginalization was less apparent, however.

In terms of gender, a positive trend can be noted in the publications portfolio. In the second time period, papers that specifically focused on gender appeared in the sample, which was not the case for the first time period. Moreover, the share of publications that addressed gender aspects as a cross-cutting issue increased. Some papers that used the principles of a Gender Transformative Approach (GTA) were also identified in the sample, which indicates that GTA has found its way in the publication portfolio. This is clearly an important achievement.

With regard to the systems perspective, one can positively note that there was an increase in the share of publications in the sample that presented findings from different hubs in a comparative perspective or that contributed to a better understanding of the farming systems in in the individual hubs. Outside the sample, one paper could be found that attempted to identify the location of the aquatic agricultural systems (based on the AAS definition) in the developing world and one paper that reviewed the literature on productivity-focused interventions in the AAS hub countries. There was, however, a scarcity of papers that applied typical methodological approaches used in farming systems research (such as developing typologies and characterizing types of farming systems) and in agro-ecosystems research (such as using systems theory to identify linkages between different components of aquatic agricultural systems). This suggests that a stronger focus on using methodologies that are suited for a systems perspective should be developed.

With regard to the use of participatory research methods and, specifically, participatory action research (PAR) approaches, the findings of the review of sampled publications are less encouraging. There was no increase in the share of publications that were based on participatory research methods or PAR in the second time period. More than 80% of the publications in the sample were not based on participatory methods or PAR. Empirical papers based on PAR will take more time to appear than was available at the time of the evaluation if such research efforts started only with AAS, but there would have been scope for conceptual papers and papers using participatory research methods, at least at the Working Paper level. The review also indicates that the

comparatively few papers that have been published were mostly based on established methods and did not focus on methodological innovations.

Interpreting the results regarding the links to AAS, it is important to note that the assessment was based on the sampled publications, not the entire publications portfolio, which may lead to omissions. However, the share of publications included in the sample was comparatively large (more than 80 publications), and the random sampling technique should avoid any systematic bias in the publications included in the review. In addition, the team checked for inter rater reliability. Therefore, it is the team's assessment that the findings presented here are robust and relevant. One should also note that AAS management was asked to provide a selection of publications that they considered the best examples of research conducted under the different AAS themes. A review of those publications is included in the main report, and the findings are largely consistent with the findings of the review presented here.

The bibliometric analysis provided information on the productivity of the researchers involved in the program, which could be assessed on the basis of the sample. However, only a snapshot for the year 2014 was possible, since the evaluation team did not have figures on the development of staff numbers over time. The value of 1.3 journal publications per PhD-level researcher in 2014 is considerably below the widely used benchmark of 2 journal publications per year per PhD researcher. However, this figure needs to be interpreted with care, since AAS is a very young program and many of the staff are fairly recent hires. Moreover, there has been an increasing trend in the number of journal publications since the beginning of the program.

F.2.7. Recommendations

The following recommendations can be derived from the review:

- The WorldFish / AAS team clearly has the capacity to publish its work in high quality journals of the respective fields of research. In addition, researchers were able to place some papers in top general journals, which is also a remarkable achievement. AAS should continue to place emphasis on producing publications in leading field-specific and general journals and ensure that the capacity and incentives of staff to publish at this level are maintained.

- To address the scope of aquatic agricultural systems, the portfolio of journals to be targeted by AAS needs to be expanded. In particular, journals focusing on agricultural systems / agro-ecological systems should be included in the future publications portfolio.

- AAS should continue its valuable efforts to publish together with researchers based in national research organizations in developing countries.

- AAS should maintain its strengths in identifying and addressing important topics, developing conceptual frameworks, and publishing reviews and syntheses papers that take a global perspective. In the future review and synthesis work, a stronger focus should be placed on addressing the objectives of AAS in the areas of systems research, gender and PAR.

- The AAS team should place a stronger focus on excellence in the use of advanced research methods and in the development of new and innovative research approaches, ranging from research design to data collection methods and analysis. AAS should develop a strategy for developing such skills based on the program's objectives, which implies a combination of

expertise in qualitative research methods and mixed methods as well as selected quantitative methods (e.g., those required for systems research) all matching the program's stated aim of working within an action research approach, exploiting the comparative advantage AAS has in contributing to the work of other CRPs.

- AAS should continue to place emphasis on addressing gender as a cross-cutting issue in all publications where this is relevant and to move towards the application of a GTA approach. Emphasis should be placed on publishing research on gender and the GTA in highly respected and widely read journals in the future.

- AAS should also continue to address poverty as a cross-cutting issue in its publications. More emphasis should be placed on specifically addressing the topic of marginalization.

- AAS should develop a publication strategy, which identifies the types of journals that the program wishes to target in the future, given the nature of the program and its foreseen impact pathways. This strategy should also set guidelines for the numbers and types of publications per year that researchers are expected of publish. Special emphasis should be placed on mentoring of junior researchers to publish at the international level.

Appendix

Rating Scheme for Sample of Publications Reviewed by Evaluation Team

This appendix explains the rating scheme that was used by the team members. For each rating a comment explaining the rating was provided. These comments were considered to cross-check the ratings for consistency. They were also considered in the interpretation of the results.

Category or score	Explanation	Comments
Impact_factor		
Explanation	Impact factor of journal (2014)	Was provided by IEA and cross-checked by evaluator

Dev_co_author		
Label	Co-author based in national institution in developing country	
1	yes	
2	no	
3	cannot be determined	

Pub_type		
Label	Type of publication	Note: This scheme does not apply to othertypes of publications (such as briefs, workshop reports, guidelines, toolsetc.)
1	Peer-reviewed international journal	
2	Other journal	
3	Book	
4	Book chapter	
5	Report	
6	Working Paper	
7	Other	

AAS-Theme		
Label	AAS Theme	Identify based on contents of the publication
1	Productivity	
2	Value Chains	
3	Resilience	
4	Gender	
5	Institutions and Policies	
6	Nutrition	

7	Knowledge Sharing and Learning	
8	Addressing several themes	
9	Not directly linked to any of the themes	
AAS_Hub		
Label	Hub classification	Publications may refer to the entire country in which hubs are located
1	Zambia	
2	Bangladesh	
3	Cambodia	
4	Phillippines	
5	Solomon Islands	
6	All hubs	
7	More than one but not all hubs	
8	Not directly linked to hubs	

Discipline		
Label	Discipline	
1	Economics	
2	Sociology, anthropology	
3	Other social science	
4	Natural science - fisheries, aquaculture	
5	Natural science - agriculture, farming systems, land, water	
6	Nutritional sciences	
7	Interdisciplinary	
8	Multidisciplinary	
9	Other discipline / discipline cannot clearly be identified	

Paper_type		
Label	Type of paper	
1	Review, synthesis or situation analysis based on secondary literature or data	
2	Primarily a theoretical or conceptual paper	
3	Primarily an empirical paper	
4	Paper that combines theory/concepts with empirical analysis	
5	Other	

Data_type		
Label	Type of data used in the study	
1	Mostly quantitative	
2	Mostly qualitative	
3	Mixed	

Qual_Analysis _Level (Apply for mostly qualitative or mixed papers)		
Label	Level of analysis of qualitative papers	
1	Mostly analytical	
2	Mostly descriptive	
3	Not applicable (e.g., because it is a review or conceptual paper)	

Quant_Analysis_Level (Apply to mostly quantitative or mixed papers)		
Label	Level of analysis of quantitative papers	
1	sophisticated (e.g., advanced econometric models or complex qualitative analysis guided by theory/ used to generate theory)	Please note that the criteria are meant as possible examples to provide guidance for the rating. Assessment has to be made based on team members expertise in the respective field.
2	intermediate (e.g., OLS regressions or intermediate qualitative analysis)	
3	simple (e.g., descriptive statistics or mostly descriptive presentation of qualitative results)	
4	Not applicable (e.g., because this is a review or conceptual paper)	Note: This category will be treated as "not applicable" in the analysis of the publications review

Originality		
Label	Originality of the contribution	
1	Very original (e.g., because it explores new reserach areas and/or develops new theoretical/analytical concepts or research methods and/or creates important new insights; in case of reviews: addresses important knowledge gaps)	Please note that the criteria are meant as possible examples to provide guidance for the rating. Assessment has to be made based on team member's expertise in the respective field.
2	Somewhat original	
3	Not very original (e.g., because it uses standard methods to confirm already estabished knowledge)	

PAR_Link		
Label	Link to participatory action research (PAR)	
1	Paper is directly based on Participatory Action Research (uses data generated through PAR or data on PAR processes)	Note: This category applies if some type of action (e.g., field trials by community members) took place on which data was collected that is used in the paper.
2	Paper is based on the use of participatory methods (e.g., Participatory Rural Appraisal), but not directly on Participatory Action Research	Note: Use of participatory methods could have been used as a first step of a Participatory Action Research Approach; if "action" has not taken place yet, the paper falls in this category
3	Paper is not linked in any way to PAR	
4	Not applicable, e.g., because it is a review paper	

Systems_link		
Label	Link to farming systems research on aquatic agricultural systems	
1	The paper applies a sytems perspective that addresses different aquatic agricultural systems in a comparative perspective	
2	Paper contributes to a better understanding of a particular aquatic agricultural system (beyond addressing just one particular aspect of that system)	
3	Paper is not linked to a systems perspective (beyond the fact that it may be relevant to a specific aspect of an aquatic agricultural system)	

Gender_link		
Label	Attention to gender in the paper	
1	The paper deals specifically with gender or systematically applies a gender perspective (e.g., because integrates gender into the analytical framework or because it analyzes findings disaggregated by gender in a way that provides important insights)	Please note that the criteria are meant as possible examples to provide guidance for the rating. Assessment has to be made based on team members expertise in the respective field.
2	Paper makes reference to gender, but not in a cross-cutting or systematic way	
3	The paper does not refer to gender issues in any way	
4	The nature of this paper does not allow for integration of gender aspects (e.g., because it has a purely natural science focus such as analyzing a	Note: This category will be treated as "not applicable" in the analysis of the publications

	fish disease);	review

GTA_Approach	**To be filled if the answer to Gender_Link was 1 or 2**	
Label	Attention to gender in the paper	Note: The Gender Transformative Approach focuses explicitly on power relations between men and women and aims to change norms, attitudes and practices that underlie gender inequalities
1	The paper applies a Gender-Transformative Approach.	
2	The paper does not apply a Gender-Transformative Approach.	

Poverty_link		
Label	Attention to poverty/marginalization in the paper	
1	Poverty/marginalization is central to this paper (e.g., because the paper focuses specifically on poor or marginalized groups or treats poverty and/or marginalization systematically as a cross-cutting issue.)	Please note that the criteria are meant as possible examples to provide guidance for the rating. Assessment has to be made based on team members expertise in the respective field.
2	Paper/marginalzation is somewhat important to this paper (e.g., because it makes reference to poverty and/or marginalized groups, but not in a cross-cutting or systematic way)	
3	The paper does not refer to poverty or margainalized groups in any way	
4	The nature of this paper does not allow for integration of poverty and marginalization aspects (e.g., because it has a purely natural science focus such as analyzing a fish disease)	Note: This category will be treated as "not applicable" in the analysis of the publications review

Pract_rel		
Label	Practical / Policy relevance	
1	Paper includes practically relevant/specific implications or recommendations (useful for development practice or policy) that are specifically based on the findings of the paper	
2	Paper includes only very generic implications or recommendations, not necessarily based on the findings of the paper	

3	Paper does not include any substantative implications or recommendations for development practice or policy	
4	Not applicable (e.g., because it is a review of mainly a conceptual paper)	

Overall quality of science		
Label	Overall rating of quality of science	Note: This rating refers to quality of science in general, and does not include the relevance of the work with regard to AAS. Relevance for AAS will be assessed based on the linkages identified in the previous criteria.
1	excellent, very good quality	
2	average	
3	Poor	
Comments_related to review		
Explanation	Comments referring to your review, e.g., you can make a note here in case you had any difficulties in reviewing this publication	

ANNEX G. STAFF SURVEY

G.1 Methods

Using SurveyMonkey, an online survey of AAS staff and partners was developed. This survey probed around a number of areas and concerns: involvement in AAS research, perceptions on research quality and general management, partnerships, capacity building and gender and the overall value added of AAS.

On 18 Nov 2014 an invitation to complete the survey and a link to it were sent to 120 AAS staff and partners (in principle all researchers employed by a WorldFish, Bioversity and IWMI – or any other organization – who have some staff time paid for by AAS). Further reminders were sent on 4 Dec 2014 by the co-team leaders as well as the CRP Director. By 18 Dec 2014 when the exercise was closed, a total of 91 individuals had responded partly, of which 82 completed the survey.

Table G-1: Survey overview

Survey sent to	120
Responses	91
Response rate	76%
Complete Reponses	82
Completed response rate	68%

Some analysis of the results were undertaken through SurveyMonkey, and in addition the survey data were imported into SPSS for more detailed analysis.

G.2 Results

PART 1: About you

Eighty-seven percent of the respondents were employees of WorldFish/AAS. Some other characteristics of the respondents are shown in Table G-2 and Table G-3.

Table G-2: Survey respondents by position and gender[32]

Research_position_2		Gender		Total
		Female	Male	
Manager / leader / coordinator	Count	12	14	26
	%	46.2%	53.8%	100%
Researcher	Count	25	33	58
	%	43.1%	56.9%	100%
Other	Count	3	3	6
	%	50.0%	50.0%	100%
Total	Count	40	50	90
	%	44.4%	55.6%	100%

[32] Q1: Please indicate your gender and Q2: What is your research position?

Table G-3: Survey respondents by country base and gender[33]

Country_base		Gender		Total
		Female	Male	
Bangladesh	Count	7	12	19
	%	36.8%	63.2%	100%
Malaysia	Count	5	10	15
	%	33.3%	66.7%	100%
Solomon Islands	Count	8	7	15
	%	53.3%	46.7%	100%
Philippines	Count	9	4	13
	%	69.2%	30.8%	100%
Cambodia	Count	1	6	7
	%	14.3%	85.7%	100%
Zambia	Count	2	5	7
	%	28.6%	71.4%	100%
Australia	Count	1	2	3
	%	33.3%	66.7%	100%
Italy	Count	1	1	2
	%	50.0%	50.0%	100%
South Africa	Count	1	1	2
	%	50.0%	50.0%	100%
Egypt	Count	1	0	1
	%	100.0%	0.0%	100%
France	Count	1	0	1
	%	100.0%	0.0%	100%
India	Count	1	0	1
	%	100.0%	0.0%	100%
Kenya	Count	0	1	1
	%	0.0%	100.0%	100%
Netherlands	Count	1	0	1
	%	100.0%	0.0%	100%
Union of Soviet Socialist Republics	Count	0	1	1
	%	0.0%	100.0%	100%
[blank]	Count	1	0	1
	%	100.0%	0.0%	100%
Total	Count	40	50	90
	%	44.4%	55.6%	100%

[33] Q6: In what country are you currently based?

Figure G-1: SURVEY – Q 3[34]: Research area?

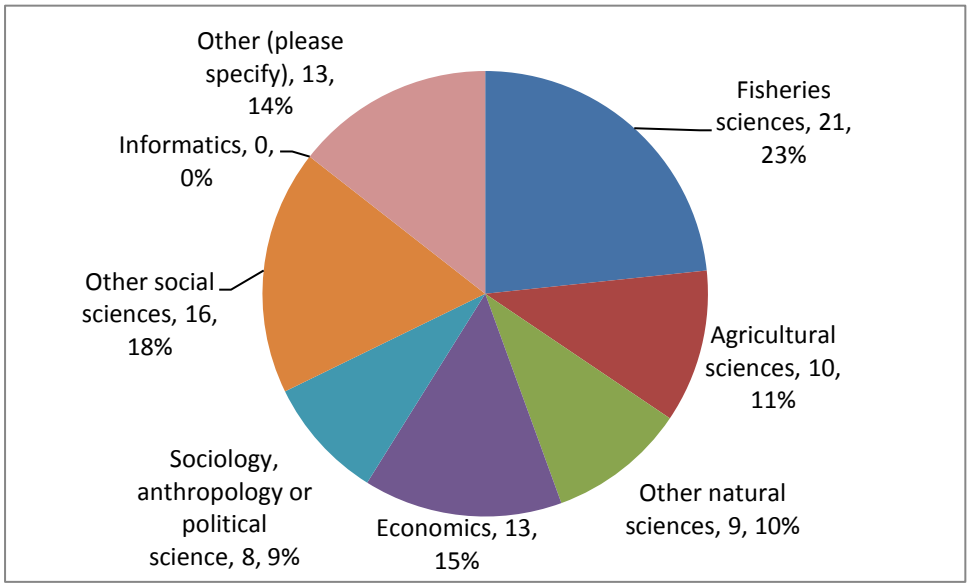
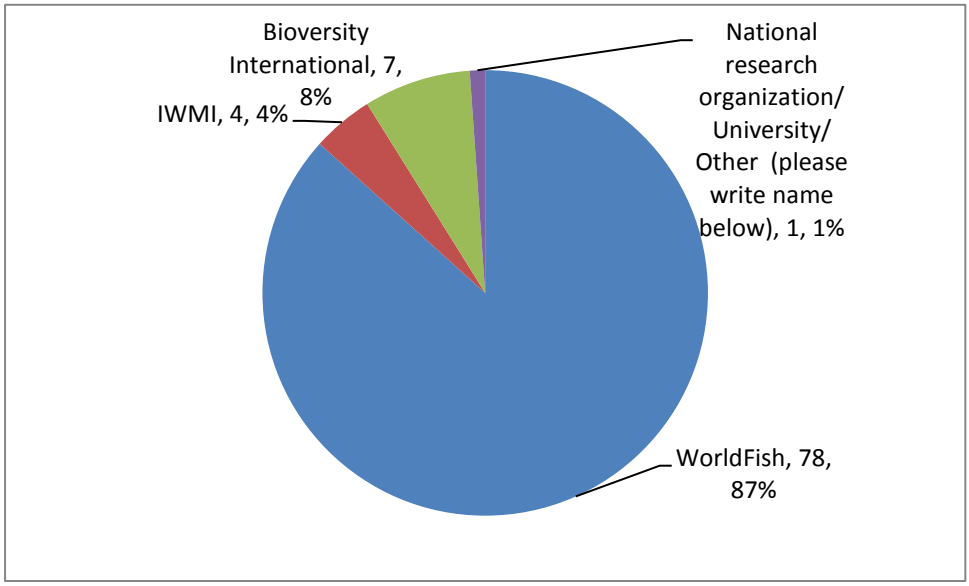
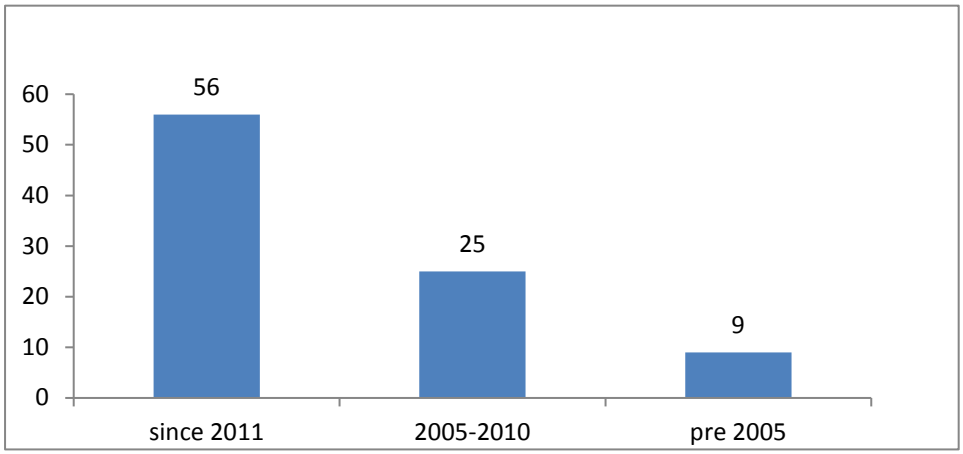


Figure G-2: SURVEY – Q 4[35]: Home institution



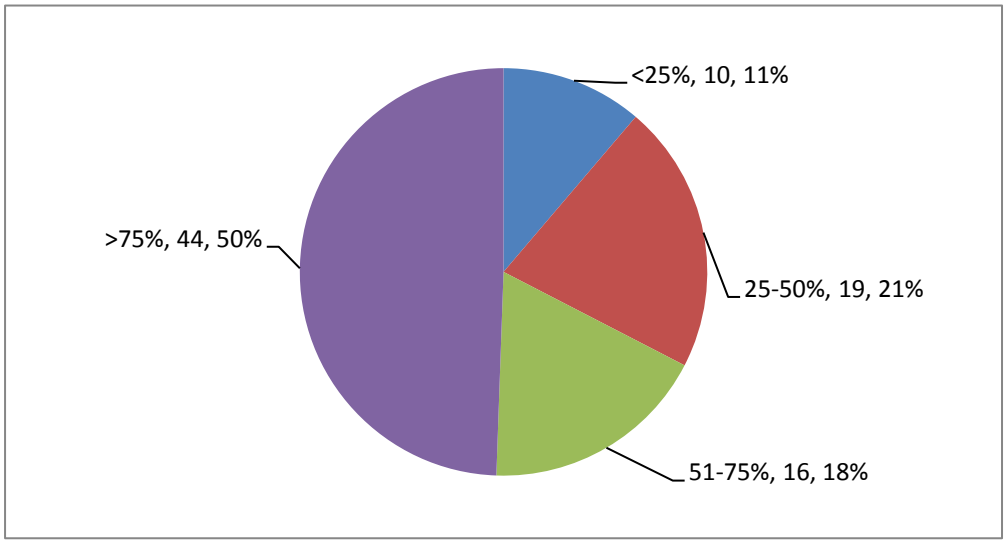
[34] Q 3: What is your research area?
[35] Q 4: Please give your home institution

Figure G-3: SURVEY– Q 5[36]: Time with current organization



PART 2: Your involvement in AAS

Figure G-4: SURVEY- Q 7[37]: Time devoted to AAS



[36] Q 5: Since when have you been working with your current organization? Please indicate year
[37] Q7: Approximately how much of your time do you devote to AAS?

Figure G-5: SURVEY- Q 8[38]: Contribution to research themes

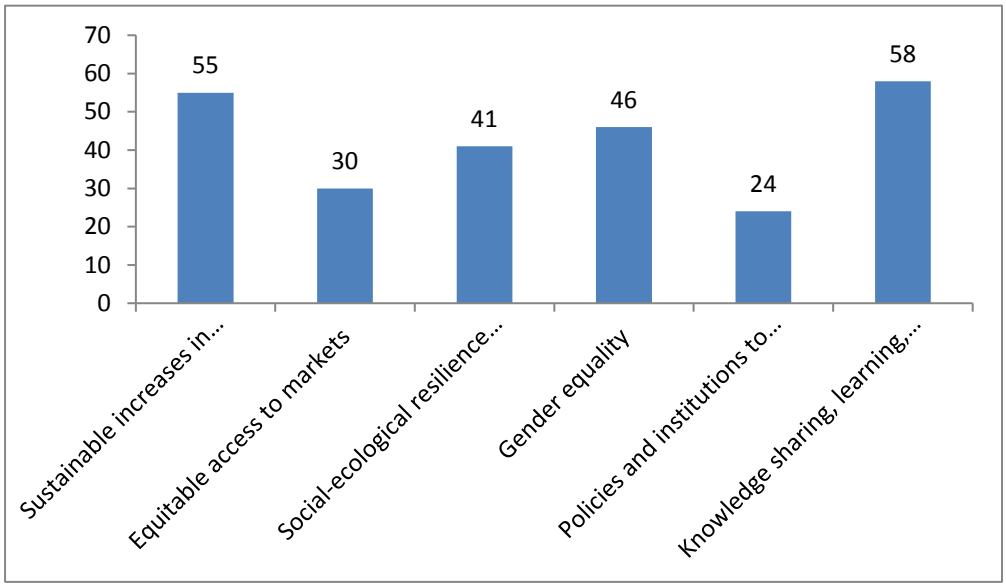
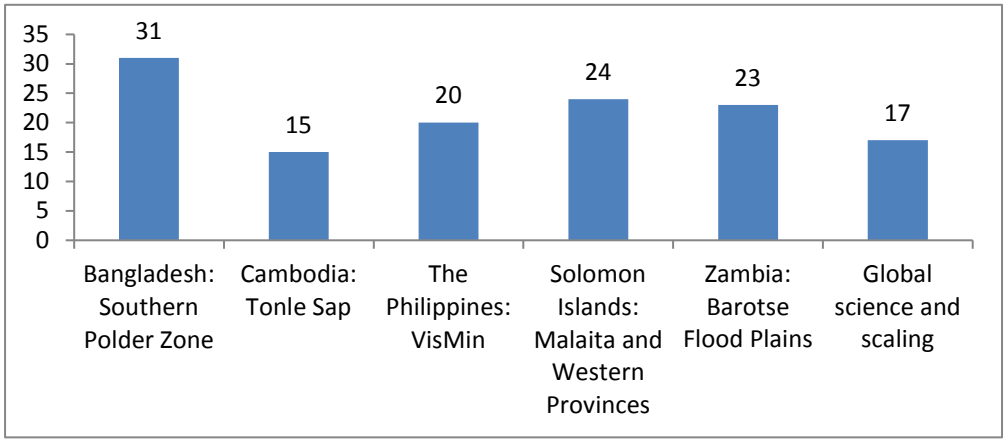


Figure G-6: SURVEY- Q 9[39]: Contribution to Hubs/Flagships



[38] Q8: To which Research Theme (s) do you contribute? Please tick all that apply
[39] Q9: To which Hub /Flagship Project do you contribute? Please tick all that apply

Figure G-7: SURVEY- Q 10[40]: Days spent in communities

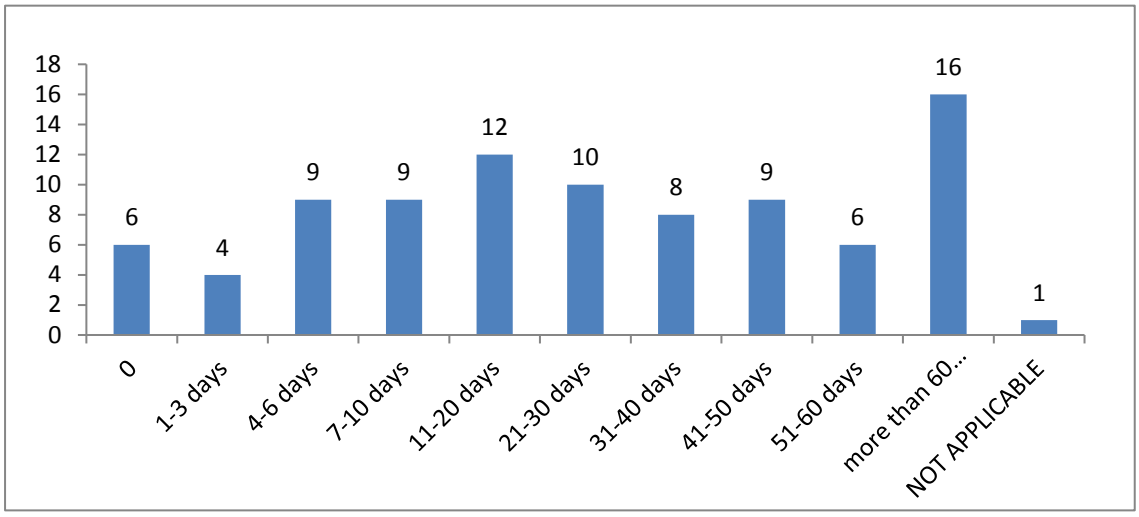
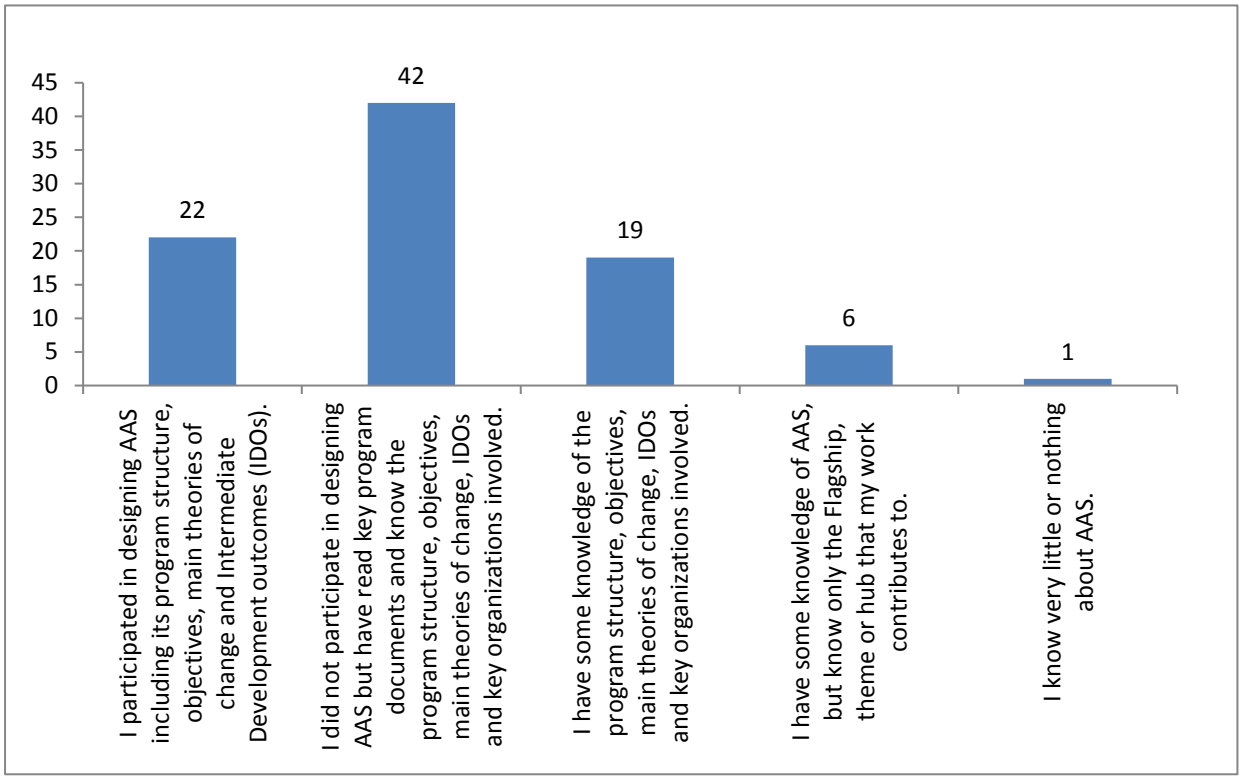


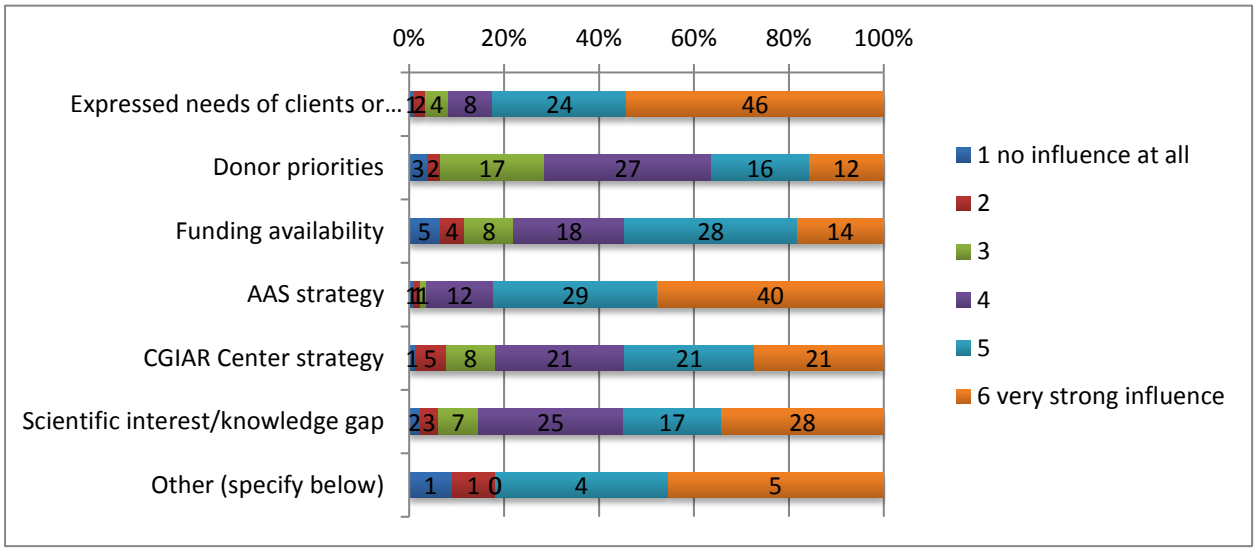
Figure G-8: SURVEY- Q 11[41]: Knowledge of program



[40] Q10: In the past year, how many days did you spend approximately in the field in the communities to which your research relates (e.g., for collecting field data, or participating in community workshops)?

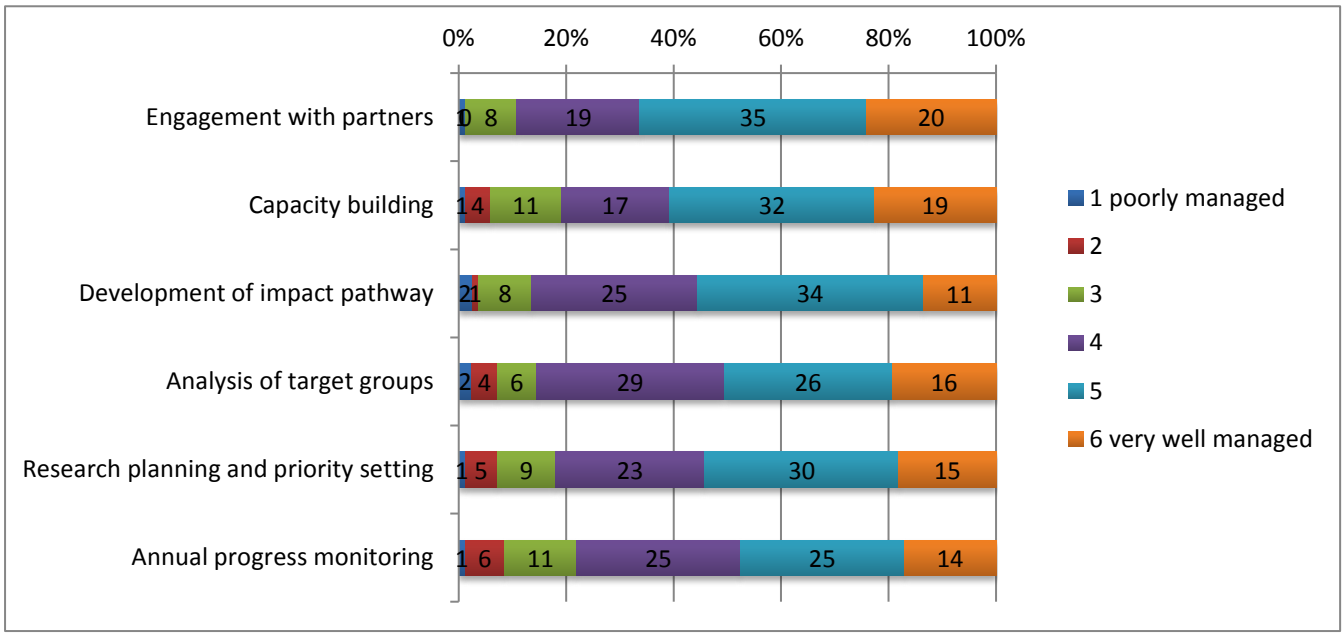
[41] Q 11[41]: How well do you know AAS? Please select the answer that best describes your knowledge of the program.

Figure G-9: SURVEY Q12[42]: Influence on choice of research topics



Total Responses: 87

Figure G-10: SURVEY Q 13[43]: Enhancing effectiveness

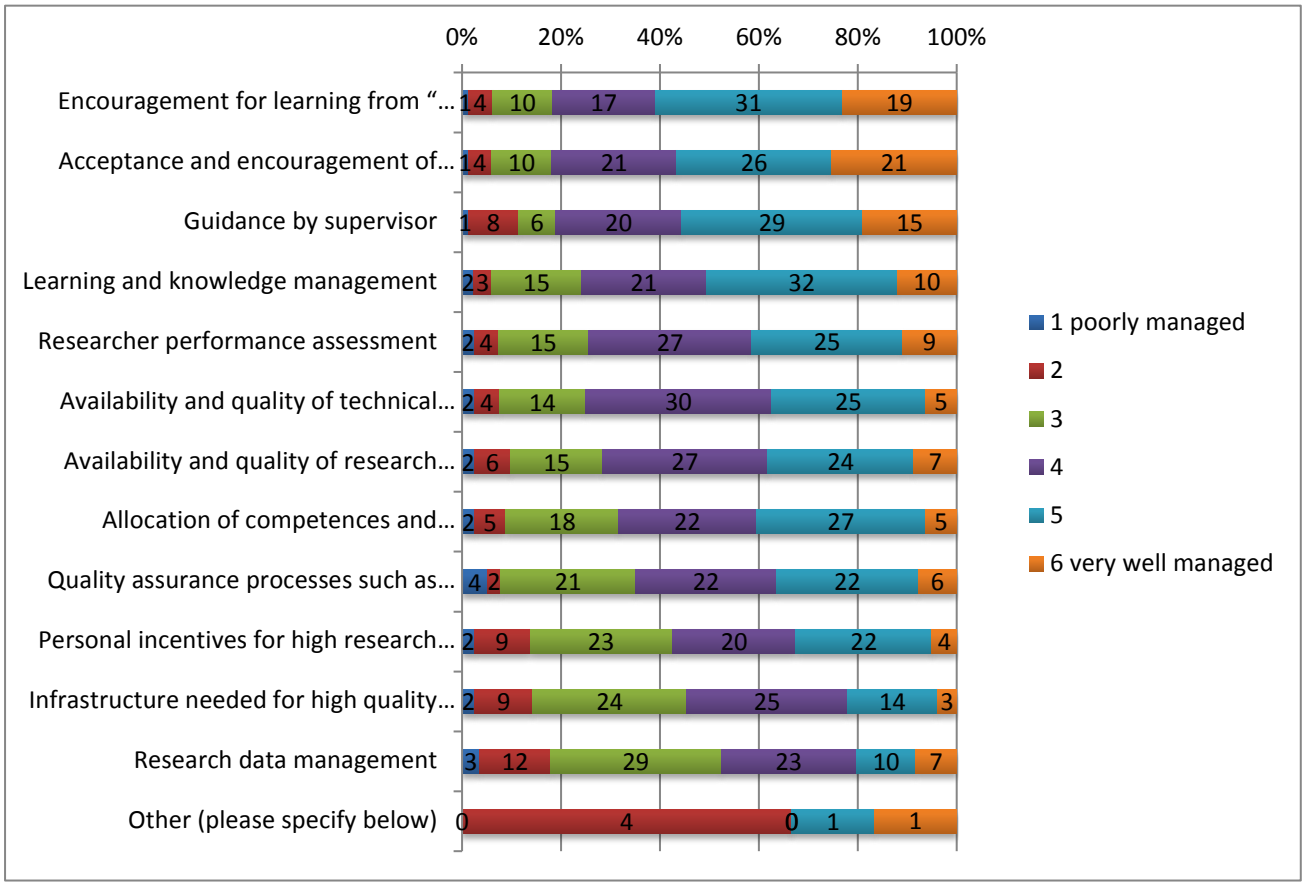


Total responses: 87

[42] Q12 In your view, how much is the choice of the AAS research topics that you mostly work for influenced by the following factors? Please score the factors below on a scale from 1 (no influence at all) to 6 (very strong influence).

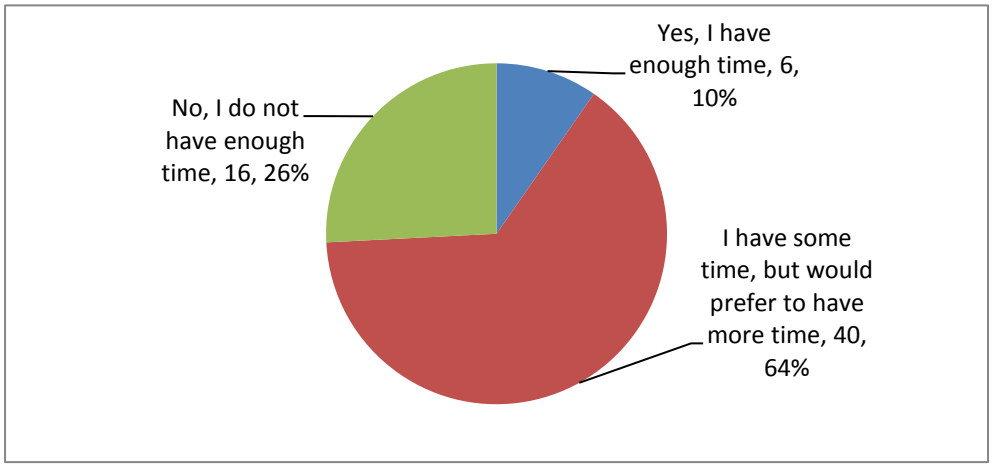
[43] Q13: In your view, how well are the following aspects for enhancing the effectiveness of AAS managed?? Please score using a scale from 1 (poorly managed) to 6 (very well managed).

Figure G-11: SURVEY Q 14[44]: AAS management



Total responses: 87

Figure G-12: SURVEY Q 15[45]: Quiet time for writing



[44] Q 14. In your view, how effectively are the measures listed below managed in AAS? Please score using a scale from 1 (poorly managed) to 6 (very well managed).

[45] Q 15: Do you have quiet time for writing?

Figure G-13: SURVEY Q 17[46]: Involvement in activities funded by W1/2

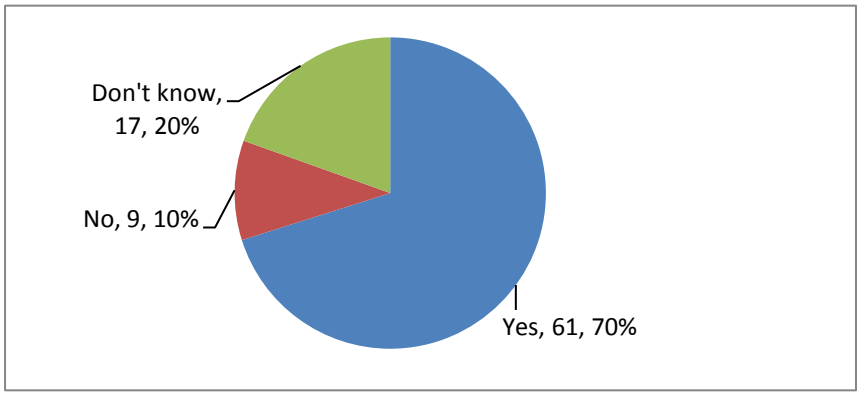
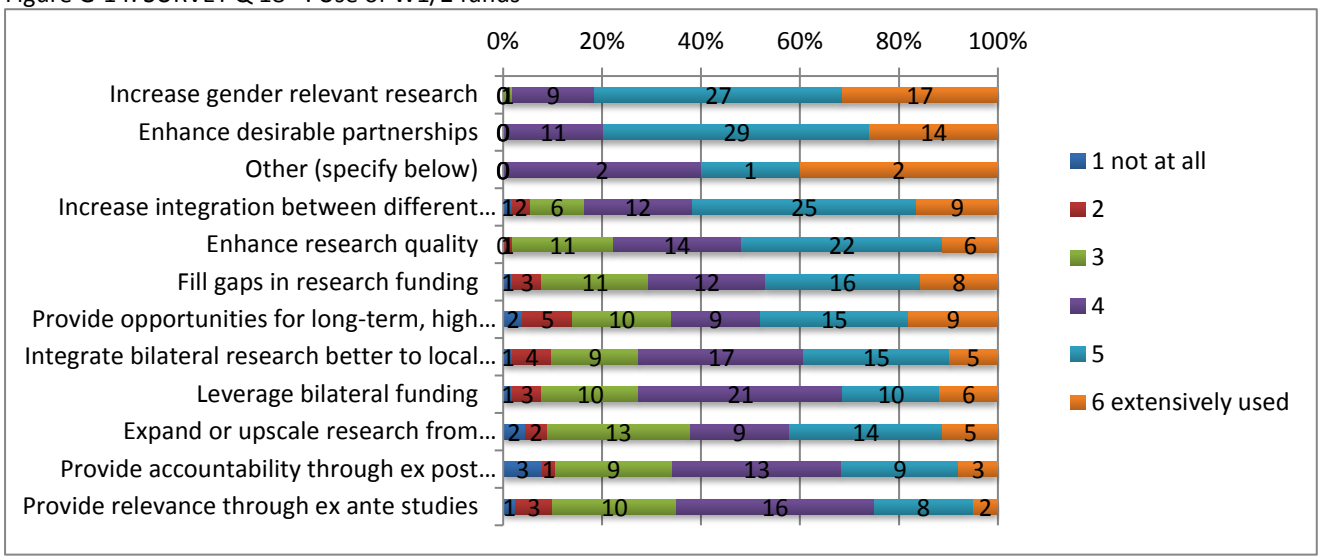


Figure G-14: SURVEY Q 18[47]: Use of W1/2 funds

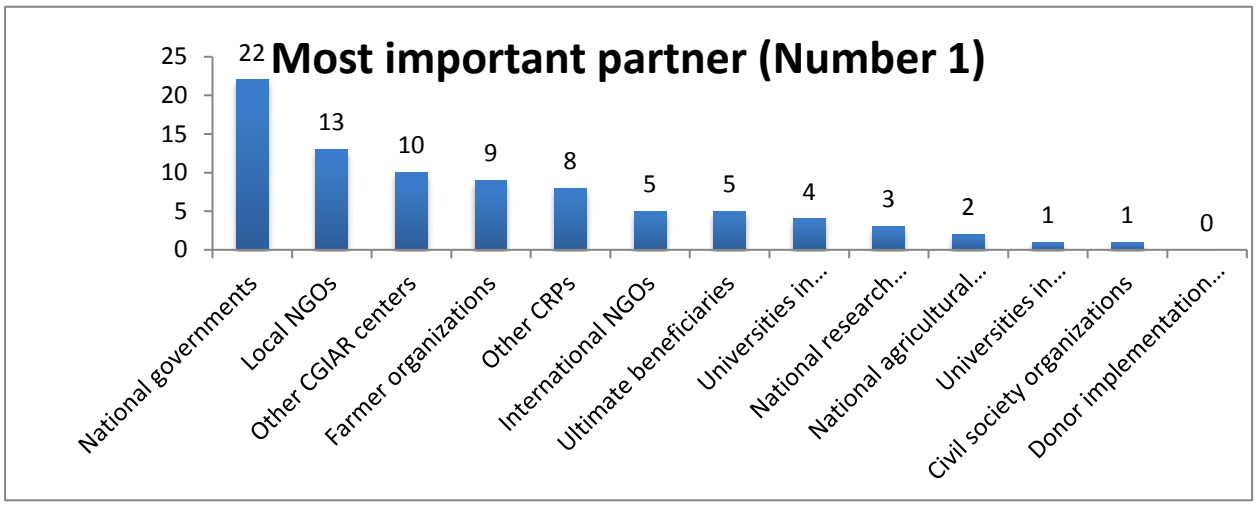


[46] Q17: AAS receives funding from different sources. The coretype CGIAR funding (Windows 1 and 2) can be used according to AAS priorities, without fulfilling specific donor requirements (as is typically the case in bilateral funding). Have you been involved in research activities funded from Windows 1/2?

[47] Q18: Based on your experience, please indicate to what extent W1/2 funds are used in AAS for the following purposes on a score from 1 (not at all) to 6

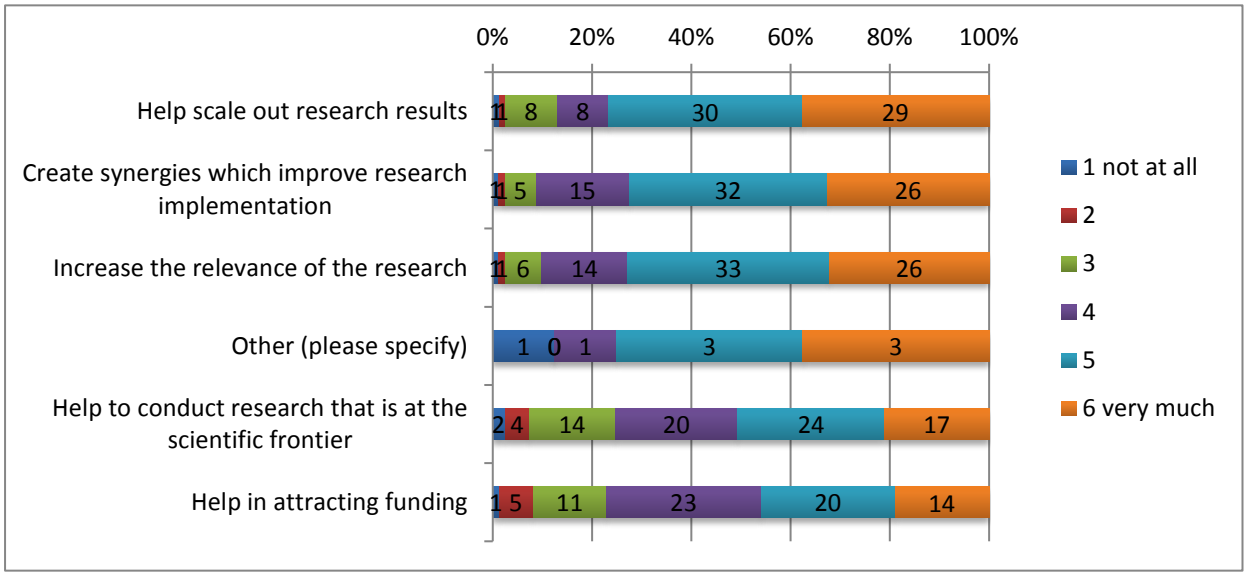
PART 3: PARTNERSHIPS, GENDER AND CAPACITY BUILDING

Figure G-15: SURVEY Q19[48]: Types of partners



Total responses: 83

Figure G-16: SURVEY Q20[49]: Effectivness of partnerships

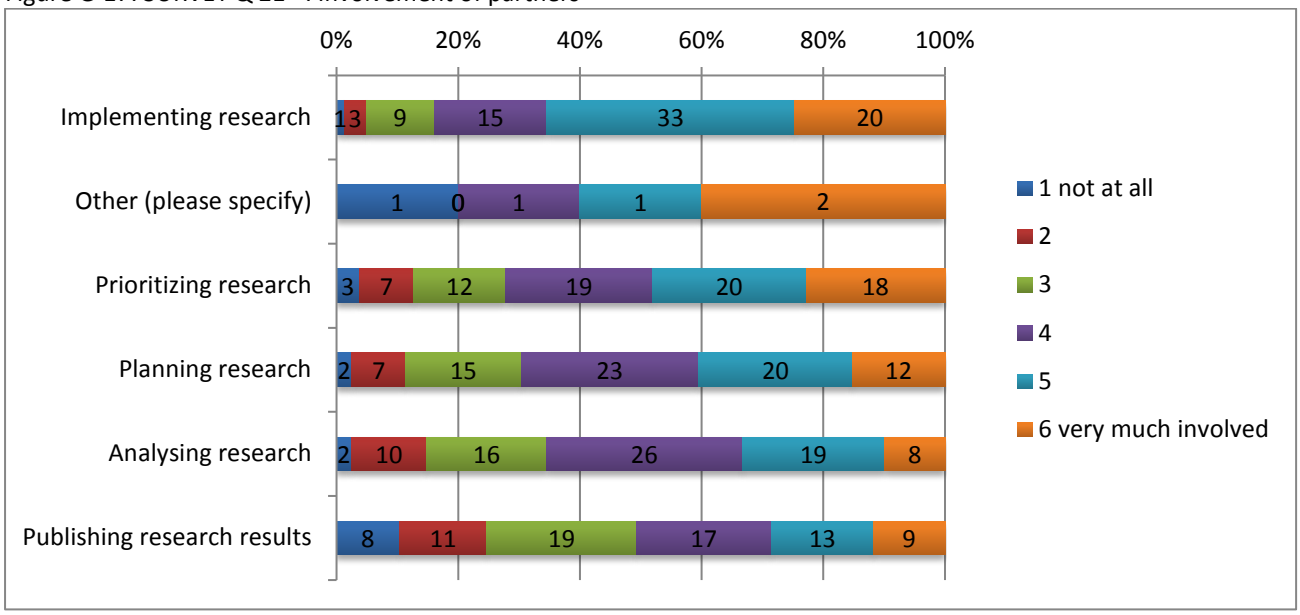


Total responses: 83

[48] Q19: Please indicate the three most IMPORTANT types of partners, for the work you do and indicate how INVOLVED those partners are in your work

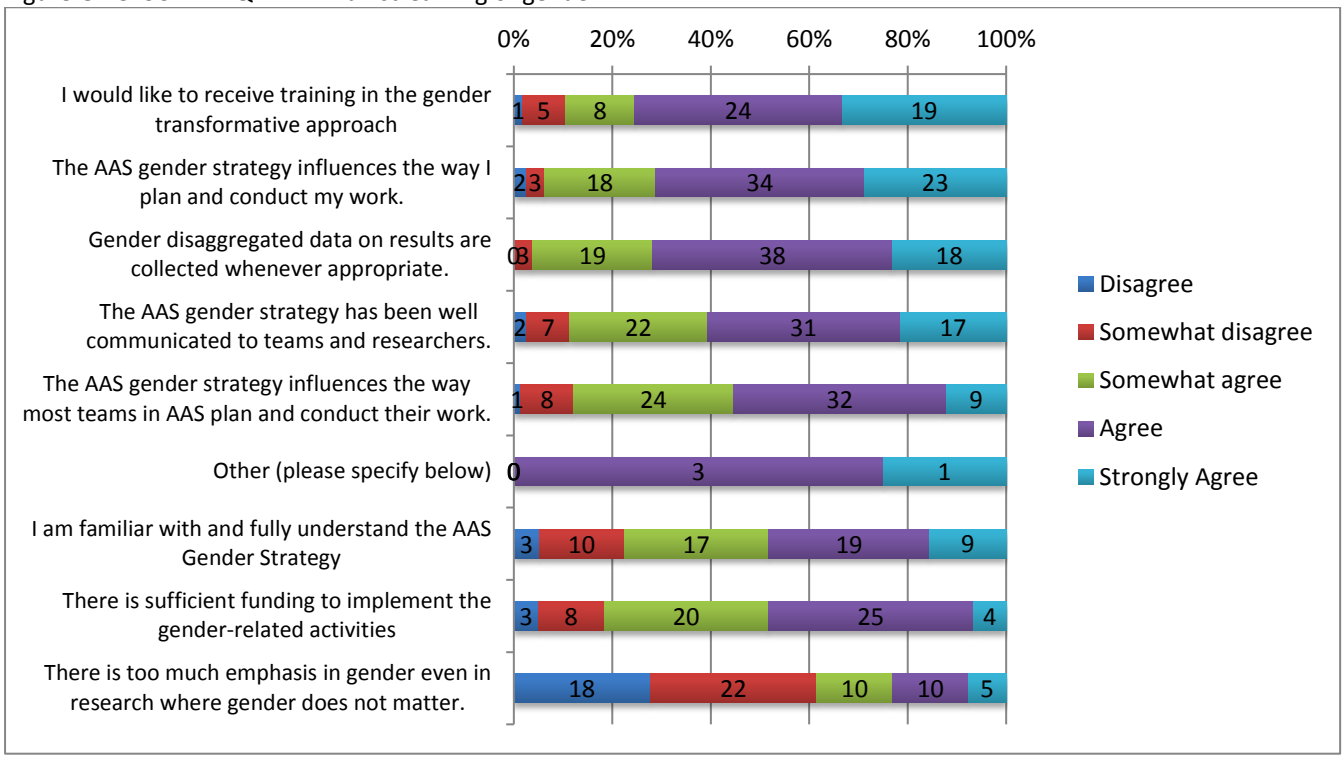
[49] Q 20. To what extent, in your view, do the current partnerships increase the likely effectiveness of your research? Please score on a scale from 1 (not at all) to 6 (very much.)

Figure G-17: SURVEY Q 21[50]: Involvement of partners



Total responses: 83

Figure G-18: SURVEY Q 22[51]: Mainstreaming of gender

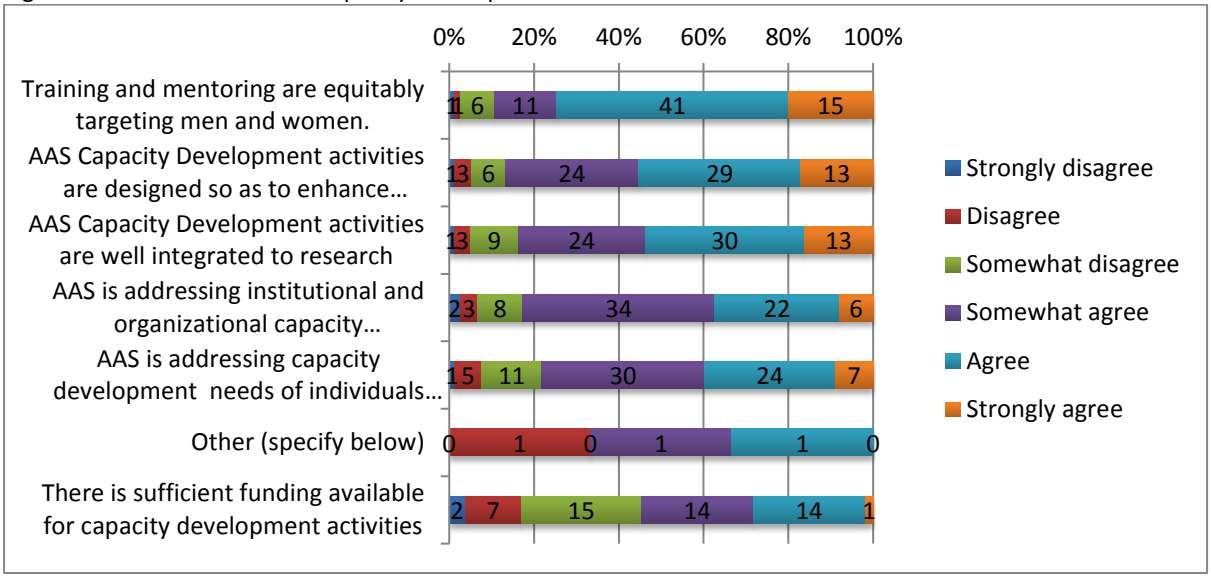


Total responses: 83

[50] Q 21. In your view, to what extent are AAS partners involved in the activities listed below? Please score on a scale from 1 (not at all) to 6 (very much involved).

[51] Q 22: Please rate your agreement with the following statements that relate to mainstreaming of gender issues in your work and the AAS

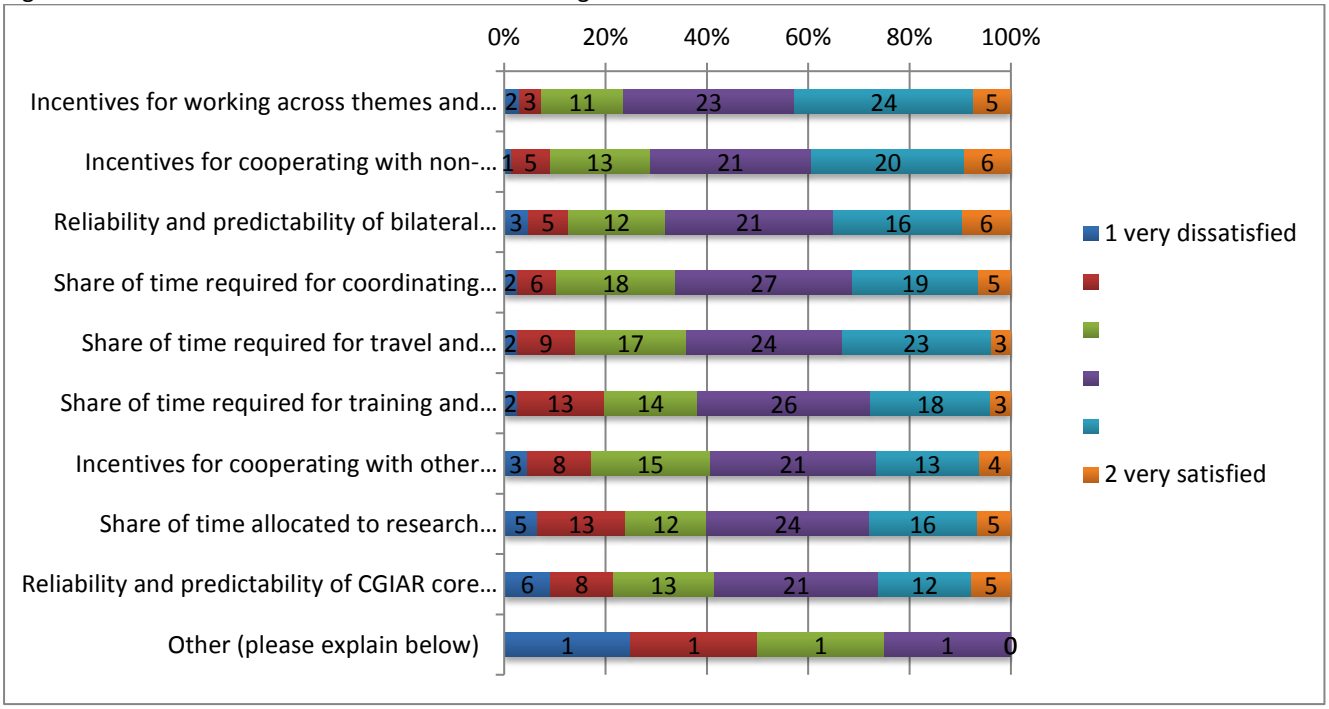
Figure G-19: SURVEY Q 24[52]: Capacity development



Total responses: 83

PART 4: AAS related working conditions

Figure G-20: SURVEY Q 26[53]: Satisfaction with working conditions



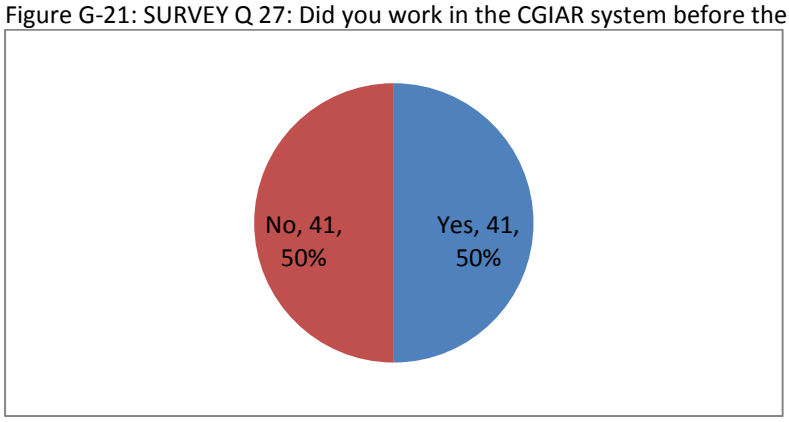
Total responses: 82

[52] Q 24: Please rate your agreement with the following statements that relate to capacity development

[53] Q 26: Please rate how satisfied you are with the following working conditions for your work. Please score in a scale from 1 (very dissatisfied) to 6 (very satisfied).

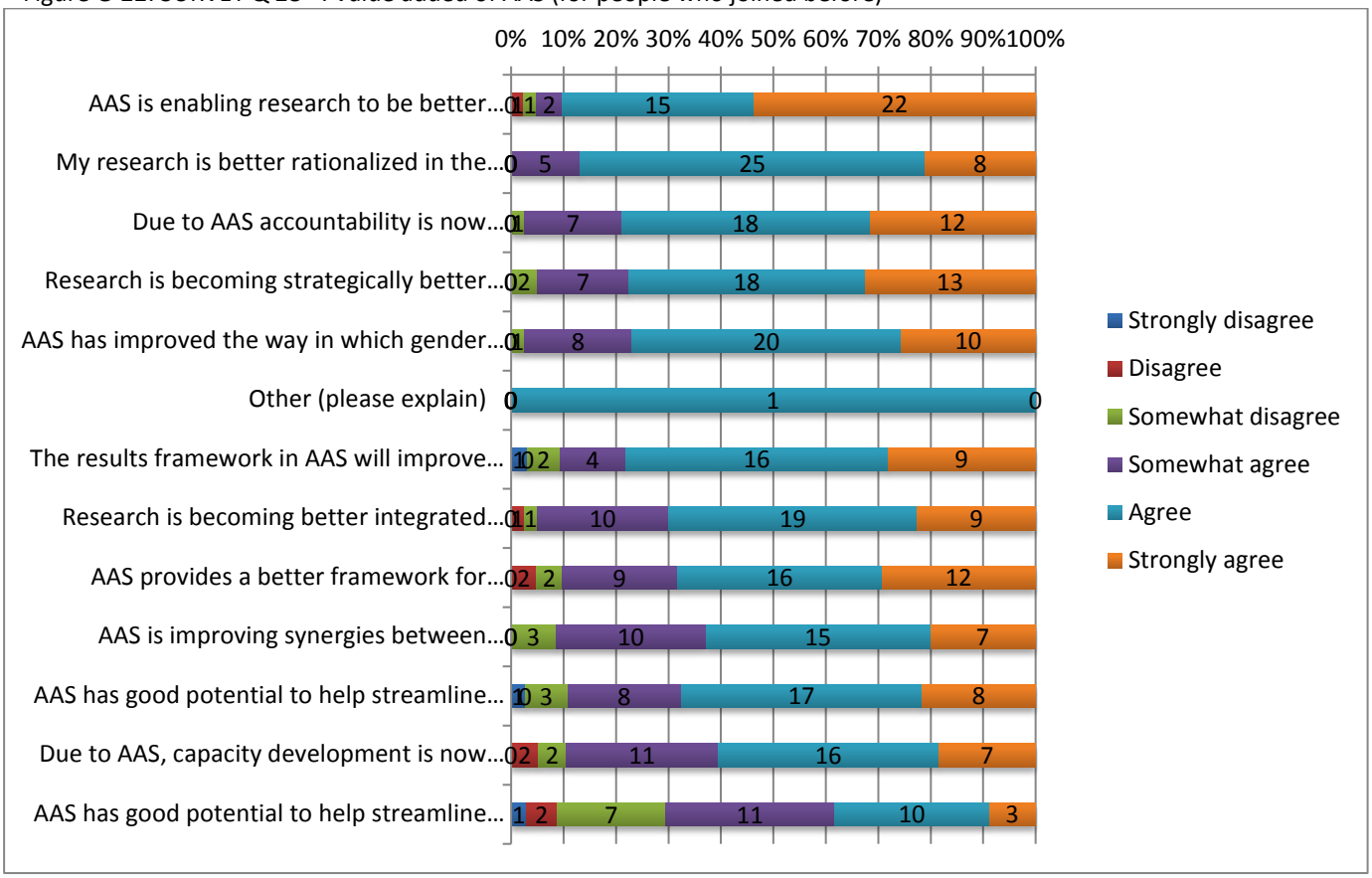
PART 5: VALUE ADDED OF AAS

Figure G-21: SURVEY Q 27: Did you work in the CGIAR system before the CRPs were introduced?



FOR PEOPLE WHO JOINED BEFORE CRPs GOT INTRODUCED

Figure G-22: SURVEY Q 28[54]: Value added of AAS (for people who joined before)

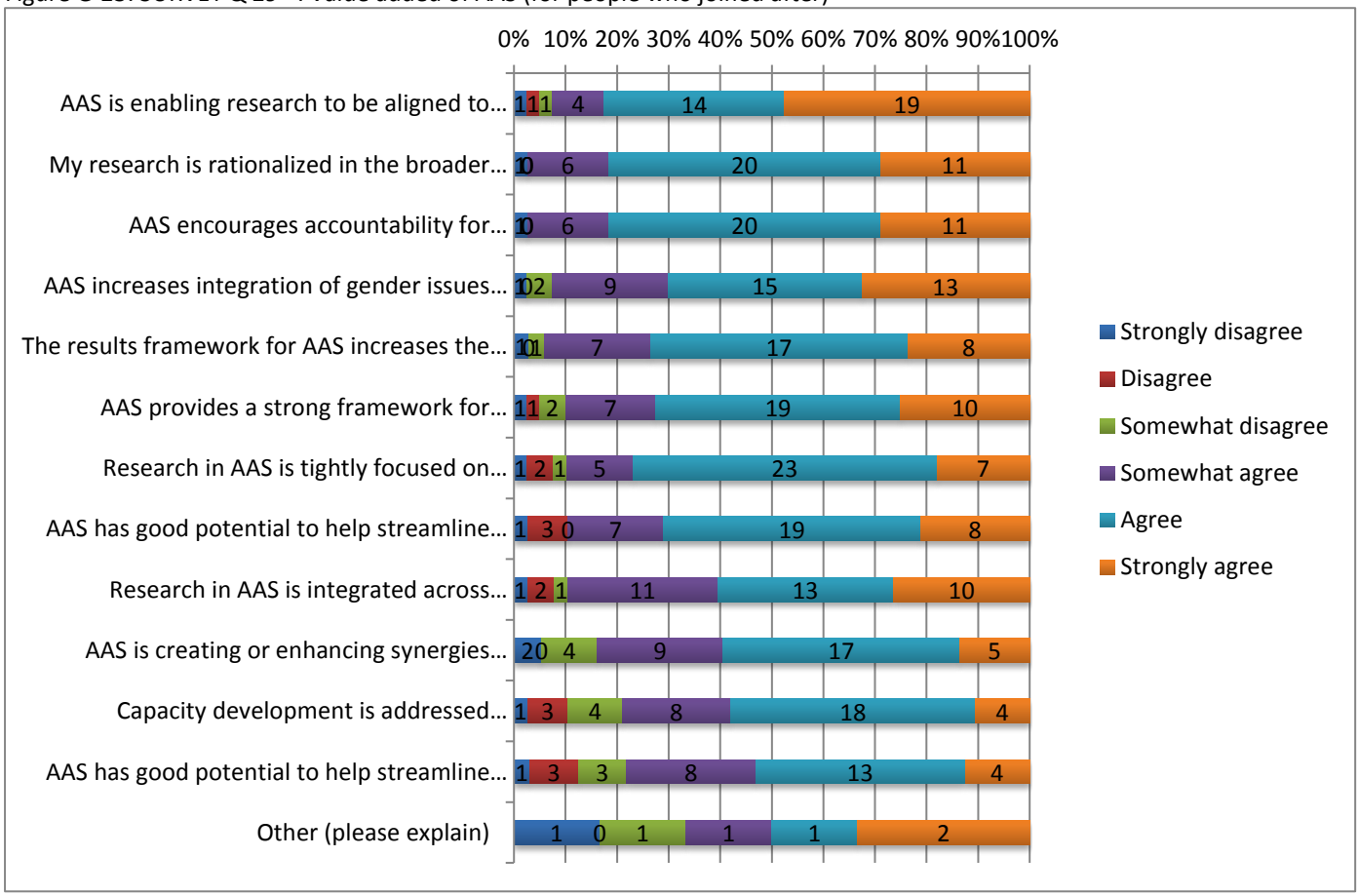


Total responses: 42

[54] Q 28: Please rate your agreement with the following statements related to the value AAS has had or is likely to have influencing the success of your research

FOR PEOPLE WHO JOINED AFTER CRPs GOT INTRODUCED

Figure G-23: SURVEY Q 29[55]: Value added of AAS (for people who joined after)



Total responses: 41

[55] Q 29: Please rate your agreement with the following statements related to the value AAS has had, or is likely to have

G.3 Further analysis

Table G-4: Staff perceptions about personal incentives for quality research.

		Position			
		Manager / leader / coordinator	Researcher	Total	Cum %
1. Very poorly managed	Count	1	1	2	
	%	3.8%	1.8%	2%	2%
2. Poorly managed	Count	1	8	9	
	%	3.8%	14.5%	11%	14%
3. Somewhat poorly managed	Count	9	12	21	
	%	34.6%	21.8%	26%	40%
4. Somewhat well managed	Count	8	12	20	
	%	30.8%	21.8%	25%	64%
5. Well managed	Count	7	15	22	
	%	26.9%	27.3%	27%	91%
6. Very well managed	Count	0	3	3	
	%	0.0%	5.5%	4%	95%
7. Don't know	Count	0	4	4	
	%	0.0%	7.3%	5%	100%
Total	Count	26	55	81	
	%	100%	100%	100%	

Table G-5: Staff perceptions relating to the share of time for research compared to administration.

		Position			
Level of satisfaction		Manager / leader / coordinator	Researcher	Total	Cum %
1. Very dissatisfied	Count	2	3	5	
	%	8.0%	6.3%	6.8%	7%
2. Dissatisfied	Count	4	8	12	
	%	16.0%	16.7%	16.4%	23%
3. Somewhat dissatisfied	Count	5	7	12	
	%	20.0%	14.6%	16.4%	40%
4. Somewhat satisfied	Count	8	16	24	
	%	32.0%	33.3%	32.9%	73%
5. Satisfied	Count	5	11	16	
	%	20.0%	22.9%	21.9%	95%
6. Very satisfied	Count	1	3	4	
	%	4.0%	6.3%	5.5%	100%
Total	Count	25	48	73	
	%	100%	100%	100%	

Table G-6: Staff perceptions about availability of quiet time for writing.

		Position		
		Manager / leader / coordinator	Researcher	Total
No, I do not have enough time	Count	5	10	15
	%	29.4%	24.4%	26%
I have some time, but would prefer to have more time	Count	12	26	38
	%	70.6%	63.4%	66%
Yes, I have enough time	Count	0	5	5
	%	0.0%	12.2%	9%
Total	Count	17	41	58
	%	100%	100%	100%

Table G-7: Staff responses to statement: I am familiar with and fully understand the AAS gender strategy

		Position			
Level of agreement		Manager / leader / coordinator	Researcher	Total	Cum %
1. Strongly disagree	Count	0	1	1	
	%	0.0%	2.6%	1.8%	2%
2. Disagree	Count	1	1	2	
	%	5.6%	2.6%	3.5%	5%
3. Somewhat disagree	Count	3	6	9	
	%	16.7%	15.4%	15.8%	21%
4. Somewhat agree	Count	6	10	16	
	%	33.3%	25.6%	28.1%	49%
5. Agree	Count	6	13	19	
	%	33.3%	33.3%	33.3%	82%
6. Strongly Agree	Count	2	7	9	
	%	11.1%	17.9%	15.8%	98%
7. Don't know	Count	0	1	1	
	%	0.0%	2.6%	1.8%	100%
Total	Count	18	39	57	
	%	100%	100%	100%	

ANNEX H. LIST OF PEOPLE INTERVIEWED

Name	Position	Organization	Country
Afroz, Shirin	Technical coordinator	Helen Keller International (HKI)	Bangladesh
Ahmed, Naseem	Deputy Program Leader	WF - Dhaka, Bangladesh	Bangladesh
Ahsan, Prof. Nazmul	Fisheries/Molecular Biotechnology	Khulna University	Bangladesh
Akhter, Ahmed	Chief of Party (Policy Research and Strategy Support Program for Food Security and Agricultural Development in Bangladesh)	IFPRI	Bangladesh
Allison, Eddie (Prof)	Professor MARINE & ENVIRONMENTAL AFFAIR	University of Washington	skype
Amin, Nurul	Director operations	International Development Enterprises (iDE)	Bangladesh
Apgar, Marina	Knowledge Sharing and Learning Scientist	WF-Penang, Malaysia (Headquarters)	Cambodia
Ashby, Jacqui	Senior Advisor on gender and research	CGIAR	skype
Atta-Krah, Kwesi	Director	HumidTropics CRP	n/a
Awasthi, Sunil	Head of Finance	WF-Penang, Malaysia (Headquarters)	Malaysia
Bakaul Islam, Md. Bakaul	Program Adviser – Livelihoods	SAVE the children	Malaysia
Bakuluzaman, Mustafa	Head of Research	SUSHILAN	Bangladesh
Barikdar, Milton	Manager CSS	Christian Services Society (AVA Center)	Bangladesh
Barlow, Chris	Manager of ACIAR Fisheries/Aquaculture programs	ACIAR	skype
Béné, Chris	Research Fellow	Institute for Development Studies	
Bennett, Greg	Post Doc	WF - SI, Western Hub	Solomon Islands
Best, Rupert	Expert, Agriculture and Livelihoods	CRS	skype
Bhandery, Bansree	Assistant Program Coordinator	Ashroy Foundation	Bangladesh
Biswas, Shankar Kr.	Program Manager - Fisheries	BRAC	Bangladesh
Borin, Chhouk	Dean of Fisheries Faculty	Royal University of Agriculture	Cambodia
Bosma, Wilko	Team Leader	Natural Resources Development Foundation (NRDF)	Solomon Islands
Boso, Delvene	Country Manager	WF - SI, Honiara	Solomon Islands
Brooks, Alan	Mekong Regional Director	WF-Phnom Penh, Cambodia	Cambodia
Bunna, Borin	Deputy Director	Fisheries Administration (FiA)	Cambodia
Chanrattana, Ung	Executive Director	TCO	Cambodia
Chhorng Sambo	Community Facilitator Muk Wat	n/a	Cambodia
Chilala, Alex	Provincial Agricultural Coordinator	Ministry of Agriculture and Livestock (MAL)	Zambia
Chisonga, Nixon	Knowledge and Sharing	WF- Mongu Hub Office, Zambia	Zambia
Choudhury, Afrina	Portfolio Support Coordinator/Gender Specialis	WF - Dhaka, Bangladesh	Bangladesh
Cohen, Pip	Scientist	WF - SI, Western Hub (based JCU)	Solomon Islands
Cole, Steven M.	Post-Doctoral Gender Specialist and Interim Hub Research Manager	WF - Lusaka, Zambia	Zambia

Name	Position	Organization	Country
Crissman, Charlie	M&E Leader	WF-Penang, Malaysia (Headquarters)	Several
Datta, Nikhil	Director of Finance & Operations	WF-Penang, Malaysia (Headquarters)	Bangladesh
De Clerk, Fabrice	Organizational Representative	Bioversity International	skype
Douthwaite, Boru	Program Leader, Knowledge sharing and Learning	WF-Penang, Malaysia (Headquarters)	several
Downing, Bill	Head, Operation and Program Support Unit	WF-Penang, Malaysia (Headquarters)	several
Dr. Rahim	Professor at Department of Horticulture	Bangladesh Agriculture University (BAU)	Bangladesh
Dugan, Patrick	AAS Director	WF-Penang, Malaysia (Headquarters)	several
EL Hamzaoui, Ramona M.	Director of the Office of Economic Growth	USAID	Bangladesh
Gardiner, Peter	Executive Director	ISPC	Italy
Gautschi, Remo	Chairman	WorldFIsh BoT	Switzerland
Gill, Maggie Prof	Chair	ISPC	skype
Glenn Galo, Glenn	Vice Chancellor	Solomon Islands National University	Solomon Islands
Hagi, James	Area Manager	World Vision, Auki	Solomon Islands
Hak, Sochanny	Knowledge and Action Researcher	WF-Phnom Penh,	Cambodia
Hall, Stephen	Director General	WF-Penang, Malaysia (Headquarters)	Malaysia
Harohau, Daykin	Malaita Hub Manager, Research Analyst	WF - SI, Malaita Hub	Solomon Islands
Heng KimLeng, Heng	Community Facilitator Peam Ta-Uo	HURREDO	Cambodia
Hichaambwa, Munguzwe	Senior Research Associate/Head, Consultancy and Training	Indaba Agricultural Policy Research Institute	Zambia
Hivu, Mr Kolo	Fisheries Officer	Western Provincial Govt	Solomon Islands
Il, Oeur	Director	ADIC	Cambodia
Islam Md Rejaul Prof	Professor Agrotechnology Discipline	Khulna University	Bangladesh
Islam, Bagirghat Rafiqul	Senior Field Supervisor	Community Development Center (CODEC)	Bangladesh
Islam, Professor Md Rejaul	Agrotechnology	Khulna University	Bangladesh
Islam, Sirajul	Program Head, Agriculture and Food Security	BRAC - Dhaka	Bangladesh
Jackson-deGraffenried, Meredith	Medical Anthropologist	Helen Keller International (HKI)	Bangladesh
Johnstone, Gareth	AAS Country Manager	WF-Phnom Penh, Cambodia	Cambodia
Kabir, AK Humayun	Project Coordinator for the AIN project at CODEC	Community Development Center (CODEC)	Bangladesh
Kamp, Kevin	Country Programme Leader for AAS	WF - Dhaka, Bangladesh	Bangladesh
Kanti Madjumdga, Pankras	Additional Deputy Director	Department of Agricultural Extension, Khulna	Bangladesh
Karim, Manjurul	Researcher	WF - Dhaka, Bangladesh	Bangladesh
Kasongo, James	Country Director	Heifer International	Zambia
Katal, Rakesh	Director Livelihood and Food Security	SAVE the children	Malaysia
Katundu, Muyunda	Senior Accountant	WF - Lusaka, Zambia	Zambia

Name	Position	Organization	Country
Khadka, Deepak	Country Director, Bangladesh	International Development Enterprises (iDE)	Bangladesh
Khan, Zahirul Haque	Principle Specialist & Director	Institute of Water Modelling (IWM)	Bangladesh
Khatun, Momotaz	Exectutive Director	Ashroy Foundation	Bangladesh
Kimoeurn, By	Director	DKK	Cambodia
Kimsan, Meng	n/a	GADC	Cambodia
Knight-Jones, Theodore	Post-Doctoral Fellow – Epidemologist/Food safety expert	ILRI	Zambia
Kong, Sereyroth	Administration Officer	WF-Phnom Penh, Cambodia	Cambodia
Krupnick, Tim	Scientist	CIMMYT	Bangladesh
Kusakabe, Kyoko	Associate Professor	Asian Institute of Technology	skype
Kuve, Marlon	n/a	Natural Resources Development Foundation (NRDF); Chief of Leona village	Solomon Islands
Leeuwis, Cees Prof	Professor of Knowledge, Technology and Innovation	Wageningen University	skype
Likonge Miyato, Dinah	Project Officer	People's Participation Services	Zambia
Limbuwa, David,	Monitoring and Evaluation Officer	People's Participation Services	Zambia
Lipi, Marzia	Natural Resources Management Policy Advisor at Tetra Tech ARD,	Climate Resilience Ecosystem and Livelihoods (CREL)	Bangladesh
Little, David (Prof)	Professor Aquatic Resources and Development,	University of Stirling	skype
Longley, Catherine (Kate)	Senior Scientist, Initiative Leader for market access/value chain development and Interim Country Program Leader	WF - Lusaka, Zambia	Zambia
Lunda, Jeston	Community Development Facilitator	WF- Mongu Hub Office, Zambia	Zambia
Lynam, John	AAS POP member	Nairobi	
Maepio, Hon. Wayne	Acting Premier and Minister for Fisheries	Western Provincial Govt	Solomon Islands
Mapedza, Everisto	Senior Social and Institutional Researcher	IWMI	Zambia
Meas, Khov, H.E.	Deputy Secretory General	Tonle Sap Authority (TSA)	Cambodia
Mehra, Rekha	Director of Economic Development	International Center for Research on Women (ICRW)	skype
Meisner, Craig	Country Director	WF- Dhaka, Bangladesh	skype
Mekonnen, Zenebe	Assistant Country Director Programmes	Concern Worldwide	Zambia
Menon, Vimala	Outgoing member of BoT, Chair Account Committee	WorldFIsh BoT	skype
Morgan, Miranda	Scientist, Gender	WF-Penang, Malaysia (Headquarters)	Cambodia
Mr Alec	Member, Management Committee	Western Prov Hub, Leona village	Solomon Islands
Mr Basil	Research Analyst	WF - SI, Malaita Hub	Solomon Islands
Mr Bemjamin	Community member	Xxx village,	Solomon Islands
Mr Chris	Research Analyst	WF - SI, Malaita Hub	Solomon Islands
Mr Dominic	Community member	Xxx village,	Solomon Islands
Mr Enly	Research Analyst, Community Liaison Officer	WF - SI, Malaita Hub	Solomon Islands
Mr Frederick	Member, Management Committee	Western Prov Hub, Leona village	Solomon Islands
Mr George xxx	Project Coordinator	World Vision, Auki	Solomon Islands

Name	Position	Organization	Country
Mr Ivan	Research Analyst	WF - SI, Malaita Hub	Solomon Islands
Mr Jacob	Research Analyst	WF - SI, Western Hub	Solomon Islands
Mr Joe	Committee chair and teacher	Northern Malaita Hub, Fumato'o cluster	Solomon Islands
Mr Mensarch	Research Analyst	WF - SI, Malaita Hub	Solomon Islands
Mr Nicholas	Committee member and teacher	Northern Malaita Hub, Fumato'o cluster	Solomon Islands
Mr Osanty	Organic farming champion	Northern Malaita Hub, Alea cluster	Solomon Islands
Mr Scotta	Chair, Management Committee	Western Prov Hub, Leona village	Solomon Islands
Mr Xxxx (aka Blackie)	Community member	Northern Malaita Hub, Fumato'o cluster	Solomon Islands
Ms Ellen	Community member	Northern Malaita Hub, Fumato'o cluster	Solomon Islands
Ms Ellenta	Community member	Western Prov Hub, Leona village	Solomon Islands
Ms Ethel	Community member	Western Prov Hub, Leona village	Solomon Islands
Ms Grace	Research Analyst	WF - SI, Malaita Hub	Solomon Islands
Ms Helen	Research Analyst, Gender	WF - SI, Malaita Hub	Solomon Islands
Ms Isobel	Community member	Western Prov Hub, Leona village	Solomon Islands
Ms Julia	Community member	Northern Malaita Hub, Fumato'o cluster	Solomon Islands
Ms Kezyhia	Research Analyst	WF - SI, Western Hub	Solomon Islands
Mubita, Pumulo	Provincial Officer	Disaster Management and Mitigation Unit (DMMU)	Zambia
Muchuchuti, Mercy	Finance Officer	WF- Mongu Hub Office, Zambia	Zambia
Mukungu, Mwiya	Principal Agricultural Officer	Dept of Agriculture, MAL	Zambia
Murshed, Jahan	Scientist	WF - Dhaka, Bangladesh	Bangladesh
Mushipi, Bruce	Regional Finance Manager - Africa	WF - Lusaka, Zambia	Zambia
Mutale, Chrisantus	Crop Scientist	Zambia Agricultural Research Institute / National Seed Certification and Control Institute (SCCI)	Zambia
Mutimukuru-Maravanyika, Tendayi	Knowledge Sharing and Learning Scientist.	WF - Lusaka, Zambia	Zambia
Muyaule, Conrad	Value Chain Coordinator	WF- Mongu Hub Office, Zambia	Zambia
Muzumwa, Barbara	Office Administrator	WF- Mongu Hub Office, Zambia	Zambia
Mwanza, Paul	Finance Officer	WF - Lusaka, Zambia	Zambia
Mweemba, Nawina	Office Administrator - EU	WF - Lusaka, Zambia	Zambia
Mweene, Margaret	Office Administrator	WF - Lusaka, Zambia	Zambia
Mwiya, Simbotwe	Regional Manager for Africa	WF - Lusaka, Zambia	Zambia
Naher, Nazmun	Horticulture Specialist	Solidaridad, Climate-Resilient Ecosystems and Livelihoods (CREL),	Bangladesh
Nalungwe, Rebecca	Crops Officer	Dept of Agriculture, MAL	Zambia
Newton, Julie	Manager of Research Policy and Practice in the Food Security and Livelihoods Sector	Save the Children	Bangladesh
Noeurn Norn	Community Facilitator Santey	TCO	Cambodia
Norman, Mahmoud	Head of HR	WF-Penang, Malaysia (Headquarters)	Malaysia

Name	Position	Organization	Country
Nur, Orko	Communications Officer	WF - Dhaka, Bangladesh	Bangladesh
Ny, Sin	Community Facilitator Muk Wat	TCO	Cambodia
Nyro, Tum	Fisheries Program Manager	Harvest project (USAID)	Cambodia
Oum, Samnang	Administrative Officer	WF-Siam Reap, Cambodia	Cambodia
Phalla, Phat	Community Facilitator for Chhnoc Tru	ADIC	Cambodia
Philipps, Mike	Discipline Director Aquatic Resources and Genetics, - Thematic Co-Head Productivity of AAS	WF-Penang, Malaysia (Headquarters)	Malaysia
Puskur, Ranjitha	Program Leader, Gender & Equity	WF-Penang, Malaysia (Headquarters)	several
Rahman, Md Hafizur	Sr. Agronomist	BRAC Khulna	Bangladesh
Ramofafia, Chris	Permanent Secretary	Ministry of Fisheries and Marine Resources	Solomon Islands
Ratner, Blake	Research Director	WF-Penang, Malaysia (Headquarters)	Malaysia
Rikimani, Clara	Women's Development Officer	Malaita Provincial Govt	Solomon Islands
Robson, Mike	FAO Representative in Bangladesh	FAO	Bangladesh
Roderick, Andrea	Organizational Representative	CARE	n/a
Rogers, Wayne	Director of Finance	WF-Penang, Malaysia (Headquarters)	Malaysia
Rose, Richard	Market Development Advisor	International Development Enterprises (iDE)	Bangladesh
Russell, Timothy	Chief of Party	Cereal Systems Initiative for South Asia (CSISA) – Bangladesh	Bangladesh
Saomasi, Hon Lester	Minister of Finance	Western Provincial Govt	Solomon Islands
Schreiner, Barbara	Director	Pegasys Strategy and Development	skype
Schwartz, Anne Marie	AAS Program Leader	WF - SI, Honiara	Solomon Islands
Sean, Sreymom	Receptionist	WF-Siam Reap, Cambodia	Cambodia
Senaratna, Sonali	Organizational Representative	IWMI	several
Seng Sopheak	Hub Research Manager	WF-Siam Reap, Cambodia	Cambodia
Sharmin, Humeira	Staff member	Ashroy Foundation	Bangladesh
Silumby, Mwangelwa Akapelwa	Induna Imandi (Traditional Government Leader)	Barotse Royal Establishment	Zambia
Sithirith, Mak	AAS National Coordinator	WF-Phnom Penh, Cambodia	Cambodia
Soeun, Mak	Deputy Director General	General Directorate of Agriculture	Cambodia
Songe, Mwansa Mathilda	Post-Doctoral Scientist-Food safety and nutrition, Initiative Leader for Nutrition and Food Safety	ILRI	Zambia
Sopheak, Put	n/a	GADC	Cambodia
Sot, Sam	Community Facilitator for Kg. Ko Leu	DKK	Cambodia
Stevenson, James	Agricultural Research Officer	ISPC	Italy
Sulu, Ruebin	Scientist	WF - SI, Honiara	Solomon Islands
Surendran Rajaratnam	Research Analyst	WF-Penang, Malaysia (Headquarters)	Malaysia
Suti, Stephen	Livelihoods Development Officer	Natural Resources Development Foundation (NRDF)	Solomon Islands
Syatwinda, Gary	District Livestock Officer	Dept of Livestock, MAL	Zambia

Name	Position	Organization	Country
Taloboe, Patrick	Director	Malaita Chazon Development Authority	Solomon Islands
Thol, By	Project Officer	HURREDO	Cambodia
Thönnissen Michel, Carmen	Senior Adviser	SDC	Switzerland
Tikai, Pita	Researcher	Asian Vegetable Research and Development Centre (AVRDC)	Solomon Islands
Tingbo, Ange	CoP Nobo Jibon	SAVE the children	Malaysia
Tsatsaros, Julie	CRP Research Coordinator	WF-Phnom Penh, Cambodia	Cambodia
Tsatsia, Helen	Director of Research	Ministry of Agriculture and Livestock, Honiara	Solomon Islands
Tum, Tok	Community Facilitator for Santey	TCO	Cambodia
Visidh, Koum	Finance and Operations Manager	WF-Phnom Penh, Cambodia	Cambodia
Wahab, MA	Professor at the Faculty of Fisheries Management	Bangladesh Agriculture University (BAU)	Bangladesh
Ward, Andrew	Senior Advisor to the Regional Director, Initiative Leader for Productivity	WF - Lusaka, Zambia	Zambia
Wenblad, Axel	Vice-Chair Board of Trustees, Chair Governance Committee		skype
Willis, Diane	Director, People and Organizational Development	WF-Penang, Malaysia (Headquarters)	Malaysia
Wlaekero, Mathew	Director	Ministry of Development Planning and Aid co-orodination	Solomon Islands
n/a	Chief, and fish pong owner	Zion village	Solomon Islands
Zulu, Festus	Gender Specialist	WF- Mongu Hub Office, Zambia	Zambia

ANNEX I. AAS RESEARCH QUESTIONS

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" (revised extension proposal)

Theme Research Questions

Productivity

1. What are the aas yield gaps? (ORQ1)

2. How can sustainable intensification be achieved, in the interests of the poor and vulnerable? (ORQ1)

3. How can farming and fisheries enterprises in aas contribute to gender transformative approaches? (ORQ2)

4. Where and how can productivity gains and intensification be scaled? (ORQ3)

Gender

1. How and why are social norms and gender relations changing in different contexts, and with what influence on development opportunities and outcomes for marginalized social groups dependent on aas?

2. What combinations of technical and transformative interventions foster transformative change for marginal social groups dependent on aas in different contexts?

3. How do gender transformative changes contribute to agricultural development outcomes like poverty reduction, food and nutrition security?

Nutrition

1. Within aquatic agricultural systems, which options do we use to improve year-round diet quality, especially in women and young children?

2. How do we scale out to reach the projected number of women and children?

Equitable markets

1. What are the key barriers to women and other marginalized groups gaining greater benefits through participation in value chains and how can they be overcome?

2. What policy and institutional interventions or changes in the enabling environment are required to improve value chain performance and equity?

3. What impacts do our value chain interventions have -- for women, poor consumers, poor producers and other key target groups?

4. What mechanisms are most effective for scaling of value chain interventions?

Governance

1. How do we **diagnose and catalyze changes** in traditional and formal governance systems with barriers to marginalized groups participating in decisions and realizing benefits? (ORQ1&3)

2. What strategies and approaches are effective in **supporting local stakeholders to manage change** by accessing technologies, services and institutions? (ORQ1&3)

3. What pathways are effective for regional and global partnerships to **influence policies and institutions** important to aas livelihoods, including gender equity? (ORQ3)

4. How do the **outcomes** of an RinD approach that addresses institutional and policy barriers and opportunities differ from approaches that do not address these issues? (ORQ2)

Resilience

1. What are the major **disturbances** and **shocks** that AAS communities may be subjected to?

2. What are the **internal** versus **external** drivers of these shocks?

3. How much shock can a system **absorb** before it becomes something fundamentally different?

4. How can **active** and **participatory transformations** from an undesirable social-ecological state into a better one be orchestrated?

5. How can such shocks be used to catalyze renewal, novelty, and innovation (**adaptation**)

Hub Development Challenges

Southern Bangladesh polder zone

"The AAS development challenge is to achieve sustainable and continual improvements in agricultural productivity, livelihoods and nutrition of poor communities in the Southern Bangladesh Polder Zone in the face of increasing salinity, changing hydrology, climate change and within a context of complex and dynamic markets and social change."

Barotse Zambia

“To make effective use of the seasonal flooding and natural resources in the Barotse floodplain system through more productive and diversified aquatic agricultural management practices and technologies that improve the lives and livelihoods of the poor”.

Tonle Sap, Cambodia

"To make more effective use of knowledge networks and of practices for improving land and water management and value chains in order to optimize productivity from the flood pulses and assist the people that depend on the flood pulses to diversify their livelihoods, ensure food and nutrition security and maintain a healthy ecosystem."

Philippines

"Key development challenges for the area include its vulnerability to natural hazards, low levels of productivity for major crops and livestock, and declining fisheries stocks due to degradation of natural resources."

Solomons

Malaita Hub: "to improve their lives through more productive, diversified livelihoods that empower communities to be better able to adapt to change and make more effective use of their resources."

Western Hub: "to improve the lives of people in Western Province by empowering communities to increase the benefits they derive from their natural resources, while accounting for the diversity and variability in the way they lead their lives and access resources and services"