Making a difference: AAS' impact and how we'll get there

(3 June 2013)

1. Introduction

Aquatic agricultural systems are farming and fishing systems where the annual production dynamics of natural freshwater or coastal ecosystems contribute significantly to household livelihoods, including income and food security. The CGIAR Research Program (CRP) on Aquatic Agricultural Systems (AAS)[1] works to strengthen these contributions and develop aquatic agricultural systems as centers of rural innovation and growth. We address this objective by taking a systems approach to agricultural research, one that recognizes the complex interactions between system ecology and the integrated livelihoods of the people who depend upon these landscapes for their wellbeing. In doing so we pursue a demand driven research agenda focused on the specific complexities and needs of each place we work.

We estimate that some 480 million people in the developing world[2], depend on aquatic agricultural systems for their livelihoods, with approximately 200 million living on <US$ 1.25/day. Many millions more rely on these systems for food - the fish produced by the Mekong river for example, provide protein and micronutrients for 22m people in Cambodia and Laos, and the fish harvested from the large lakes of Eastern and Southern Africa are traded widely and feed poor consumers across large parts of that region. The overall challenge of AAS is to foster innovation that can strengthen the livelihoods of the women and men who live in these systems, and do so in ways that increase their contribution to wider economic development and national food security.

Fisheries or aquaculture are generally an important component of aquatic agricultural systems, but other farming and natural resource management activities predominate in some. In all cases the communities that live there adopt a mix of farming practices designed to harness the diversity of options available. For example, rice and cattle are particularly important in many of the larger freshwater plains and deltas, while a diversity of root crops and other vegetables are grown in most types of aquatic agricultural system, often combined with small ruminants and poultry and a range of off-farm activities. Recognizing this complexity AAS works together with local stakeholders to identify opportunities and challenges, and nurture innovative approaches and capacities to address them.

In developing AAS, the CGIAR has recognized that, while aquatic agricultural systems contribute to rural growth, poverty reduction, food security and nutrition, past investments in agricultural research and development in these places have had limited sustainable impact on poverty. Accordingly AAS has been designed to foster technological and methodological innovations that both harness the productivity and diversity of these systems and increase the inherent capacity of smallholder farmers to experiment and innovate. Of particular importance is the fact that the program is built on a place-based approach

[1] Throughout the text we use the acronym AAS to refer to the CRP, and aquatic agricultural systems to refer to the systems we work in.

[2] Current estimates are 73m for Africa, 27m for Latin America, 373m for Asia, and 2.5m for the Pacific. This analysis will be completed and published later in 2013.

through which we seek to bring to bear the strengths of the CGIAR[3] and multiple research and development partners to address the challenges and opportunities identified by local stakeholders in these locations. We seek to do this by working initially in a limited number of locations, generating learning that can have broader applicability, and by building partnerships and capacities to apply this learning at scale. In collaboration with other CRPs, notably those focusing on other agricultural and natural management systems, and with wider networks of researchers and development practitioners, we also seek to contribute to improved policy and practice in other complex farming and systems.

2. Goal and Geographical focus

AAS aims to improve the lives of an estimated 21 million people by 2023 through the development, dissemination and scaling of technologies in the places we work, and by improving conditions for innovation there. We also aim to benefit a further 27 million through national and regional scaling of the learning developed through AAS. To achieve this goal and these targets, our work is focused on four types of aquatic agricultural systems in Africa, Asia and the Pacific, each with significant numbers of low income people[4]:

- Freshwater systems of sub-Saharan Africa. These aquatic systems lie along Africa's rivers and lake shores. They cover some 800,000km² and support over 70 million people, of whom an estimated 43 million live on <$1.25/day. AAS has focused initially on the Zambezi basin and the Barotse floodplain of Western Zambia. In collaboration with NEPAD, through both the Rural Futures Initiative and CAADP, we will expand this to West, Central and Eastern Africa in 2014-2017.

- Coastal systems of sub-Saharan Africa. These aquatic systems lie along Africa's coasts. They cover approximately 300,000km² and support over 12 million people, of whom an estimated 7 million live on <$1.25/day. AAS did not focus on coastal systems in Africa in our first phase, but will do so in 2014-2017 in collaboration with NEPAD.

- Asian Mega Deltas. These systems cover the deltas of Asia's major rivers where substantial areas of natural ecosystems remain and where the natural productivity of these ecosystems contribute substantially to the agricultural economy. They include the Ganges-Brahmaputra-Meghna system of Bangladesh and eastern India, the Irrawaddy in Myanmar, the Mekong in Vietnam and Cambodia, and the Yangtze in China. The aquatic agricultural systems in these deltas cover an estimated 50,000km² and support over 100 million people, of whom an estimated 40 million live on <$1.25/day. AAS has focused initially on the deltas in Bangladesh and Cambodia in the first phase. During the period 2014-2017 we will expand to include the Irrawaddy Delta in Myanmar.

- Island systems of South-East Asia and the Pacific. These coastal systems cover approximately 650,000 km² and support 54 million people, of whom an estimated 22 million live on <$1.25/day. AAS focused initially on the southern Philippines and Solomon islands. During the period 2014-2017 we will expand to include other systems as opportunities emerge in partnership with national partners and the Secretariat for the Pacific Community (SPC).

[3] The contributions of CGIAR Centers to AAS, and linkages with other CRPs are summarized in Annex 1.

[4] The figures provided here should be regarded as first estimates and will be refined once analysis is completed later in 2013.

These four systems provide both the geographic and substantive focus for the program. They are generally highly productive, support comparatively high population densities, and play an important role in wider rural and national economies. They are also very dynamic, evolving in the face of a diversity of demographic and resource pressures. Most of these pressures are set to increase over the next 25-50 years, and be exacerbated by the emerging impacts of climate change. In order that the development contribution of these systems is sustained and enhanced, investments are needed now to build the necessary capacities to innovate and adapt.

Within each system we have identified specific large geographies (coastal zones, deltas, or river basins), and countries within these, that are representative of the opportunities and challenges in each. For example the research agenda that is emerging from our work in the Ganges-Brahmaputra-Meghna delta in Bangladesh will address the challenges of sustaining and increasing agricultural productivity and development benefits in the face of rising salinity, changing demography, and sea level rise. This is important not only for Bangladesh, but for all of Asia's mega deltas (and several in Africa). Similarly for Africa's inland systems we have focused first on the Zambezi basin and within this the Barotse floodplain in Zambia. By pursuing a research agenda focused on understanding how to improve development opportunities, and reduce livelihood risk and undernutrition in the face of seasonal flooding and migration, the program seeks to shape future development investment both in Barotse and freshwater agricultural systems across the continent.

Within each of the focal systems we have used three main criteria to choose the countries and hubs we work in. First, we prioritize places where a significant number, or proportion of a country's poor, are dependent upon aquatic agricultural systems. Second, we look to work in locations where the program can address issues of regional importance, and where the learning generated will therefore be of value for neighboring countries addressing similar opportunities and challenges. Third, we work where strong government support and good operational conditions, accompanied by learning from previous work and partnerships, provide a platform on which to build. We believe that these criteria together enable both good site selection and increase the likelihood of influence at scale.

3. Intermediate Development Outcomes and Targets

Intermediate Development Outcomes. The CGIAR is working to identify a set of common Intermediate Development Outcomes (IDOs) that can provide a system level focus for the CGIAR Research Programs. While this is still work in progress we have found that AAS aligns well with the early drafts of the common IDOs (April 2013). For AAS we have recognized three levels of IDO: (i) material development outcomes that will result from AAS interventions and the work of our partners; (ii) instrumental development outcomes that will enable these material outcomes; and (iii) environmental outcomes. Table 1 sets out the AAS IDOs according to these three categories, and Annex 2 provides a comparison with the draft set of common IDOs. The focus of this document is upon the first two categories of IDOs – material and instrumental outcomes.

Targets. Specific indicators and targets for each IDO have been developed (and will continue to be refined) through dialogue with stakeholders and partners in focal countries and hubs. Table 2 sets out examples of these initial targets for four AAS IDOs, two material and two instrumental. A fuller set of

draft AAS IDOs and targets is provided in Annex 3. Table 3 provides projections for total numbers of beneficiaries by 2023 in all current and anticipated hubs, and from national and regional scaling.

Table 1. AAS IDOs.

Material Outcomes
Increased and more equitable income from agricultural and natural resource management and environmental services earned by low income value chain actors in aquatic agricultural systems
Increased and stable access to food commodities from aquatic agricultural systems by rural and urban poor
Increased consumption of nutritious, safe foods by low income households in aquatic agricultural systems, especially by nutritionally vulnerable women and children
Instrumental Outcomes
Improved productivity in aquatic agricultural systems (water and total factor productivity)
Increased control of assets, inputs, decision-making and benefits by women and other marginalized groups in aquatic agricultural systems
Increased capacity to innovate within low income and vulnerable rural communities in aquatic agricultural systems allowing them to seize new opportunities to improve livelihoods and increase household income
Increased capacity to adapt to environmental and economic variability, shocks and longer term changes in low income communities in aquatic agricultural systems
Greater resilience of aquatic agricultural systems through enhanced ecosystem services
Policies supporting sustainable and equitable agricultural and natural resource management in aquatic agricultural systems developed and adopted by agricultural, conservation and development organizations, national governments and international bodies
Environmental Outcomes
Minimized adverse environmental effects of increased production and intensification in aquatic agricultural systems
Increased carbon sequestration and reduction of greenhouse gases through improved agriculture and natural resources management in aquatic agricultural systems

Table 2: Examples of 2017, 2020 and 2023 targets for AAS IDOs. These targets are described in terms of benefits to households and people living in the program's focal hubs. Targets for scaling at national and regional level have not yet been developed.

AAS IDO	**Indicator**	**Targets (#)**		
		2017	**2020**	**2023**
Income	Income in # poor households increased by at least 30% and with 40% of that income earned by women	270,000 households	1.2m households	2.7m households
Consumption & nutrition	50% increase in consumption of nutrient rich small fish and vegetables by women and children in # poor rural households	135,000 households	600,000 households	1.35m households
Control of assets & decision making	# of women, youth and marginalized people in focal communities pursuing new and beneficial livelihood choices, accessing services and inputs, building personal and household assets, and controlling decisions regarding use.	68,000 people	300,000 people	675,000 people
Capacity to innovate	Community and hub level innovation platforms established in a) # hubs (# platforms) with b) # hubs fully performing (# platforms).	a) 15 hubs (75 p'fms) b) 5 hubs (50 p'fms)	a) 24 hubs (130 p'fms) b) 10 hubs (100 p'fms)	a) 24 hubs (180 p'fms) c) 15 hubs (150 p'fms)

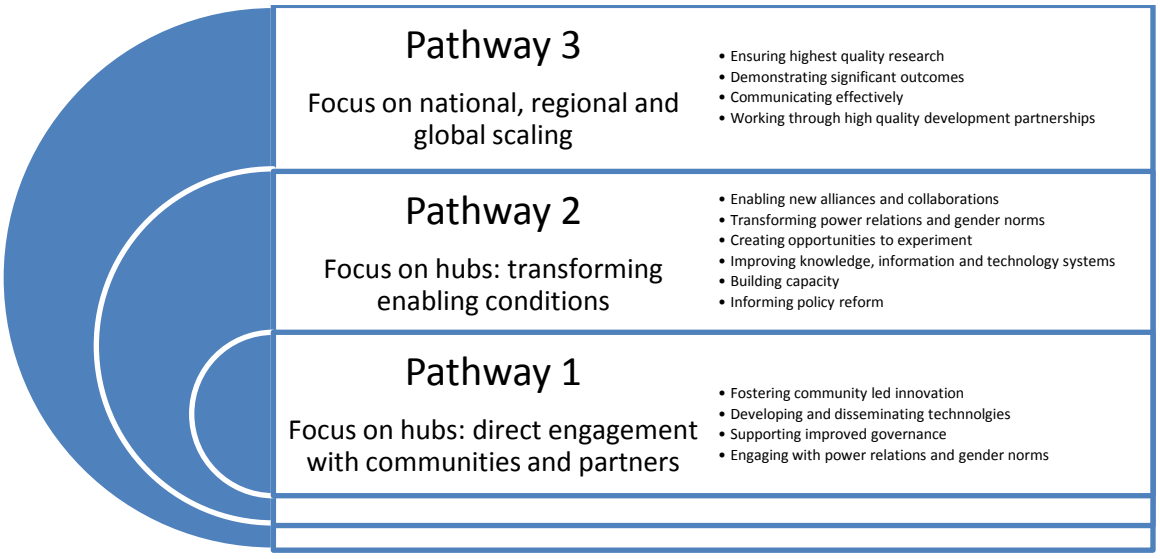
Table 3. Total numbers of people benefitting from AAS by 2023, through direct engagement in program hubs, and from scaling at national and regional levels. These figures for direct AAS engagement are derived from detailed estimates for current hubs and projections for potential additional hubs. These are provided in Annex 4. The figures for scaling at national and regional levels are based on the assumption that learning from the program will influence development investment impacting approximately 25% of poor people dependent on the four focal systems. They are derived from a first draft of a detailed GIS study of aquatic agricultural system dependent populations that will be published in the second half of 2013.

Aquatic agricultural systems	Direct AAS engagement	Scaling		
	Hubs	National	Regional	
Asian Mega deltas	13.2m	5m	4m	
Asia-Pacific islands	1.9m	3m	2m	
African inland	3.8m	4m	6m	
African coastal	2.5m	1m	2m	
Totals	21.3m	13m	14m	48.3m

4. Achieving outcomes at scale: impact pathways to meet our targets

The outcome targets described in Tables 2 and 3 are ambitious but achievable. Reaching these targets, however, requires geographical focus and careful investment in a combination of partnerships, knowledge sharing and learning, and capacity development. AAS is making these investments to achieve impact at scale by pursuing three distinct but related programmatic impact pathways. These are summarized Fig. 1 and described in more detail below.

Fig. 1 The three impact pathways of AAS.



Impact Pathway 1. This focuses on the program's geographic hubs and the communities and partners we work with there. In each hub, AAS is working with selected communities (innovation villages) to

build on their strengths and identify where new research can support development of specific innovations addressing the opportunities or challenges they face. It is intended that the resulting innovations (technologies, institutional arrangements, methods, insights and knowledge), and the outcomes they bring, will be scaled up and out (to adjacent villages) through community to community learning and increase in the effectiveness and reach of organizations serving households in the hubs. NGO partners in particular are working to scale the approach through their engagement in the hubs, so allowing the program to reach significantly larger numbers of communities and households. To facilitate this we are working with partners to establish "innovation platforms" that share knowledge and learning around key areas of work, and so help create an environment that fosters innovation. Our innovation platform approach is illustrated in section 5 for the research we will conduct on value chains in Zambia, one of the priority issues through which we will address the Barotse development challenge. As part of this work we aim to stimulate and scale up learning processes that stabilize and bolster what is already working, drive the uptake of novel ideas, techniques and technologies, and begin to transform norms and institutions.

Impact Pathway 2. Our work under Pathway 1 is designed to help scale the specific innovations developed through AAS interventions. Under Pathway 2 we aim to leverage the innovation friendly environment created by AAS to encourage farmers and other stakeholders to pursue their own innovative solutions to other challenges and opportunities as these emerge within our hubs. The program is working to do this by 1) fostering collective action by enabling new alliances and collaborations; 2) building upon this to transform power relations and gender norms that constrain rural households and communities from having a greater say in choosing and taking control of their livelihood options; 3) creating opportunities for women and men farmers to experiment with new approaches to pursue these options; 4) improving the knowledge, information and technology systems that can support these new approaches; 5) building capacity of all stakeholders to support and engage effectively in these community processes; and 6) informing necessary policy reform. Several research networks e.g. Prolinnova, are working to support conditions for farmer innovation and the program is exploring how it might work with these networks to foster mutual learning.

Impact Pathway 3. For AAS to achieve impact at scale beyond the program's geographic hubs, the knowledge and learning generated through the program will need to be recognized as beneficial by the development community and used widely at national, regional and global scale. Achieving this will in turn require not only that our research is of the highest quality, but also that our monitoring and evaluation shows clearly how the program's approach has resulted in significant outcomes, and that we communicate these effectively. The absence of M&E methods suitable for learning from, and measuring outcomes and impact of, research in complex agricultural and natural resource management systems, has been recognized by the ISPC as a critical weakness of earlier CGIAR research in this area. In response AAS is working with other concerned CRPs in developing new approaches to M&E. A paper describing this work is available at www.aas.cgiar.org.

Translating this learning into an effective body of international public goods will however require substantial investment in high quality partnerships at multiple levels. To this end AAS has also

prioritized engagement with both national and international development partners, and is working with these to scale the learning from our work into national, regional and international development policy and practice, into research practice and networking, and into capacity development at multiple scales. For example at regional level in Africa, AAS has entered into partnership with NEPAD, with a view to supporting the Rural Futures Initiative and CAADP, while at national level we are partnering with Bangladesh's National Planning Commission to integrate learning from AAS into policies governing polder management. Similarly AAS is working with FARA to design an African regional platform on knowledge sharing and capacity building for aquatic agricultural systems. At global level we are also exploring opportunities to exchange learning with international research networks and development partners, including bilateral and multilateral aid agencies. Complementing these initiatives the program has also worked closely with development NGOs in focal countries and hubs, and is building upon this to pursue wider collaboration on policy and practice. This is facilitated through the participation of CARE and CRS in the program's leadership team. A fuller summary of partnerships being developed to pursue Pathway 3 is provided in Annex 5.

5. AAS Theory of Change: how our work will make a difference

Sections 3 and 4 above summarize AAS IDOs and targets, and outline the impact pathways required to achieve these at scale. They do not however provide a detailed description of how the program's research will lead to the innovation and improvements in wellbeing that we aspire to. This section addresses this issue by summarizing the approach the program is taking in the places we are focusing, and illustrating this with reference to our work in Zambia.

The AAS approach. AAS is built on the premise that rural people, including those currently living in poverty, possess the potential to transform their lives through social, institutional and technological innovation. We are therefore designing and implementing our research in ways that foster rural innovation capacity, and improve well-being in the face of evolving opportunities and challenges. Our approach (Fig. 2) focuses initial efforts on selected geographical hubs and the people who live there, and works with these communities to develop and pursue a participatory action research agenda. At the core of this work we apply a Gender Transformative Approach (see www.aas.cgiar.org), and emphasize knowledge sharing and learning through our program networks. These four elements of our research in development approach are accompanied by significant investment in partnerships and capacity building at multiple levels, and it is the successful blend of these six elements that we believe will achieve the development outcomes we seek, and do so at scale. A separate working paper describing this approach in available at www.aas.cgiar.org. A program science handbook is also currently being written. This builds on the program's six research themes of productivity, markets, resilience, gender, policies and institutions, and knowledge sharing and learning, and describes the range of science being drawn upon and developed through the program. The first version of this handbook will be available later in 2013.

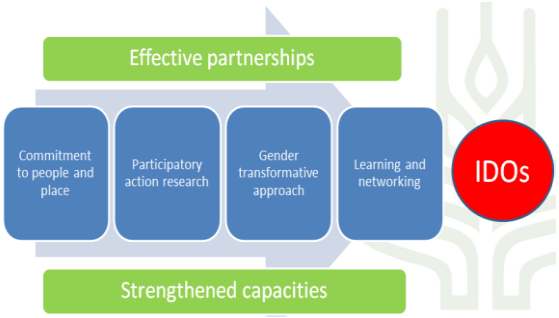


Fig.2. AAS program approach

Designing research to address a development challenge. In each of the program hubs we work with partners, stakeholders and communities to identify a compelling development challenge facing agriculture and natural resource management there. We then build upon this collective analysis to identify how the program's research can help build the understanding, commitment, engagement and capacity required to meet this challenge and bring about positive change. For example in the Barotse floodplain in Zambia, local stakeholders aligned strongly around the annual flooding cycle as the key development challenge that AAS needed to focus upon there. While this sustains the area's fisheries and livestock production, and provides water for agriculture, it also curtails the farming season, threatens lost production and food shortages, and compels people to move off the floodplain and rely upon less productive upland areas for several months a year. In response the research agenda agreed for Barotse highlights: i) development of pro poor agricultural and natural resource value chains as a means of better harnessing the productivity of the floodplain and optimizing the benefits to local people from these sectors; ii) opportunities for crop diversification and improved productivity designed to improve food security and eliminate the hunger season for the poorest; iii) development of new approaches to flood risk management and water management; and iv) use of our gender transformative approach to realize the untapped potential for women and youth to engage in, and earn income from, agriculture in Barotse. By pursuing this research agenda we seek not only to help increase the effectiveness of future investments in agricultural development in the Barotse floodplain, but also to harness the learning derived and use this to help address similar challenges in Africa's other inland systems.

Similarly in Bangladesh stakeholders identified increasing salinity, changing hydrology and climate change as the key development challenge for the southern polder zone. Future investments in agricultural development here need to recognize and adapt to these changing conditions, and the challenges and opportunities they bring. Learning from this work will also be important for other countries working to address the challenges of Asia's large deltas.

The detailed process used to work with stakeholders in developing the development challenges is set out in the program's scoping and design methodology which is available separately in the AAS Rollout Handbook at www.aas.cgiar.org. It is based on the premise that the quality of engagement we develop with and between stakeholders shapes our ability to address the more immediate dimensions of the development challenge while helping to build the long term capacity and commitment required for sustained innovation. A key element of this approach lies in the program's commitment to transforming power relations and gender norms.

While it is too early at this stage to judge the success of these processes, first outcomes indicate quality engagement. For example in Barotse the design workshop was attended by CGIAR Centers, NARS, NGOs, national and local government, the Royal Barotse Establishment (the traditional authority), the private sector and community representatives. Participants said they appreciated "the evolution of team spirit and joint ownership", "the good effort to get engagement by many" and "the process and methodology used to come up with community priorities". Several made reference to beginning to see

the potential of building better linkages between the organizations and sectors supporting community development.

Pathways to impact. Whether our approach to the priorities identified in each hub's research agenda leads to the impact we seek depends on the credibility and practicality of the impact pathways we will pursue. While these pathways are yet to be developed fully with stakeholders, and will evolve over time, our work so far illustrates how we believe these pathways will deliver the changes we seek. The broader engagement of stakeholders in developing the program's research agenda and their enthusiasm for the approach also provides first evidence that the conditions required to achieve sustainable change are being put in place.

We have detailed impact pathways and theories of change for two of our early research initiatives in a working paper available separately at www.aas.cgiar.org. These initiatives: i) value chains in the Barotse hub; and ii) productivity and diversification in the Southern Bangladesh Polder Zone (SBPZ), provide examples of the research that we will pursue to address the development challenges in each hub. The full research agenda as identified by stakeholders in each hub is described in the working paper. Box 1 provides a short description of the impact pathway for the Barotse value chain research. While we can't be certain at this point in all of the causal linkages described we are confident that the innovation platform and participatory action research we are putting in place will allow for the stakeholders involved to make expected linkages explicit and then test their validity. It is by enabling the value chain actors themselves to think through how they will achieve their objectives, to then act, reflect, and modify their assumptions and future actions that we expect to build sustainable capacity and lay the foundation for long-term impact at scale.

Box 1: Impact pathways for value chain initiatives in the Barotse hub

Rice and fish are respectively the most important agricultural commodity and natural resource in the household economies of the Barotse floodplain. Yet despite their importance local stakeholders agree that they have received little development investment. Recognizing this priority AAS is now working with value chain actors, ranging from farmers, fishers, processors and traders, to improve collective capacity to engage in development of each value chain through an innovation platform approach. A first step has involved using participatory action research at community level as a means to enhance entrepreneurial and technical skills of community level actors. Simultaneously we are working to improve availability of market information, credit, and services, as a means of enhancing their capacity to proactively respond to market opportunities. Building on these two steps we are now bringing value chain actors together to help improve mutual understanding and vertical linkages within the chain and explore ways through which to improve efficiency and equity along the chain.

Our investment in collective action at community level is also helping to improve horizontal coordination, and we believe will foster economies of scale and strengthen the position of communities when engaging with processors and traders, many of whom are not from Western Province. Similarly our gendered approach to value chain analysis is helping to improve understanding and dialogue about men and women's roles and responsibilities in the value chain and the household. This dialogue

challenges existing norms and attitudes that prevent women and youth from benefiting equitably, and we believe this will contribute in time to transformative change in their engagement in, and equitable benefit from, these value chains. In turn it has been well documented that increased incomes and greater control over resources by women leads to improved education, food and nutrition security, and our approach is designed to achieve this.

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6. Development of AAS 2014-2023

Building on good progress made with program implementation from July 2011 to June 2013, AAS has developed plans for steady growth of the program in the four focal systems over the period 2014-2017, followed by consolidation and scaling from 2018-2023. This will focus on delivery of the research agenda and associated investments in impact pathways in the five hubs where the program has rolled out in 2012 and 2013, while progressively increasing the number of countries and hubs in each of the focal systems. By 2017 the program aims to have 24 operational hubs in 12-14 countries. Roughly half of these countries and hubs will be located in Africa and half in Asia-Pacific, providing balanced coverage of the four systems. A provisional schedule for country engagement is provided in Annex 6. As the program matures we will focus increasingly upon learning across hubs and countries and working with partners to scale. The four focal systems will provide a geographical framework for this scaling work.

7. Indicative budget

Program expenditure in the initial 3.5 years (2011-2014) is projected to total US$ 81 million, with US$41 million for W1/W2 and US$40 million from bilateral sources. The expansion described here will require expenditure to grow to US$ 207 million in the period 2015-2017, US$ 303 million in the period 2018-2020 and US$ 340 million in the period 2021- 2023. The anticipated source of this funding in each of these periods is summarized in Table 4. The total cost of the program over the period from 2011-2023 is projected to reach US$ 931 million, with US$ 485 million from W1/W2 and US$446 million from bilateral sources.

Table 4. Projected program expenditure 2011-2023.

Funding source	Projected expenditure (US$m) in each budget period				
	2011-2014	2015-2017	2018-2020	2021-2023	Totals
W1/W2	41	115	159	170	485
Bilateral	40	92	144	170	446
Totals	81	207	303	340	931

Annexes

Annex 1. Engagement of CGIAR Centers in AAS and linkages with other CRPs.

Annex 2. Potential common CGIAR IDOs and corresponding AAS IDOs.

Annex 3. Draft indicators and targets for AAS IDOs by 2017, 2020 and 2023.

Annex 4. Estimated number of households and people who will benefits from AAS by 2023.

Annex 5. Examples of strategic partnerships being developed through AAS as part of our work on impact pathway 3.

Annex 6. Provisional schedule for expanding AAS country engagement during 2014-2017.

Annex 1. Engagement of CGIAR Centers in AAS and linkages with other CRPs. Given the placed-based focus of AAS (and the other system CRPs) the program looks to work with CGIAR Centers and CRPs wherever the skills and learning they provide can contribute to effective delivery of the program. There are three main ways through which these contributions are provided: through Managing Centers who lead implementation of AAS; through Partner Centers that provide specific additional expertise not available in the program's Managing Centers; and through collaboration between CRPs. These three types of contribution are summarized below.

Managing Centers. Bioversity, IWMI and WorldFish initiated in AAS in 2011, with WorldFish as the lead Center. All three Centers are represented in the program's leadership team, and have engaged closely in the development of the program in focal countries and hubs. Specific technical contributions in program implementation are summarized below

Center	Contribution
Bioversity	Participatory approaches to agrobiodiverity assessment and use; assessment and use of ecosystem services in agro-ecological systems.
IWMI	Water and wetland valuation, management and governance; flood modeling and risk assessment.
WorldFish	Participatory management and resilience of capture fisheries; aquaculture technologies and methodologies; value chains and markets; policies and institutions; gender and social change; knowledge management and learning (M&E).

Partner Centers. In addition to the Managing Centers, other Centers have worked closely with the program in a number of important geographic or thematic areas. These areas of collaboration are summarized below.

Center	Contribution
IFPRI	Strategic collaboration in development of AAS gender and nutrition research; country level collaboration on national policy engagement in Bangladesh.
ILRI	Opportunities for engagement with AAS identified in Zambia and Bangladesh; to be pursued in 2014.
Africa Rice	Engaged in strategic discussions regarding expansion of AAS in Africa; specific collaboration in Zambia rice value chain being discussed.
CIMMYT	Joint implementation of Cereal System Initiative for South Asia project in Bangladesh hub.
IRRI	Joint implementation of Cereal System Initiative for South Asia project in Bangladesh hub.

CRPs. A growing number of opportunities for collaboration with other CRPs are emerging. These are summarized below and will be developed further in 2014.	
Area of collaboration	**CRPs**
Thematic	
Innovative approaches to complex agricultural systems	Drylands, Humidtropics
Development of innovative approaches to M&E for complex agricultural and NRM systems	CCAFS, FTA, WLE, RTB
Gender Transformative Approach	CCAFS, L&F, PIM
Climate change	CCAFS
Nutrition	A4NH
Geographic	
Bangladesh	PIM, WHEAT, GRiSP, RTB, L&F, A4NH, WLE, CCAFS
Myanmar	GRiSP, WLE

Annex 2. Potential common CGIAR IDOs and corresponding AAS IDOs.

Common CGIAR IDOs[5]	Corresponding AAS IDOs
Material Outcomes	
Increased and more equitable income from agricultural and natural resource management and environmental services earned by low income value chain actors	Increased and more equitable income from agricultural and natural resource management and environmental services earned by low income value chain actors in aquatic agricultural systems
Increased and stable access to food commodities by rural and urban poor	Increased and stable access to food commodities from aquatic agricultural systems by rural and urban poor
Increased consumption of safe, nutritious foods by the poor, especially among nutritionally vulnerable women and children	Increased consumption of nutritious, safe foods by low income households in aquatic agricultural systems, especially by nutritionally vulnerable women and children
Instrumental Outcomes	
Improved productivity in pro-poor food systems	Improved productivity in aquatic agricultural systems (water and total factor productivity)
Increased control by women and other marginalized groups of assets, inputs, decision-making and benefits	Increased control of assets, inputs, decision-making and benefits by women and other marginalized groups in aquatic agricultural systems
Increased capacity for innovation within low income and vulnerable rural communities allowing them to seize new opportunities to improve livelihoods and increase household income	Increased capacity to innovate within low income and vulnerable rural communities in aquatic agricultural systems allowing them to seize new opportunities to improve livelihoods and increase household income
Increased capacity in low income communities to adapt to environmental and economic variability, shocks and longer term changes	Increased capacity to adapt to environmental and economic variability, shocks and longer term changes in low income communities in aquatic agricultural systems
Greater resilience of agricultural/forest/water based/mixed crop livestock, aquatic systems through enhanced ecosystem services	Greater resilience of aquatic agricultural systems through enhanced ecosystem services
Additional policies supporting sustainable and equitable agricultural and natural resource management developed and adopted by agricultural, conservation and development organizations, national governments and international bodies	Policies supporting sustainable and equitable agricultural and natural resource management in aquatic agricultural systems developed and adopted by agricultural, conservation and development organizations, national governments and international bodies
Environmental Outcomes	
Minimized adverse environmental effects of increased production and intensification	Minimized adverse environmental effects of increased production and intensification in aquatic agricultural systems
Increased carbon sequestration and reduction of greenhouse gases through improved agriculture and natural resources management	Increased carbon sequestration and reduction of greenhouse gases through improved agriculture and natural resources management in aquatic agricultural systems

[5] The common CGIAR IDOs are those presented to the Fund Council in April 2013.

Annex 3. Draft indicators and targets for AAS IDOs by 2017, 2020 and 2023. The indicators and specific targets provided below are still being refined in discussion with partners and will be finalized later in 2013. For control of assets and decision-making, capacity to innovate, and policies, more detailed process indicators have been provided to illustrate how the program will track progress towards creating the enabling conditions required for the higher order outcomes.

AAS IDO	2017	2020	2023
Material Outcomes			
Income	Income in 270,000 poor households increased by at least 30% and with 40% of that income earned by women.	Income in 1.2m poor households increased by at least 30% and with 40% of that income earned by women.	Income in 2.7m poor households increased by at least 30% and with 40% of that income earned by women.
Access to food	20% increase in production of major foods (crops, livestock, fish – commodities we focus on through our initiatives) in 5 hubs. Food stocks in 135,000 hub households last through the year.	40% increase in production of major foods (crops, livestock, fish – commodities we focus on through our initiatives) in 10 hubs. 20% increase in target foods marketed in 10 hubs. Food stocks in 600,000 hub households last through the year.	60% increase in production of major foods (crops, livestock, fish – commodities we focus on through our initiatives) in 15 hubs 40% increase in target foods marketed in 20 hubs Food stocks in 1.35m hub households last through the year.
Consumption and nutrition	50% increase in consumption of nutrient rich small fish and vegetables by women and children in 135,000 poor rural households.	50% increase in consumption of nutrient rich small fish and vegetables by women and children in 600,000 poor rural households.	50% increase in consumption of nutrient rich small fish and vegetables by women and children in 1.35m poor rural households.
Instrumental Outcomes			
Productivity	Knowledge, practices, and technology adoption by men and women in	Knowledge, practices, and technology adoption by men and women in 1.2m	Knowledge, practices, and technology adoption by men and women in 2.7m

	270,000 households contributing to improved productivity. Improved water and total factor productivity resulting from AAS program interventions in 5 AAS hubs	households contributing to improved productivity. Improved water and total factor productivity resulting from AAS program interventions in 10 AAS hubs	households contributing to improved productivity. Improved water and total factor productivity resulting from AAS program interventions in 20 AAS hubs
Control of assets and decision making	68,000 women, youth and marginalized people in focal communities pursuing new and beneficial livelihood choices, accessing services and inputs, building personal and household assets, and controlling decisions regarding use. GTA initiatives being implemented in 10 hubs. 10 hub and 5 national coalitions formed to facilitate GTA uptake. Reflection and learning groups on gender transformational change embedded in 75 platforms and 50 are fully functional. Skills of program staff, partners and service providers enhanced to integrate GTA in programs and services in 15 hubs. 25% of partners embedding GTA in their programs and allocating adequate resources in program hubs.	300,000 women, youth and marginalized people in focal communities pursuing new and beneficial livelihood choices, accessing services and inputs, building personal and household assets, and controlling decisions regarding use. GTA initiatives being implemented in 20 hubs. 20 hub and 7 national coalitions formed to facilitate GTA uptake. Reflection and learning groups on gender transformational change embedded in 130 platforms and 100 are fully functional. Skills of program staff, partners and service providers enhanced to integrate GTA in programs and services in 20 hubs. 50% of partners embedding GTA in their programs and allocating adequate resources in program hubs.	675,000 women, youth and marginalized people in focal communities pursuing new and beneficial livelihood choices, accessing services and inputs, building personal and household assets, and controlling decisions regarding use. GTA initiatives being implemented in 24 hubs. 24 hub and 10 national coalitions formed to facilitate GTA uptake. Reflection and learning groups on gender transformational change embedded in 180 platforms and 150 are fully functional. Skills of program staff, partners and service providers enhanced to integrate GTA in programs and services in 24 hubs. 75% of partners embedding GTA in their programs and allocating adequate resources in program hubs.

	30% increase in women, youth and marginalized groups taking up leadership roles in AAS focal communities in 5 hubs.	40% increase in women, youth and marginalized groups taking up leadership roles in AAS focal communities in 15 hubs. 25% increase in women, youth and marginalized groups taking up leadership roles in neighboring communities in 5 hubs	50% increase in women, youth and marginalized groups taking up leadership roles in AAS focal communities in 24 hubs. 40% increase in women, youth and marginalized groups taking up leadership roles in neighboring communities in 15 hubs
Capacity to innovate	Community and hub level innovation platforms established in 15 hubs (75 platforms) with 5 hubs fully performing (50 platforms).	Community and hub level innovation platforms established in 24 hubs (130 platforms) with 10 hubs fully performing (100 platforms). 10 platforms developed by partners in neighboring areas and countries. 5 national and regional partners adopting AAS innovation platforms as policy and practice in fostering capacity to innovate. Participation in AAS innovation platforms is shown as a contributory cause to increases in Income, Consumption and Productivity IDOs in 600,000 households	Community and hub level innovation platforms established in 24 hubs (180 platforms) with 15 hubs fully performing (150 platforms). 30 platforms developed by partners in neighboring areas and countries. 15 national and regional partners adopting AAS innovation platforms as policy and practice in fostering capacity to innovate. Participation in AAS innovation platforms is shown as a contributory cause to increases in Income, Consumption and Productivity IDOs in 1.35m households
Capacity to adapt	Community adaptation and resource management established in 50 communities from 5 hubs provide demonstrated increases in resilience and capacity of men and women to adapt to social and ecological change.	Community adaptation and resource management established in 150 communities from 15 hubs and five countries provide demonstrated increases in resilience and capacity to adapt to social and ecological change.	Community adaptation and resource management established in 300 communities from 20 hubs provide demonstrated increases in resilience and capacity to adapt to social and ecological change.

Resilience	Improved governance in 15 communities from 5 hubs contribute to demonstrated increases in resilience of AAS ecosystems.	Improved governance in 50 communities from 10 hubs contribute to demonstrated increases in resilience of AAS ecosystems.	Five national programs in community-based resource management demonstrated to contribute to improvements in national poverty and wellbeing statistics and reducing gender gaps.
Policies	Policy and institutional obstacles and opportunities for realization of hub development challenges identified in 20 hubs. Multistakeholder strategies for addressing policy and institutional challenges being implemented in 5 hubs. Evidence of positive contributions to shifts in gender equitable policies, policy implementation, or institutional context in 5 hubs.	Policy and institutional obstacles and opportunities for realization of hub development challenges identified in 24 hubs. Multistakeholder strategies for addressing policy and institutional challenges being implemented in 20 hubs. Evidence of positive contributions to shifts in gender equitable policies, policy implementation, or institutional context in 10 hubs. Evidence that shifts in policies, policy implementation or institutional strategies is contributing to scaling of AAS innovations in 10 countries. Evidence that lessons and insights from AAS Program have influenced the strategies and investment priorities of 5 organizations active in rural development, conservation, or agriculture internationally, including influence on programming in 5	Multistakeholder strategies for addressing policy and institutional challenges being implemented in 24 hubs. Evidence of positive contributions to shifts in gender equitable policies, policy implementation, or institutional context in 20 hubs. Evidence that shifts in policies, policy implementation or institutional strategies is contributing to scaling of AAS innovations in 15 countries. Evidence that lessons and insights from AAS Program have influenced the strategies and investment priorities of 15 organizations active in rural development, conservation, or agriculture internationally, including influence on programming in 10

		countries beyond the AAS Program focal countries.	countries beyond the AAS Program focal countries.
Environmental Outcomes			
Environmental effects	Key location specific indicators of environmental performance show positive change in 3 hubs, covering (i) freshwater productivity; (ii) N&P budgets; (iii) ecosystem services	Key location specific indicators of environmental performance show positive change in 6 hubs, covering (i) freshwater productivity; (ii) N&P budgets; (iii) ecosystem services	Key location specific indicators of environmental performance show positive change in 10 hubs, covering (i) freshwater productivity; (ii) N&P budgets; (iii) ecosystem services
Carbon sequestration	Contribution of mangrove forests to carbon storage quantified in one country	Mangrove management established in five communities and potential for payment for ecosystem services established	Community resilience improved through carbon offset mechanisms in 20 communities

Annex 4. Estimated number of households and people who will benefits from AAS by 2023. Estimates are provided for the five hubs initiated in 2012-2013, and through new hubs to be developed over the period 2014-2017 (countries and numbers for new hubs should be regarded as indicative only).

	Initial hubs (initiated 2012-2013)				**New hubs (initiated 2014-2017)**			**Total number of people per country**
	Pathway 1		**Pathways 2 & 3**		**Pathway 1+2+3**			
	Households[6]	People[7]	Households	People	Additional hubs	Households	People	
Asian Mega Deltas								
Bangladesh	158,800	800,000	950,000	4.75m	2	950,000	4.75m	9.5m
Cambodia	70,000	350,000	150,000	750,000	2	300,000	1.5m	2.25m
Myanmar					1	240,000	1.44m	1.44m
Asia-Pacific islands								
Solomon Islands			10,000	50,000	1	15,000	75,000	0.125m
Philippines	70,000	420,000	140,000	840,000	0			0.84m
Other potential hubs (Timor Leste, Indonesia)					2	180,000	900,000	0.9m
Africa Inland								
Zambia	38,000	228,000	100,000	600,000	2	194,900	1.17m	1.77m
Other potential hubs (Burkina Faso, Uganda, Ghana)					4	400,000	2m	2m
Africa coastal								
Ghana					1	100,000	0.5m	0.5m
Other potential hubs (Benin, Mozambique, Tanzania)					4	400,000	2m	2m
							Grand total	21.3m

[6] Number of households in each hub has been calculated on the basis of the number of communities engaged with directly in each, and the number of communities that will be reached through scaling. This multiplier varies between countries and hubs according to population density and number and track record of development partners through whom the program will scale.

[7] Number of people assumes 5 people per household for all hubs except Philippines, Myanmar and Zambia where available data show household size to be 6.

Annex 5. Examples of strategic partnerships being developed through AAS as part of our work on impact pathway 3.

Main categories of strategic partners
National Governments
In all focal countries the program has engaged closely with national ministries of agriculture, fisheries and livestock or their equivalents as well as other related ministries such a environment or planning. For example in Bangladesh the program has worked particularly closely with the Ministries of Agriculture and Fisheries, and with the National Planning Commission and Local Government Engineering Department. These agencies all play a central role in developing and implementing policy and effective collaboration is essential if the program is to make the contribution to national policy that we seek.
Regional institutions
In order to help ensure relevance of the program at regional level, and lay the basis for scaling, we have worked closely with regional institutions in Africa, Asia and the Pacific. Of particular importance for the program's work in Africa a joint planning workshop was convened with NEPAD and FARA, with a view to agreeing how the program might best contribute to national and regional priorities as it expands. Through this work AAS and NEPAD have agreed to focus program implementation in Africa on supporting the Rural Futures Initiative and CAADP, and within these also contribute to the Program on African Fisheries and the NEPAD Environment Framework.
Multilateral and Bilateral Development Agencies
The program enjoys good relations with both bilateral and multilateral agencies in focal countries, and is working closely to strengthen synergies between the AAS priorities and processes and donor engagement in these countries. While this is taking the traditional form of bilateral funding for specific initiatives in AAS hubs, the program is also seeking to draw upon hub learning to influence donor engagement in these systems. Building upon this work opportunities for broader international collaboration with selected donors on specific themes are being explored, including for example with IFAD on AAS and nutrition.
Agricultural Research Networks
Effective engagement with regional and global research networks is essential for scaling learning from AAS. To this end the program is working closely with a range of research networks. For example in

Africa the program is working with FARA to design an African regional platform on knowledge sharing and capacity building for aquatic agricultural systems. Similarly at sub-regional level AAS is working with ASARECA to develop capacity through program extension there.

At global level the program is prioritizing development of research partnerships with institutions and networks that have a strong focus on rural innovation, including Prolinnova, Constellation, ICRA, and CIRAD, and others with a focus on sustainability, including Ecoagricultural Partners and the Stockholm Environment Institute.

International Development NGOs

A wide range of national and international development NGOs are working in the AAS hubs and we are working closely with these wherever possible. In view of our scaling aspirations we are also working closely with some of the largest of these NGOs to generate collaborative learning and use this to inform their policy and practice. Reflecting this approach CARE and CRS are important members of the program's leadership team.

Annex 6. Provisional schedule for expanding AAS country engagement during 2014-2017. Countries for expansion in 2014-2017 should be regarded as indicative only at this stage.

	Current status	**Expansion**			
Country	2012-2013	2014	2015	2016	2017
Africa inland					
Zambia	1st hub		2nd hub	3rd hub	
Uganda		1st hub			2nd hub
Ghana			1st hub		
Burkina Faso				1st hub	
Africa coastal					
Ghana		1st hub			
Benin			1st hub		
Mozambique				1st hub	2nd hub
Tanzania					1st hub
Asian Mega Deltas					
Bangladesh	1st hub		2nd hub		3rd hub
Cambodia	1st hub		2nd hub		3rd hub
Myanmar		1st hub			
Asia-Pacific islands					
Philippines	1st hub				
Solomon Islands	1st hub		2nd hub		
Timor Leste				1st hub	
Indonesia				1st hub	