Enabling Resilient, Equitable and Sustainable Food Systems:
A synthesis of the Cultivate Africa’s Future (CultiAF) partnership, 2013-2023
Acknowledgment

We would like to acknowledge the multitude of people and organizations that have played a critical role in the success of the Cultivate Africa’s Future (CultiAF) program over its 10-year span. Firstly, for providing leadership and overseeing the management of CultiAF Phase 1, our sincere thanks go to Mellissa Wood, previous Manager of Global Programs at ACIAR, Dr. Merle Faminow, former Program Manager for the Agriculture and Food Security program at IDRC at the time of CultiAF’s inception, and Dr. Renaud De Plaen, former Program Leader for Agriculture and Food Security at IDRC. Special thanks also go to Mr. Santiago Alba-Corral, Director of the Climate-Resilient Food Systems Division at IDRC, and Ms. Julianne Biddle, Director of Multilateral Engagement at ACIAR, for their leadership in Phase 2, and for steering it through the Covid-19 pandemic. A big thank you also goes to Dr. Anna Okello, Research Program Manager at ACIAR for being the anchor of CultiAF as it transitioned to Phase 2, and our ACIAR Nairobi colleagues, Dr. Leah Ndungu, Regional Manager at ACIAR, and Mr. Kennedy Osano, Assistant Manager at ACIAR, for their collaboration, insights and inputs.

During Phase 1, members of the first Governance Committee provided essential guidance to the program, including: Dr. Nick Austin, former Chief Executive Officer (CEO) of ACIAR and now with Watertrust Australia Ltd; Dr. Andrew Campbell, former CEO of ACIAR; Mr. Albert Blair, former Chief Financial Officer (CFO) of ACIAR; Dr. Dominique Charron, former Director for the Agriculture and Environment Program at IDRC; and Dr. Simon Carter, former Regional Director for IDRC’s Sub-Saharan Africa office.

The second Governance Committee for Phase 2 also provided crucial strategic leadership. Special thanks go to the Committee leaders – Dr. Dominique Charron, Vice-President of Programs at IDRC, and Dr. Andrew Campbell, CEO of ACIAR. In addition, we would like to thank Governance Committee members: Dr. Kathryn Toure, Regional Director for Eastern and Southern Africa Office at IDRC; Ms. Audrey Gormley, CFO Finance Officer at ACIAR; and Dr. Dan Walker, Chief Scientist at ACIAR.

Appreciation also goes to our Phase 1 experts in the Scientific Advisory Committee who took the time to review and make recommendations on the concept notes and proposals submitted for funding. These include: Prof. Fanuel Tagwira, Permanent Secretary, Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development, Zimbabwe; Dr. Irene Egyir of the University of Ghana; Ms. Mwila Kamwela of the Africa Union Commission; Dr. Nuhu Hatibu of the Kilimo Trust, now with the Alliance for a Green Revolution in Africa (AGRA); Dr. Salim Nahdy of the Africa Forum on Agriculture Advisory Services; and Dr. Susan Kaaria of the Food and Agriculture Organization of the United Nations (FAO), now with African Women in Agricultural Research and Development (AWARD). These experts were instrumental in the selection of high-quality proposals that were funded under the program.

We would also like to thank members of the Scientific Advisory Committee during Phase 2 who put in a lot of time and effort in choosing the most exciting projects for CultiAF’s portfolio and broadening the scope and reach of the program. These members include, again, Prof. Tagwira; Ms. Anne Mbaabu, former Head of Markets & Harvest Management at AGRA; Prof. Danny Simatete, Professor at the University of the Witwatersrand; Dr. Maureen Miruka at CARE USA; and Prof. William Baah-Boateng from the University of Ghana.

We would like to acknowledge and thank the CultiAF team of program officers, grant administrators, program management officers and administrators for their unrelenting support over the last 10 years: Dr. Edidah L. Ampaire, Ms. Mercy Rurii, Dr. Sandra Gagnon, Dr. Marwan Owaygen, and former IDRC staff Dr. Annie Wesley, Dr. Jemimah Njuki, Dr. Innocent
Butare, Dr. Pascal Sanginga, and Dr. Susan Robertson for providing intellectual oversight to the projects; Ms. Janet Waiyaki for overseeing knowledge translation and reporting that has formed a significant part of this synthesis; Ms. Josephine Njuguna and Mr. Abel Cheung for providing grant management, financial budgeting and reporting support; and Ms. Esther Paul and Ms. Anne Marie Butuba for providing program administrative support. Special thanks go to all other program officers and staff at IDRC and ACIAR for providing much needed technical expertise as and when needed, including during the review of concept notes and proposals, monitoring visits, joint inception workshops and technical support during project implementation.

Our thanks also go to the Donor Partnership Division staff at IDRC for providing support in partnership management, in technical and financial reporting to ACIAR, and for providing overall budget support to the program.

We also thank the ACIAR and IDRC corporate communications departments for their work in communicating about the program and for providing communications support to the teams.

We acknowledge other organizations that have provided invaluable technical and other support to CultiAF, including WRENmedia, ELEA Africa, the International Food Policy Research Institute (IFPRI), Ideas and Places, Artful Eyes Productions, ALINe, and SD Direct.

And, last but not least, our deepest gratitude goes to all the project teams in Ethiopia, Kenya, Malawi, Mozambique, Uganda, Zambia, and Zimbabwe, without whom the results in this synthesis would not have been possible.
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACIAR</td>
<td>Australian Centre for International Agricultural Research</td>
</tr>
<tr>
<td>ACRE Africa</td>
<td>Agriculture and Climate Risk Enterprise</td>
</tr>
<tr>
<td>BSF</td>
<td>Black soldier fly</td>
</tr>
<tr>
<td>CultiAF</td>
<td>Cultivate Africa's Future</td>
</tr>
<tr>
<td>e-CAS</td>
<td>electronic Catch Assessment Survey</td>
</tr>
<tr>
<td>EIAR</td>
<td>Ethiopian Institute of Agricultural Research</td>
</tr>
<tr>
<td>GAME Centre</td>
<td>Global Agribusiness Management and Entrepreneurship Centre</td>
</tr>
<tr>
<td>IDRC</td>
<td>International Development Research Centre</td>
</tr>
<tr>
<td>IPM</td>
<td>Integrated pest management</td>
</tr>
<tr>
<td>KEBS</td>
<td>Kenya Bureau of Standards</td>
</tr>
<tr>
<td>KWS</td>
<td>Kenya Wildlife Service</td>
</tr>
<tr>
<td>MACE</td>
<td>Manyakabi Area Cooperative Enterprise</td>
</tr>
<tr>
<td>MBS</td>
<td>Malawi Bureau of Standards</td>
</tr>
<tr>
<td>MFN</td>
<td>Mastercard Farmer Network</td>
</tr>
<tr>
<td>PICS</td>
<td>Purdue Improved Crop Storage</td>
</tr>
<tr>
<td>pro-WEAI</td>
<td>Project-level Women Empowerment in Agriculture Index</td>
</tr>
<tr>
<td>PTC</td>
<td>People's Trading Centre</td>
</tr>
<tr>
<td>SME</td>
<td>Small- and medium-sized enterprise</td>
</tr>
<tr>
<td>UNBS</td>
<td>Uganda National Bureau of Standards</td>
</tr>
</tbody>
</table>
# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents</td>
<td>8</td>
</tr>
<tr>
<td>Foreword</td>
<td>10</td>
</tr>
<tr>
<td>1. Introduction</td>
<td>12</td>
</tr>
<tr>
<td>- Climate-smart innovations</td>
<td>14</td>
</tr>
<tr>
<td>- Fish processing technologies</td>
<td>14</td>
</tr>
<tr>
<td>- Food storage solutions</td>
<td>15</td>
</tr>
<tr>
<td>- Efficient water use technologies</td>
<td>16</td>
</tr>
<tr>
<td>- Improved food security</td>
<td>16</td>
</tr>
<tr>
<td>- Skills building</td>
<td>16</td>
</tr>
<tr>
<td>2. Inclusive value chains</td>
<td>18</td>
</tr>
<tr>
<td>- What did CultiAF do?</td>
<td>19</td>
</tr>
<tr>
<td>- Gender</td>
<td>19</td>
</tr>
<tr>
<td>- Youth</td>
<td>24</td>
</tr>
<tr>
<td>- Conclusions</td>
<td>26</td>
</tr>
<tr>
<td>3. Improving productivity and resilience</td>
<td>28</td>
</tr>
<tr>
<td>- What did CultiAF do?</td>
<td>29</td>
</tr>
<tr>
<td>- Achievements</td>
<td>30</td>
</tr>
<tr>
<td>- Challenges</td>
<td>33</td>
</tr>
<tr>
<td>- Conclusions</td>
<td>34</td>
</tr>
<tr>
<td>4. Partnering with the private sector</td>
<td>36</td>
</tr>
<tr>
<td>- What did CultiAF do?</td>
<td>37</td>
</tr>
<tr>
<td>- Achievements</td>
<td>37</td>
</tr>
<tr>
<td>- Challenges</td>
<td>38</td>
</tr>
<tr>
<td>- Conclusions</td>
<td>41</td>
</tr>
<tr>
<td>5. Innovative financing for inclusive value chains</td>
<td>44</td>
</tr>
<tr>
<td>- What did CultiAF do?</td>
<td>45</td>
</tr>
<tr>
<td>- Achievements</td>
<td>46</td>
</tr>
<tr>
<td>- Challenges</td>
<td>49</td>
</tr>
<tr>
<td>- Conclusions</td>
<td>49</td>
</tr>
<tr>
<td>6. Influencing policy to scale impact</td>
<td>52</td>
</tr>
<tr>
<td>- What did CultiAF do?</td>
<td>53</td>
</tr>
<tr>
<td>- Achievements</td>
<td>53</td>
</tr>
<tr>
<td>- Challenges</td>
<td>55</td>
</tr>
<tr>
<td>- Conclusions</td>
<td>57</td>
</tr>
<tr>
<td>7. Conclusions</td>
<td>58</td>
</tr>
<tr>
<td>CultiAF2 projects</td>
<td>62</td>
</tr>
</tbody>
</table>
Enabling Resilient, Equitable and Sustainable Food Systems

© IDRC/Nichole Sobecki
Research makes a difference to the livelihoods of millions of farmers across Eastern and Southern Africa.

ACIAR and IDRC are committed to supporting research intended to enhance sustainable and resilient agricultural development, and establish equitable and just food systems in developing areas across the globe. Their objectives encompass strengthening research capabilities, advocating for research utilization to alleviate poverty, and attaining gender equality.

In this context, Cultivate Africa’s Future (CultiAF), a 10-year collaborative program between IDRC and ACIAR, was established in 2013 to fund agricultural research in Eastern and Southern Africa. This aligned with IDRC and ACIAR mandates to fund research to inform local, national, and regional decision-making. To accomplish this mandate, the two organizations convened various stakeholders – scientists primarily based in Eastern and Southern Africa, policymakers, civil society actors, the private sector, and regulators – to undertake research to inform policy for food security on the continent.

Food security is a critical priority for both the Australian and Canadian governments. Recognizing the untapped potential of African smallholder farmers to feed the continent, there was considerable scope for research to find effective ways to reduce losses while increasing returns through product quality control, market segmentation, processing, and value addition. Over 10 years, CultiAF’s program evolved with a growing focus on climate, gender, youth, and policy, especially during Phase 2 from 2017 to 2023.

Throughout its 10-year span, the CultiAF program funded 17 research projects on 53 innovations in seven Eastern and Southern African countries, with an investment of CAD 35 million/AUD 37 million. The research cut across questions of reducing post-harvest losses, empowering women, increasing uptake of climate-smart agricultural technologies, improving nutritional outcomes, food quality and safety standards, and public and private sector investments in agribusiness.

This synthesis presents the 10-year journey that IDRC and ACIAR have taken together in the program and the results of that investment. It looks at how strong partnerships can navigate challenges to produce significant accomplishments. It is a comprehensive look at the innovations, the science, what worked, the outcomes, the challenges (including unexpected ones such as the Covid-19 pandemic), the risks, the trade-offs, the partnerships, the recommendations, and the impact that was achieved for the livelihoods of farmers and the communities in which they live.

We are excited to witness the implementation of research that promotes innovative approaches to enhance strategic leadership, influence, and participation of women and youth in Eastern and Southern Africa and beyond. We believe that this synthesis will provide valuable insights and inspire you to incorporate the knowledge into your funding and research programs to achieve stronger, more equitable, and more resilient food systems.

Mr. Santiago Alba-Corral,  
Director of the Climate-Resilient Food Systems Division, IDRC

Ms. Julianne Biddle,  
Director of Multilateral Engagement, ACIAR
Introduction
For 10 years, Cultivate Africa’s Future (CultiAF) – a partnership between Canada’s International Development Research Centre (IDRC) and the Australian Centre for International Agricultural Research (ACIAR) – supported projects to strengthen food and nutrition security across Eastern and Southern Africa. Between 2013 and 2023, CAD 35 million/AUD 37 million was invested into the program.

Agriculture is the primary livelihood activity for over 70% of the rural population in these African regions. Yet, poor performance in the sector has led to reduced economic growth, food insecurity, and malnutrition. CultiAF aimed to help improve food and nutrition security in Eastern and Southern Africa by funding applied research in agricultural development.

Across Ethiopia, Kenya, Malawi, Mozambique, Uganda, Zambia, and Zimbabwe, CultiAF aided in the development and scaling of sustainable, gender-responsive, climate-smart innovations. These enhanced farmers’ resilience and incomes and provided consumers with higher quality and more accessible produce – while simultaneously providing examples and results to inform policy on food safety.

Influencing policy change is crucial to long-term results, so another goal of IDRC and ACIAR’s collaboration was to build partnerships with African governments, private sector actors, and research institutions; encouraging decision-makers to take steps that will improve the lives of millions. Myriad approaches taken during CultiAF’s decade-long duration aided in achieving this.

Effective communication was critical in establishing and maintaining strong relationships between producers and users of research. While scientific data is vital in obtaining a realistic picture of the challenges and needs of Africa’s smallholder farmers, necessary changes cannot occur if information is not clearly and efficiently used by key stakeholders.

In total, CultiAF funded 17 different projects, which supported the development and testing of 53 innovations over two phases. Eight projects – comprising 34 innovations – were launched in Phase 1 (2013-2017). Four of these projects continued into Phase 2 (2017-2023), in addition to the launch of five new projects, which together created 19 innovations. Collectively, these projects assisted in managing and reducing post-harvest losses, empowering women, increasing uptake of climate-smart agricultural technologies, improving nutritional outcomes among humans...
and livestock, developing food quality and safety standards, and attracting public and private sector investments in agribusinesses.

Climate-smart innovations

Several projects worked to enhance awareness and uptake of climate-smart agricultural technologies. For instance, the Improving Agricultural Productivity and Resilience with Satellite and Cellphone Imagery to Scale Climate-Smart Crop Insurance (Picture Based Insurance) project (Phase 2) encouraged uptake of crop insurance among women farmers – a group typically wary of becoming involved in such schemes. Men and women ‘champion farmers’ took photos of damaged crops in insured fields, which were then uploaded onto a dedicated phone app for processing and review. Through direct involvement with the process, farmers developed greater trust towards insurance – and this was reinforced by the speedier claim assessments and payments afforded by the app. By the end of the project, almost 8,500 farmers had taken out Picture Based Insurance, and around half of those had received a payout.

Other climate-smart innovations worked to increase yields and empower women. In Phase 2, the Climate-smart Interventions for Smallholder Farmers in Ethiopia (Ethiopia Sorghum) project established over 323 demonstration plots (62 of which were women-led) on which to trial alternative varieties of sorghum – including Argity, Fedis, and Melkam. These varieties are early-maturing and drought-tolerant, and provide high biomass for livestock fodder, helping farmers build resilience in the face of climate change-related weather events.

Fish processing technologies

Elsewhere, in Malawi, Uganda and Zambia, three projects – Better Processing and Marketing of Healthy Fish Products in Malawi (Malawi Fisheries)
Improving Fish Post-Harvest Management and Marketing in Malawi and Zambia (Improving Fish Post-harvest Management) project (Phase 1); and Harnessing Dietary Nutrients of Under-Utilized Fish and Fish-Based Products in Uganda (NutriFish) project (Phase 2) – supported women in accessing improved fish processing technologies. These included solar tent dryers and improved smoking kilns: solutions for more hygienic and faster drying of fish. In the Malawi Fisheries project, solar tent drying reduced post-harvest fish losses by one-quarter. By using such technologies, the quantity, quality, and shelf-life of produce is also enhanced, allowing for increased market opportunities and incomes for women.

Solar dryers were also used alongside integrated pest management (IPM) techniques by fruit farmers in Malawi, Mozambique, Zambia, and Zimbabwe. The Alien Invasive Fruit Flies in Southern Africa: Implementation of a Sustainable IPM Programme to Combat their Menaces (IPM Fruit Flies) project (Phase 2) provided starter packs – containing traps, lures, bait, and biopesticides – to farmers to help reduce mango crop losses. Over 17,500 farmers (52% men and 48% women) were trained in the use of IPM techniques, leading to an impressive seven out of 10 mangoes being ‘saved’. Further, by using dryers to produce and sell dried rather than fresh mango, farmers boosted the value of their mangoes eight-fold.

New storage solutions were also introduced to increase productivity. For example, the Ethiopia Sorghum project provided farmers with technologies to aid in reducing crop losses in the face of climate change. Over 8,850 sorghum farmers were afforded access to de-hulling machineries to enhance crop quality and reduce processing time. The time required to thresh 0.5 ha of sorghum, for instance, reduced from one day to just four hours. More than 4,400 farmers were also provided with Purdue Improved Crop Storage (PICS) bags, which enable grain to be stored for longer without a reduction in quality – meaning produce can be sold for more money outside of competitive harvest season ‘windows’.

The Post-Harvest Management Technologies for Reducing Aflatoxin Contamination in Maize Grain and Exposure to Humans in Zimbabwe (Aflatoxin) project (Phase 1) also provided farmers with innovative storage solutions. The team worked with farmers to assess the benefits of using hermetic technologies – metal silos and PICS bags – in reducing maize grain

Food storage solutions

New storage solutions were also introduced to increase productivity. For example, the Ethiopia Sorghum project provided farmers with technologies to aid in reducing crop losses in the face of climate change. Over 8,850 sorghum farmers were afforded access to de-hulling machineries to enhance crop quality and reduce processing time. The time required to thresh 0.5 ha of sorghum, for instance, reduced from one day to just four hours. More than 4,400 farmers were also provided with Purdue Improved Crop Storage (PICS) bags, which enable grain to be stored for longer without a reduction in quality – meaning produce can be sold for more money outside of competitive harvest season ‘windows’.

The Post-Harvest Management Technologies for Reducing Aflatoxin Contamination in Maize Grain and Exposure to Humans in Zimbabwe (Aflatoxin) project (Phase 1) also provided farmers with innovative storage solutions. The team worked with farmers to assess the benefits of using hermetic technologies – metal silos and PICS bags – in reducing maize grain
contamination from aflatoxin. Grain stored hermetically sold for almost double compared to grain stored conventionally.

**Efficient water use technologies**

To improve irrigation on farms, recent technologies were developed by the User Driven Approaches to Make Government and Farmer led Smallholder Irrigation in Mozambique More Productive (Mozambique Irrigation) project (Phase 2). These not only aided in cutting costs but were crucial for sustaining crop production in the face of climate-related challenges. For example, the project introduced farmers to Chameleon water sensors and wetting front detectors, which resulted in water usage being halved and irrigation costs reduced by 40%. In addition, crop yields increased by 10%, which resulted in enhanced incomes and resilience for farmers.

**Improved food security**

Improving food security was a focal point for the Precooked Beans for Food, Nutrition, and Income in Kenya and Uganda (Precooked Beans) project (Phase 1-2). The initiative involved training farmers to cultivate bio-fortified bean varieties that are not only nutritious but can be quickly processed into precooked beans – saving time and reducing environmental impact (as less water and charcoal are used). Working with partners, the project then developed five products incorporating the bean, including a ready-to-eat snack and noodles. Enhancing nutritional outcomes through new food products was also key to the NutriFish project, which incorporated nutrient-rich silver fish into products including baby food, sauce, and maize meal. Currently, over 300 street vendors and retailers use and sell the NutriFish sauce.

While the Insect Feed for Poultry and Fish Production (INSFEED) project (Phase 1-2) also worked to enhance food security, its focus was largely on doing so through policy change. Engagement with policymakers saw three new standards developed and approved in Kenya and Uganda, which supported insect-based product development, certification, and commercialization. The project’s success of transforming municipal organic waste into high-quality black soldier fly (BSF) frass fertilizer also made policymakers aware of the need to revise existing fertilizer standards. Meanwhile, the Aflatoxin project aided in influencing national-level stakeholders, with the Government of Zimbabwe using its findings in the strategy ‘Zimbabwe’s Agenda for Sustainable Socio-Economic Transformation’.

**Skills building**

Finally, training and skills building was a key aspect of several CultiAF initiatives. The Effectiveness of the Metro Agri-Food Living Lab for Gender Inclusive Youth Entrepreneurship
Development in Kenya (Youth Agripreneurs) project (Phase 1-2) highlighted the importance of training and mentoring youth agripreneurs in digital and financing solutions. Such training is critical in ensuring the long-term success of small businesses, many of which are started by young individuals with few practical skills. The project also found that the training helped to de-risk young people, with banks and credit agencies gaining confidence in the abilities of agripreneurs to pay back loans compared to those who had not received any training. A total of 492 youths were trained on nine topics, including online marketing, value addition, and financial record keeping – leading to their monthly sales increasing by over CAD 100/ AUD 110. Local governments were also engaged to develop agribusiness strategies that could support these new and existing businesses once the project ended.

In Malawi, Zambia, and Zimbabwe, the Expanding Business Opportunities for African Youth in Agri-Value Chains (Youth Entrepreneurship Hub) project (Phase 1) worked with 68 entrepreneurial youths (particularly women) to build their business and market development skills. Training materials were specifically developed to aid their growth, while project researchers also supported the entrepreneurs in identifying employment opportunities and target markets. During the Communicating Science for Impact: Radio for Reaching Farmers with Research Results (Farm Radio) project (Phase 1), awareness-raising and education activities took place on a much larger scale. Using six radio stations as a dissemination platform, the team used interactive programs to encourage adoption of agricultural innovations – including messages highlighting research and findings related to the INSFEED and Precooked Beans projects. Nine million listeners were reached over two years: with those tuning in subsequently more likely to feed insects to their poultry or fish stock, or increase their level of bean production.
2. Inclusive value chains
What did CultiAF do?

Food system value chains consist of multiple actors involved in production, processing, marketing, distribution, and consumption. Men, women, and youth participate in value chains in various ways, and some are more disadvantaged than others – through unequal access to land, inputs, capital, markets, nutritious food, or incomes. Inevitably, this inequity leads to more ineffective and inefficient food systems.

The implementation of inclusive approaches within food systems can unlock a myriad of benefits for smallholder farmers and other actors, enabling them to enhance their nutritional diversity, boost their yields and incomes, and improve their livelihoods. In turn, this allows them to access social benefits including education, healthcare, and better housing. A fundamental aim of the CultiAF program was to bring inclusion and equality to the forefront of agricultural research to achieve a food-secure future for Africa’s population. Investing in rural women increases productivity, reduces hunger and malnutrition, and improves rural livelihoods significantly. This is why women’s empowerment and gender-equality was a key focus of the program’s development, and within each of the CultiAF projects implemented across Eastern and Southern Africa.

With the youngest continental population in the world, Africa must maximize the potential of its youth by engaging them in meaningful enterprises. Agriculture provides a good pathway for young people, who tend to be more innovative and better adopters of modern technologies than their older counterparts. However, the conception among youth is that agriculture is old fashioned and unprofitable, thus they often shy away from the sector. Several CultiAF projects focused on engaging youth in agribusinesses that would lead to decent employment, offering reliable incomes and improved livelihoods.

A critical element of CultiAF’s gender-transformative approach was the use of ‘champions’ in several projects. To ensure greater participation of women in the various value chains, recruiting and training ‘gender champions’ proved critical in sensitizing community members and addressing underlying power inequalities and social norms. A vital aspect of a few projects involved affording women greater control over their income and savings. Another key approach involved providing access to post-harvest technologies to reduce drudgery, improve product quality, and add value for women working in value chains.

Gender

To measure women’s empowerment and inclusion, all CultiAF projects carried out pro-WEAI (project-level Women Empowerment in Agriculture Index) surveys. Initial baseline surveys were conducted early in project implementation, following which the projects made changes to their gender strategies to respond to the factors of disempowerment that arose. For example, within the IPM Fruit Flies project, it became clear that women would have more control over their mango incomes if they were organized into groups. As such, the project set up participatory farmer groups in each of the target countries, which enabled women farmers to pool their financial resources to expand their mango production and invest in other income-
A gender-transformative approach promotes women’s empowerment, including shared control of resources and decision-making. It unpacks social inequalities, provides space for women, men, and non-binary genders to learn, and engages with people across the socio-economic spectrum to change the norms that enable inequalities. This approach is important because it tackles inequalities in ways that reflect the lived experiences of real people, and it promotes sustainable solutions that address root causes.

Source: https://bit.ly/44xrirL

Achievements

The Malawi Fisheries project team made the first ever adaption of pro-WEAI to measure the empowerment of women in the fisheries sector: the Women Empowerment in Fisheries Index. With this tool, the project tested the effectiveness of gender transformative approaches in changing norms and perceptions around women’s roles in the fish value chain. For example, Malawi Fisheries selected and trained 36 champions (25 men and 11 women) to sensitize community members on gender issues within the fish value chain. These ‘gender champions’ trained a further 319 individuals (123 men, 196 women) by project end. The gender champions were mainly local leaders and service providers, including chairpersons of beach village committees and village savings and loans associations, as well as chiefs and landing site fisheries extension officers. Overall, women’s participation in fishing increased from 5% to 75%, while their involvement in decision-making on fish processing and use of income from fish increased by 30% and 49% respectively.

‘Project champions’ trained by the NutriFish team created awareness about the importance of proper drying, fishing, handling, and hygiene throughout the fish value chain. The project started with 68 champions from different fishing communities (including 26 women and youth), and these champions trained another 70 champions.

To further support women and youth groups in the fish trade, NutriFish helped them set up generating activities, such as pig farming. Final surveys were conducted close to project completion to provide comparative data where empowerment (or disempowerment) had occurred.

EMPOWERING WOMEN FISHERS

As a result of NutriFish support, Busijjo Sophia, a fish seller who trained to become a project champion, now owns her own boat. “After the NutriFish training, we formed a group savings account. I was able to access a loan of USh 1 million [CAD 360/AUD 410] from the group to buy my boat – which employs three men and earned me enough money to repay the loan.” Her example motivated seven other women in her group to also purchase their own boats.

Kimono Magdalene from Kikondo landing site on Lake Victoria used group savings to successfully invest in dairy goat production. “Some of these goats give birth to two or three kids at once. The minimum I can sell one for is USh 150,000 [CAD 55/AUD 62], but bigger ones go for Ush 400,000 [CAD 145/AUD 165]. I have also educated my children, and bought commercial plots and farming land,” she reveals.

Source: https://bit.ly/44xrilL
“Women have gained respect and families are now working together, which has reduced gender-based violence.”

Amanna Bashir, NutriFish project beneficiary

To provide clean and efficient storage and fish drying facilities, solar tent dryers (greenhouse-like structures) were introduced by Malawi Fisheries and NutriFish. The increased quality fish produced using the NutriFish solar dryers doubled women’s incomes to CAD 2.6/AUD 3/kg and tripled the shelf-life of dried small fish to almost five months. Smaller solar baskets were also introduced by the IPM Fruit Flies project to women mango farmers in Zambia and Zimbabwe. These dryers significantly boosted incomes by adding value to the product and reducing surplus fruit from going to waste. For example, in Zambia, a basket of fresh mango costs CAD 7/AUD 8, while a basket of dried mango costs CAD 56/AUD 63. Women are also using their new skills to dry vegetables.

In Ethiopia, manual threshing and de-hulling (pounding) of sorghum grain is very time consuming and laborious, and mostly carried out by women and children. Threshing 0.5 ha of sorghum, for example, takes an average
household a full day to complete. However, with the introduction of threshing machines by the **Ethiopia Sorghum** project, processing was reduced to just four hours. A de-hulling machine was also manufactured by the Ethiopian Institute of Agricultural Research (EIAR) – a project partner – with the capacity to de-hull 2 t/hr. With the reduction in drudgery, women had more time to spend on other income-earning opportunities.

With improved sorghum quality resulting from dehulling, women can now use the grain to achieve higher incomes by making **injera** – a traditional flatbread typically made with teff, a more expensive grain. However, the project demonstrated that injera quality could be maintained whilst reducing the cost, by substituting 50% sorghum instead of teff.

The **Precooked Beans** project launched a digital payment system to enable farmers to directly receive earnings from bean sales. Access to income was identified as a disempowering factor for women in Phase 1. In Phase 2, the project had to find the means to channel payment for the supply of beans directly into the hands of women by registering their businesses in their own names and using their own accounts. By the end of the project, almost 18,500 farmers (7,572 men and 10,984 women) had registered with the digital payment app. Data captured by the app also provided opportunities for farmers to borrow credit from their cooperative.

**Challenges**

Awareness-raising to change perceptions regarding men and women’s roles was a key intervention in the NutriFish project. Theatrical performances were held in local villages to portray united and successful families, with the savings group members taking up acting roles. As a result, men better supported their wives by, for instance, paying the children’s school fees and participating in the women’s **Mukene** (small silver fish) processing businesses.

"Significant change has been seen in the communities; domestic violence dropped by 30% and women’s savings increased by up to 100% in some groups. We are also seeing more men and women making decisions together,"
In the first phase of the **Youth Agripreneurs** project, the team recognized that women – particularly those with young children – were finding it more of a challenge than men to attend city-based training. The project adjusted its activities to decentralize training events and involve village-based mentors who could provide training locally – or at the students’ homes – and childcare facilities were also made available at training venues. This approach provided the opportunity for more women to participate in trainings and saw an increase in the number of young women completing the course.

However, in contrast, an unintended consequence of the Precooked Beans project was a rise in gender-based violence – a result of women’s increased control of their income. Further, as women expanded their bean production area to supply the project, this led to increased drudgery on their part.

While the Ethiopia Sorghum project’s threshing machinery significantly reduced women’s drudgery, the machines had to be imported –
making their use unsustainable.
And, while de-hulling machines are made locally by EIAR, these also proved expensive, and use was constrained in rural areas by limited access to electricity. Furthermore, women were found to have limited de-hulling knowledge to improve sorghum quality for injera making, and the project acknowledged that more analysis on women’s understanding should have been done at the outset to set more realistic and achievable targets in terms of project technology uptake.

Although greater women’s empowerment was observed among savings groups that were established by the IPM Fruit Flies project, particularly in Zimbabwe, the team acknowledged that more could have been done to support these groups, by linking them to high value markets and supporting them to achieve product certification.

The implementation of pro-WEAI was acknowledged by all CultiAF projects to be more time-consuming and expensive than expected. Effective implementation also required expertise outside the skillset of most teams, so time was lost in recruiting specialist staff. In the IPM Fruit Flies project, pro-WEAI could only be conducted fully in one of the four target countries (Zambia), as it was too costly – although in Mozambique and Zimbabwe some qualitative data was collected using selected pro-WEAI modules.

Youth

One inclusive approach of the CultiAF projects – that had clear success – was the provision of training and ongoing mentoring and technical backstopping to individual youths and youth groups. This strategy enabled beneficiaries to establish their own enterprises and equipped them with the marketing skills to ensure their businesses became successful and sustainable.

Achievements

Four youth groups – with 60 members each – from the Kenyan counties of Bungoma, Kiambu, Nyandarua, and Siaya, were engaged by the INSFEED project in an intensive training course on all aspects of BSF farming. Additional training on business marketing was also provided. As well as producing and selling insect larvae, the youths began leading demonstration farms in each county and accessed an additional income source by providing training to women groups and other youths in the community.
“Nurturing young people’s creativity and determination is of paramount importance for the future of Africa. Empowering young people to create innovative, eco-friendly businesses will not only create employment opportunities, but will also contribute to creating responsible leaders.”

Nicholas Ndekei, CEO at Zihanga Ltd, INSFEED project beneficiary

As a result of INSFEED support, over 1,000 new private companies and young entrepreneurs make money from BSF farming. Many of the BSF enterprises are not standalone but linked to local feed millers, such as Treasure Feeds Ltd, so they have a ready market for their produce. The youth-led businesses have also started diversifying into insect-composted organic (frass) fertilizer, which is used by farmers to improve soil health and crop yields.

Additionally in Kenya, the Youth Agripreneurs project rolled out its course of agribusiness training and mentorship, coupled with links to financing, by recruiting 492 entrepreneurs – up from 60 in its first phase. The trainings increased awareness among youths on various technical
business aspects, such as the production of legal documents, while the mentorship enhanced good practices, such as record keeping and accounting, and created awareness on resource mobilization. When compared to a ‘control’ group of youth entrepreneurs not involved in the course, the trained participants achieved higher valuations for their businesses, and more of the participating youths legitimized their businesses through registration and obtaining relevant licenses.

**Challenges**

A combined approach of training and mentorship proved particularly vital for entrepreneur resilience during Covid-19. Research from the Youth Agripreneurs project found that this approach facilitated business diversification; more time for the entrepreneurs to network or seek business advice and additional funds; and use of social media to increase sales – all key factors in enabling the businesses to stay afloat. During the pandemic, digital applications such as WhatsApp were used by the project to continue delivering peer-to-peer learning and business mentorship. Affordable internet bundles for participants were also secured by partnering with internet service providers, which allowed young entrepreneurs to venture into online product marketing.

The Youth Agripreneurs project also found that mentorship, which can support youths at an individual level, was more important for generating business success than training, which deals with generalities in groups. “The youth are not homogenous. They have different dynamics, unique needs, dreams, and aspirations,” emphasizes Salome Asena from the Youth Agripreneurs project. She goes on to explain that mentors provide critical role models for young people and are well-placed to provide hands-on, practical training – including in financial matters. “We have to prepare young people to access funding and to use it in the right manner,” she adds. Linking youth with financial institutions was a key element of the project to ‘de-risk’ the entrepreneurs (they were able to demonstrate to financial institutions relevant business skills and training), but they needed mentoring in how to borrow money and what was involved.

**Conclusions**

Whilst there is no doubt that real progress has been made in recent years, food systems are still a long way off being inclusive and equitable. Necessary sex-disaggregated data is still lacking to help policymakers make informed decisions and there are limited financing services to support inclusion. Age-old issues persist with regards to access to resources (including land) and, in most value chains, labour remains a very intensive and time-consuming activity.
Projects must be intentional in their efforts to address gaps faced by distinct groups, and use multi-dimensional approaches – finances, assets, and skills – to engage markets. But it is important to recognize that women, youth, and men are not homogeneous – and, in designing innovations, there needs to be an understanding of who they are, where they are, and what skills they need to unlock their potential.

Inclusion is more than a focus on gender or youth – it is about diversity and responding to people’s needs and abilities. The Youth Agripreneurs project took this into account by establishing a center that provided support to differently-abled students. In addition, they noted the importance of considering the circumstances and needs of vulnerable minority groups, including migrants and refugees, who must also have access to income-earning opportunities.

Women cannot be empowered without men also being involved in any intervention or initiative aimed at enhancing women’s wellbeing. Men need to understand their role in supporting women and it is critical that initiatives take this into account so as not to unintentionally contribute to disempowerment and worsened gender outcomes.

Focusing on gender is not an ‘add-on’. A project must be intentional about gender-transformative approaches and really consider it an integral part of the initiative. Tools used for gender analysis – such as pro-WEAI – must be considered during proposal development because of the cost and skills required in implementing them. You can train technical experts and sensitize them to gender aspects, but to have a truly transformational approach on gender outcomes, sufficient budget is required, as well as personnel with the necessary skills and expertise.
3

Improving productivity and resilience
What did CultiAF do?

For too long, productivity has only been considered as production at farm level. However, climate variability, gender biases, and cultural norms, along with a lack of processing and storage facilities, poor infrastructure, and distribution challenges, impact productivity throughout the entire food value chain. CultiAF implemented several innovative approaches and tools to enable better processing, storage, and distribution, while addressing the challenges of climate to deliver food security and better livelihoods for food system actors.

In addition, the CultiAF program ensured greater availability of more nutritious foods. Nutritional deficiencies are widespread across the continent, particularly among women of reproductive age and children under five years. Several CultiAF projects targeted enhanced nutritional security as a key project outcome or pivoted their research during the project timeline to help address local nutritional needs.

In Mozambique, ‘producing more with less’ was the key aim of the Mozambique Irrigation project, as droughts and erratic rainfall contribute to crop losses and food scarcity in a region increasingly vulnerable to climate change. Water-efficient innovations were tested to enhance resilience and increase the productivity, profitability, and sustainability of both government-funded and smallholder farmer-led irrigation schemes in Gaza and Manica provinces.

More prolonged droughts are common in Ethiopia, where the Ethiopia Sorghum project provided game-changing technologies, including improved varieties, processing machinery, and innovative storage solutions, for farmers growing sorghum – a drought-resilient crop.

Crop insurance provides a cushion to farmers at risk from climate-related shocks. However, successful schemes for smallholders are limited due to high implementation costs, low demand, and a lack of other risk management options, such as drought-tolerant cultivars. The innovative Picture Based Insurance project in Kenya worked to address these challenges and build trust in insurance among farmers by working with champion farmers to take photos of farmers’ crops at different growing stages, which were used by insurance companies to determine if conditions warranted a payout.

In Southern Africa, insect infestations hamper mango productivity and curtail export opportunities, with 80% of crop lost to fruit flies.
With global warming, such pest infestations are likely to increase. However, a bundle of IPM techniques promoted by the **IPM Fruit** project resulted in a reduction in fruit fly damage, which led to increased farmers’ yields and incomes in four countries.

In Uganda, limited access to animal protein and micronutrient-rich foods has contributed to national nutritional deficiencies. The country consumes half the recommended amount of fish, even though small pelagic fish, which are highly nutritious, are abundant in local lakes. To increase fish consumption and boost nutrition security, Nutreal – a local processing company and partner of the **NutriFish** project – developed five high-value Mukene (small silver fish)-based nutritious products: baby food, sauce, maize meal, snacks, and seasoning.

In Kenya and Uganda, beans are an important source of protein, especially for low- and middle-income households, but consumption is limited by the high energy and water requirements for cooking beans, which takes 2-3 hours. To increase bean consumption and enhance the nutritional quality of bean varieties, the **Precooked Beans** project developed a range of innovative bean products.

**Achievements**

Through adopting water-monitoring tools promoted by the Mozambique Irrigation project, farmers cut water used for irrigation by half, reduced irrigation pumping costs by 40%, and increased crop yields by 10% in two consecutive seasons (2020 and 2021). Benefiting at least 40% women-owned/managed farms, a key innovation was the hand-held Chameleon soil water sensor, which displays a colour code according to the level of moisture in the soil. The inclusive sensors are easily interpreted, including by those who cannot read (blue: soil is wet; green: sufficient moisture; and red: soil is dry and time to irrigate).

With increased food productivity, farmers are afforded a surplus which can be sold. Money from this may be used to buy other goods or

**PRODUCING MORE WITH LESS**

Esmeraldo Julio Ngovene, head of production at the Makateco Irrigation Scheme, says that before being introduced to the water-saving technologies, farmers irrigated on a hunch. Previously, over a three-month cropping season, farmers used 90 liters of diesel to pump water to grow beans on 2 ha of land.

Since adopting the devices, Ngovene explains that they pump water based on the water monitoring tool readings, and now use only 50 liters of fuel on the same area. This has cut irrigation costs by half – from CAD 194/AUD 220 to CAD 100/AUD 112 for the entire crop cycle.

“Insurance is not an investment, it is a shock absorber. Climate change is real and needs to be taken seriously.”

Wycliffe Mwake, Picture Based Insurance project beneficiary
Invest in other economic activities, such as growing fruit trees, cultivating rain-fed crops, and fishing, to provide greater resilience and enable them to withstand or recover from future climate-related shocks. With enhanced crop yields, farmers were also encouraged to take a more market-oriented approach to their production – including diversification to attract higher prices. As a result, beans were grown during the dry season when most farmers grow vegetable crops, whilst others grew additional vegetable crops, such as tomatoes, to increase incomes. Maria Alexandre Sitoe, president of the Rivoningo Irrigation Scheme in Gaza Province, says that diversifying into tomatoes provided her additional earnings of CAD 447/AUD 505, which she invested in building her house and educating her children.

The Mozambique Irrigation project also found that taking farmers on exchange visits allowed them to learn from one another. As a result, they were more inclined to adopt mixed cropping – including growing fruit trees around the perimeters of their fields, which is a risk mitigation strategy providing enhanced resilience.

In Ethiopia, demonstrations for early maturing, drought tolerant sorghum varieties were also used to train farmers on crop, water and soil management techniques to obtain optimum yields. After adopting these varieties along with improved management practices, yields significantly increased from 2.7 tonnes/ha up to a peak of 4.8 tonnes/ha. In conjunction with the EIAR, the project also provided threshing technologies to over 8,850 farmers, which reduced post-harvest losses by around 30%.

The introduction of three-layered PICS bags, which prevent oxygen from degrading the sorghum grain, also made a significant difference to Ethiopian farmers by enabling them to store grain for up to six months without compromising quality. Farmers were able to sell their crops at higher prices later on, rather than selling immediately after harvest when there is a surfeit of grain and prices are low.

PICS bags were also successfully implemented to reduce post-harvest losses as part of the Phase 1 Aflatoxins project. In Zimbabwe, for instance, PICS bags effectively slowed the accumulation of aflatoxin B1 – the toxin produced as a result of fungal contamination
– in maize grain. Evaluation of the post-harvest grain demonstrated significantly lower levels of damage and losses reported by farmers, which resulted in higher incomes.

In Kenya, the Picture Based Insurance project provided crop insurance to 8,500 farmers (65% women) and 3,672 received a payout. For an acre of land, insurance cover worth CAD 1.84/AUD 2.08 provided a payout of up to CAD 18.47/AUD 20.85 in the event of weather-related crop loss, which helped farmers recover the initial investment paid to buy seed. The project also evidenced that farmers are willing to pay a higher insurance premium if it is bundled with advisory services and access to high quality certified seeds, and if payouts are made directly into mobile money accounts.

In Malawi, Mozambique, Zambia, and Zimbabwe, over 9,300 men and 8,272 (48%) women were trained in IPM technologies by the IPM Fruit Flies project, and provided with starter packs containing traps, lures, bait, and biopesticide to kill the fruit flies. As a result, 70% of mangoes grown were saved, when previously 80% were lost to fruit flies in the region. This has boosted incomes and household nutrition and enabled families to send their children to school. The reduction in fruit flies also improved the production of other fruit (papaya and passion fruit) and vegetable crops (squash, pumpkin, and butternut) impacted by fruit flies.

One of the five nutritious products developed by the NutriFish project was a fish sauce, which is quick to cook – thereby saving low-income families’ time and energy resources. The project’s baby food was also affordable and convenient for mothers, packaged in 50 g sachets for hygiene and affordability. By the end of the project, the products were sold in five supermarkets in Kampala, and the baby food was available to mothers attending antenatal classes and routine child immunizations in five health facilities. Thanks to the project’s efforts, there
was a 30% increase in consumption of *Mukene*, which contains micronutrients like iron, zinc and calcium.

In Phase 1, the Precooked Beans project developed a fast-cooking, iron- and zinc-fortified bean product. The pre-cooked bean product reduced the required cooking time for beans to just 10 minutes, which led to high popularity and uptake among consumers. In Phase 2, the project created more innovative bean-based products, including a quick cooking bean, a ready-to-eat bean snack bar, quick cooking bean flour, bean noodles, and bean ‘chunks’ (an ingredient in making bread). These products were promoted to other businesses, such as supermarkets, hotels, restaurants, roadside kiosks, and food vendors, to make them more available to consumers.

Musa Odwoka, NutriFish project beneficiary

**Challenges**

In several projects (e.g. Mozambique Irrigation and IPM Fruit Flies), a key aspect involved taking a value chain approach and connecting farmers to markets. However, this approach took time and proved more challenging than was perhaps expected. Improving and maintaining the quality of produce, and finding accessible markets for farmers, were two of the biggest challenges that needed to be overcome. Assumptions made by the projects also created some challenges and unexpected outcomes. For example, the Ethiopia Sorghum team planned to promote the improved high-yielding and drought-tolerant variety Argity. However, the team found that the variety did not suit degraded soils. For Argity to perform well, farmers needed to implement soil moisture conservation practices and cultivate in areas where the soil had good water-holding capacity. Farmers also wanted higher biomass than Argity provided. Another improved variety, Melkam, was preferred by farmers and taken up by local seed companies.

Another challenge encountered by many of the projects was ensuring sustainable supply of materials used in project technologies. In the Mozambique Irrigation project, for example, the Chameleon sensor had to be imported from South Africa. Meanwhile, the IPM Fruit Flies project found that, although the materials used in IPM technologies were available, they were only imported for large-scale farmers and were unaffordable for smallholders.

A key innovation of the Picture Based Insurance project was its use of photos taken by farmers to show crop damage caused by extreme weather conditions. Over 60,000 photos were submitted by farmers, and these were manually analyzed by agronomists to assess damage. This manual process led to a delay in payouts, with farmers receiving their money an average of five months after the end of the season. To counter this, the project developed three machine learning models to try to automate the classification of growth states, types of damage, and extent of damage, based on maize images. More work...
NutriFish found the certification process for their fish-enriched products to be long and protracted, but it was a necessary step to introduce their products to the market. While all the products were ultimately granted Uganda’s quality mark (Q-mark), the project also worked to increase awareness of the products through radio campaigns, a cookbook, and cooking demonstrations. More than 12 million listeners were reached by the radio campaign to promote the value addition and consumption of Mukene — a significant step in tackling long-standing social beliefs that Mukene is a food only eaten by poor families or animals.

Conclusions

The projects found that they needed to work with the private sector and financial service providers to ensure that beneficiaries could access and afford the promoted technologies and innovations. For instance, service-based provision – where private companies rent machinery to individual farmers – is one way to reach farmers who cannot afford to purchase technologies. This approach of engaging the private sector therefore needs to be considered within project proposals and implemented from the start of the project – not just adopted in the final stages.

The availability of materials required for project technologies may also be increased locally through enhanced demand for innovations. The IPM Fruit Flies project asserted that area-wide implementation of IPM was required to create sufficient demand for local agri-dealers to consider supplying the necessary equipment at regional and national markets. However, country-wide project implementation is challenging and usually only selected areas within a country are targeted.

To achieve scalability and sustainability of insurance products, loss assessments need to become automated. Whilst there is an obvious cost associated with the development of such technology, it is important to reduce the time needed to assess high numbers of farmers – thus settling claims quickly, improving trust in insurance, and driving uptake.
To demonstrate the impact of weather insurance schemes and further increase uptake, insurance projects need more time to account for the farmers taking up the product, experiencing weather-related crop damage, and finally, receiving a pay-out for their claim. This process can take several years and must be considered in the drafting of project proposals.

With increasingly erratic weather events on the rise, the development of climate-resilient technologies, such as drought-tolerant seed varieties, is critical to ensuring farmer’s livelihoods. However, these technologies must be locally tested for their suitability. The Ethiopia Sorghum project found the variety they had intended to promote did not suit the local soil type, and further breeding and improvement was required for it to thrive. Other lessons around climate-resilient technologies can be taken from the Malawi Fisheries project – which implemented solar dyers for the local communities to enhance their fish processing livelihoods but were washed away during the recent cyclones and floods. In the future, technologies should be designed with this context in mind, and environmental risks must be thoroughly assessed so that mitigation measures can be integrated from the outset.
4 Partnering with the private sector
What did CultiAF do?

In the second phase of CultiAF, four first phase projects were supported as ‘scaling projects’ to increase the coverage and impacts of their initial achievements. In three of these scaling projects, private sector partners played a key role in achieving scaling ambitions and ensuring sustainability.

A public-private partnerships approach engaged over 20 partners during the second phase of the **Precooked Beans** project in Kenya and Uganda. Partners included national research organizations in Kenya and Uganda, a CGIAR center, two private sector companies, farmer organizations, seed companies, aggregators, and finance and digital service institutions, among others. The private sector was particularly critical in using the research evidence to expand from one to five processed bean products, scale from one to six established processors during the second phase, and reach more consumers.

The **Malawi Fisheries** project established an innovative partnership with FDH Bank Limited, a private commercial bank, to develop a new, innovative, and appropriate financial product for fish processors, which did not require significant collateral. This was a vital component identified during CultiAF-1, which allowed a greater number of fish processors to invest in improved fish processing technologies, and benefit from access to new markets that were protected by standards developed during the project (see chapters on finance and policy for more information). In addition, a partnership was formed with the People’s Trading Centre (PTC), a supermarket retailer with over 80 shops across Malawi and linkages to other market chains in Southern Africa, to provide a market outlet for the processed fish.

In Kenya, the private sector was the driving force in scaling the **INSFEED** project, and private actors – particularly young enterprising entrepreneurs – benefitted from various aspects of the initiative. For example, the youth-led social enterprise SAFI Organics Ltd used the knowledge generated by INSFEED researchers to produce and sell government-certified insect-composted organic (frass) fertilizer to farmers; whilst individual insect farmers and feed millers were key to insect production and feed processing.

During the second phase of CultiAF, a private sector company – Agriculture and Climate Risk Enterprise (ACRE Africa) – was the lead partner in the **Picture Based Insurance** initiative in Kenya. ACRE Africa was responding to an identified need and believed the business case existed – even if the evidence to prove it was unavailable. Using satellite and smartphone imagery, the Picture Based Insurance scheme addressed the discrepancies between insurance pay-outs and actual farmer losses, and ultimately, poor trust in insurers among farmers. To deliver the project, ACRE Africa worked with a diverse range of insurance value chain stakeholders, including farmer groups, seed producers, input suppliers, insurance companies, and microfinance institutions.

**Achievements**

During its first phase, the Precooked Beans project collaborated with one processor to develop two products: precooked beans and a bean snack. To scale-up their product range and further penetrate the market in the

---

4. Partnering with the private sector
second phase, the project collaborated with six processors, which led to the expansion of grain production into 15 new districts across the two countries. Lasting Solutions and Smart Logistics, the original private sector collaborators during the first phase, were particularly instrumental in adding value to the beans, as they purchased the grain, tested the products with consumers, and went on to supply supermarkets, kiosks, restaurants, and other informal food outlets.

Recognizing the potential of rearing insects, such as BSF, as a protein source, private actors advised the INSFEED project on product diversification and played a key role in refining and optimizing these products. For example, over 53 insect-based livestock and fish feed formulations and 10 prototypes of insect-composted organic fertilizer products (i.e., granulated, powder, and liquid-based organic fertilizers) were developed.

As the lead partner in the Picture Based Insurance project, ACRE Africa brought in key expertise around insurance operations, and had contacts with insurers which supported and underwrote this innovation. Other partners included the Kenya Agricultural and Livestock Research Organization, which afforded the innovation credibility, and led to quick market acceptance and facilitation of partnerships with relevant government bodies. Expertise from two international research partners – International Food Policy Research Institute and Wageningen University & Research – enabled the viability of the innovation to be tested. Over 8,500 farmers (65% women) were involved in the CultiAF-funded initiative and, over four seasons, 3,672 were eligible for a payout.

**Challenges**

The public-private partners of the Precooked Beans project worked well together as a consortium. Each institution and private entity had a sense of ‘buy in’ and came together to effectively discuss issues, overcome problems, and minimize risks. This dynamic partnership, coupled with a strong belief in the products, enabled the consortium to move ahead quickly and achieve project objectives. In addition, through its research in phase one, the Precooked Beans project demonstrated consumer willingness to pay for the bean products. This proved a crucial step, enabling the project to present a strong business case to engage private actors and indicate the potential returns.

Nevertheless, the Precooked Beans team acknowledged it is critical to challenge assumptions made in a project proposal. For instance, the team assumed they would be able to access a consistent and reliable bean supply in Kenya once a market for the products had been established – but, in reality, supply was limited. Additional efforts had to be made to raise production levels, but the team had not planned to invest in developing the supply chain and sourcing different bean varieties to meet demand. On the other hand, in Uganda, the farmers provided a greater supply than expected – but Covid-19-related border closures made it difficult to transport and access this.

**COUNTING THE COST – AND THE BENEFITS**

Elizabeth Musembi, a 43-year-old mother of three children from Machakos County, enrolled with the Picture Based Insurance project after engaging with a champion farmer. She signed up prior to the 2021 rainy season, paying a premium of CAD 2.63/AUD 2.97. Farmers were hit by drought during this season, losing most of their crops. Fortunately for Elizabeth, she was able to claim CAD 19.75/AUD 22.32 in compensation through the scheme – enough to buy three bags of seed to plant for the next season, which she would not have been able to afford without the insurance.
The relationship with private sector actors was not as cohesive for the Malawi Fisheries project – particularly as the banks had different objectives and perspectives regarding development outcomes. A key issue at the start of the second phase was that the point of contact at the bank was very commercially oriented and had no background in agriculture or development. Meanwhile, senior bank personnel with relevant experience had little time to engage with the project, and these factors led to delays in the implementation of the financial component. Further into the project, a more suitable contact with an agribusiness background was assigned to the project by the commercial bank. The contact person had a better understanding of the fisheries sector, and this accelerated the rolling out of the project to a point where loans could be disbursed.

The Malawi Fisheries team also faced challenges working with PTC, as the supermarket retailer paid the small fish processors at least four weeks after delivery of their products. This approach did not suit small processors, who needed the money immediately to continue their business. To overcome this challenge, the project introduced an off-taker to act as an intermediary who could wait for some time for PTC to make payments.

This scenario demonstrated the importance of striking a balance with private sector involvement, as private company practices and procedures are often mismatched with the needs of small businesses to sustain their activities.

The INSFEED project resulted in the establishment of many insect-producing small- and medium-sized enterprises (SMEs), which initially engaged positively with the team. However, once the SMEs started making good incomes, many implemented a ‘closed door policy’ to protect their product from other farmers. As the INSFEED technologies were produced as a public good, the project team had hoped SMEs would share successes with other farmers to help scale-up insect farming and the production of related products. To overcome these challenges in Phase 2, the project supported the decentralization and establishment of more commercial pilot production facilities with open-minded farmers, which reduced the necessity of exchange visits.
“Involving the private sector is self-sustaining.”

Levison Chiwaula, principal investigator, Malawi Fisheries project

Enabling Resilient, Equitable and Sustainable Food Systems

The project also provided newly-established SMEs with guidance and technical backstopping to optimize their businesses, and to help break down the resistance of knowledge sharing. However, overall, extensive engagement with the private sector and continuous education on the need to work together, as well as the establishment of knowledge-sharing networks, led to new opportunities and highlighted that the enthusiasm of private sector partners serves as a key driver of scaling insect-based farming technologies.
“It is unusual for private sector players to lead a research project, and even more unusual for donors to provide grants to cover private sector input. The CultiAF program gave us a chance.”

Jean Eyase, communications and project associate, ACRE Africa

Unlike the other projects, the Picture Based Insurance initiative was led by a private company – ACRE Africa. It worked well alongside the key research partner, the International Food Policy Research Institute, and this strong relationship is credited to the efforts of the two team leaders. CultiAF was also recognized for providing the funds to cover ACRE Africa’s involvement, as many donors will not provide grants to pay for private sector input – as was found when sourcing funds for this initiative.

A challenge also arose in relation to the Picture Based Insurance project timescale. Insurance projects need sufficient time to generate product uptake and demonstrate impact. And, once data has been gathered, further time is required to engage with policymakers. This process was only starting to occur by project completion, as it was difficult to establish before the relevant data had been sourced, and the Covid-19 pandemic also caused delays.

Conclusions

Commercial perspectives of private sector partners can be an issue. The Malawi Fisheries team believed that the local bank understood the project objectives from the start, but this was not the case. If there had been a greater choice of partners, it would have been beneficial to work with more than one bank/financial institution (and more than one retailer for the fish products) to create competition. In addition, if the mechanism or agreement failed, there would have been another option to minimize risk.

However, the ACRE Africa team stressed, “If you think more commercially, the sustainability aspects will be there.” They emphasized the necessity of viewing the project as a mechanism to design an insurance product with a commercial lens from the start, rather than viewing it as development project collecting data for research.

Scaling requires significant investment and takes time. An assumption of the Precooked Beans project was that, with the right partners, product scaling would be straightforward. However, the innovations required significant investment, and scaling was more expensive than anticipated. Some partners did not have the necessary financial resources to put into the products, meaning product development took more time. Ultimately, the SMEs required more support than could be provided – including after the end of the project. The Precooked Beans team found that three years was insufficient to launch the bean products and achieve significant scale.
Early identification of private sector partners is key. It is crucial to involve all partners from concept of idea, providing them each with a role and facilitating them to encourage ownership and responsibility in the project and its outcomes. For example, in terms of sustainability, the private sector actors who collaborated with the INSFEED project will continue with insect farming and processing of related products (larvae meal, frass fertilizer, etc.); they will continue to scale production and marketing without project input.

Private sector actors understand the reality and context on the ground. ACRE Africa emphasized the importance of researchers realizing that the situation is often quite different and not what they expected, hypothesized, or assumed. Private actors are also self-driven and keen to ensure success. On reflection, the Malawi Fisheries team could see the value of working with private sector extension-led services to link the bank with fish processors.

Utilizing the private sector to develop secondary markets is key. A critical challenge for the Malawi Fisheries project (also experienced in other CultiAF projects where solar dryers and other equipment was introduced), was the challenge of sourcing materials. Activities cannot be sustained if materials are only provided by the project, so a critical consideration is how to get the private sector to support a market systems approach and provide locally-sourced materials and employment opportunities.
Partnering with the private sector
5 Innovative financing for inclusive value chains
What did CultiAF do?

Innovative finance approaches – often bundled with other accompanying services and innovations – were a key aspect of several research projects during the second phase of CultiAF. Digital platforms and flexible loans were used by projects to enable the adoption of improved technologies and practices in the fish and bean value chains, as well as to support youth agri-entrepreneurship.

For instance, the Malawi Fisheries project partnered with FDH Bank Limited in Malawi to provide fish processors with flexible loans that did not require significant collateral and that considered external factors, such as seasonality in fish catch. The project also gave female fish processors a preferential reduced interest rate (2% lower) as part of its gender-empowerment strategy. Enabling access to finance was a key component that allowed the project to help men and women improve their livelihoods, as well as enhance the quality and profitability of fish and fish products.

The Precooked Beans project developed a digital platform in Kenya and Uganda through which farmers were paid for their produce directly. This ensured that all money earned by female farmers was received directly by them, without the transaction being detoured through their husbands and other male relatives. This system empowered women as autonomous business owners, enabling them to register business transactions in their names using their personal phone numbers with rights to independently access their profits. This was achieved by collaborating with Mastercard which provided the digital platforms for the project.

In Kenya, 53.4% of young people in the Youth Agripreneurs project struggled to access financial services due to lack of collateral – meaning most had to resort to using personal savings to provide the required start-up capital. The project found that women were even more likely than men to struggle with financial access due to their lack of collateral security (64.9%), business records (57.8%), and limited awareness on sources of funding (57.3%). To increase their chances of accessing finance, the model followed in this project aimed to empower the youth through knowledge transfer and by providing a pathway for de-risking youth in access to finance. Working with 60 youths, Phase 1 of the project found that training and business counselling significantly enhanced youth participation and investment in agribusiness. And, in the scale-up phase, 1,200 youth were engaged with County Governments in Kenya to participate in a rigorous evaluation that sought to understand the impact of entrepreneurial training, mentorship, and financing on youth entrepreneurship development.

Similar to the Youth Agripreneurs project, the Youth Entrepreneurship Hub project in Phase 1 tested innovative business models to increase youth participation in the fish industry in Malawi and Zambia and the maize post-harvest agribusiness sector in Zimbabwe. Like the Youth Agripreneurs project, this project also identified the lack of mentors as one constraint hindering young people from succeeding in
their businesses. As such, 27 mentors were trained to support entrepreneurs who received seed funding.

Achievements

The Malawi Fisheries project helped small groups of fisherfolk access a financing product that enabled them to build improved fish processing technologies. Of the 60 applicants (25 women and 35 men), 18 (10 women and eight men) successfully had loans approved. Of these, six fish processors (three men, three women) received loans totaling CAD 21,071/AUD 23,805. The loans were primarily disbursed through the purchase of materials from trusted suppliers and payments to approved contractors. Through this process, the funds were used to construct six solar dryers, five smoking kilns, and two warehouses to store processed fish products.

The project also built the capacity of the fisherfolk to manage their businesses. Following training, they became more confident in applying for other opportunities, which enabled some of the loan beneficiaries to develop service-oriented businesses and create employment opportunities.

Financing provided in the form of materials, under a loan agreement with FDH Bank, allowed one young woman to construct a solar tent dryer, a fish smoking kiln, and a fish processing shelter to enhance product quality and improve shelf-life. As a single mother, the young woman used the additional income to care for her child as well as pay for a diploma course at a local college.

The Precooked Beans project trained local farmers in good agronomic practices and improved financial management and linked them to seed suppliers of improved bean varieties. The project recruited and trained 52 Village Enterprise Agents – mostly youths (60%) – 15 of whom were provided with Android phones to use the Mastercard Farmer Network (MFN, now referred to as the Mastercard Farm Pass) app. The app comprises various functions, such as farmer registration, digital payments, produce collection, service support requests, transport management, extension services, and linkages to financial institutions for credit. By the end of the project, 18,466 farmers (7,572 men and 10,894 women) had registered with the app and traded CAD 135,665/AUD 153,209 worth of beans through the platform.

The MFN app helps farmers establish a real-time financial history through digital records, which is useful for evaluating their credit worthiness. For example, Equity Bank used this information to extend credit to farmers for input acquisition. MFN also ensures that payment is sent directly to the supplier of the produce and, for the Precooked Beans project, helped estimate...
Innovative financing for inclusive value chains

production and seed demands from historical data. The app improved farmer data integrity and created jobs as agents for 11 women and 16 men.

The Youth Agripreneurs training helped identify potential funders to provide financial products, such as recurring working capital loans, to the project beneficiaries. The agripreneurs were also linked with county governments and financing bodies such as the Agricultural Finance Corporation, Juhudi Kilimo, and the Kenya Women Microfinance Bank. The project team also engaged with UWEZO Fund – a Government of Kenya fund that supports businesses run by women, youth, and persons with disabilities – for future partnership. In addition, the Kenya Youth Agripreneurs in Nyandarua County were prioritized for funding under the Nyandarua County partnership with Equity Bank. As a result of this project and the

“Standalone financing is not enough to scale agribusinesses. We must find strategies that will work for everyone.”

Prof. Francis Wambalaba, principal investigator, Youth Agripreneurs project
combination of mentoring and access to finance, youth appreciated agribusiness more, increased their monthly incomes through diversification and value addition, and were able to create employment for other youth. For example, combining training and mentorship increased monthly sales of youth enterprises by CAD 100/AUD 110 on average, and enabled them to hire one extra employee. In addition, during the Covid-19 pandemic, trained entrepreneurs were more financially resilient and able to make shifts in product lines or remodel supply chains to mitigate against the shock.

In Phase 1, the Youth Entrepreneurship Hub project similarly revealed that combining business opportunity identification and entrepreneurship training alongside seed funding and mentoring, resulted in exponential

“If you have the knowledge, but no finance, you won’t make it.”

Roland Mwangi, Youth Agripreneurs project beneficiary
5. Innovative financing for inclusive value chains

Innovative financing for inclusive value chains growth for youth-led businesses. Results showed that about 80% of the supported business introduced their first or added new products; 70% reported establishing new partnerships; 50% increased clients; and 30% reported applying and/or accessing new sources of funding. About 60% of the funded businesses acquired new technologies and practices while another 30% expanded their existing businesses, including diversifying into new locations.

**Challenges**

The Malawi Fisheries project faced some challenges in negotiating a gender-responsive loan package with the private bank partner FDH. The bank was slow to respond during the initial stages of the project and delayed signing the project agreement. The project could have reached more people if the loan package had been rolled out earlier. The bank later assigned staff from its agribusiness section to work with the project and speed up the process. In addition, the number of loans disbursed was impacted by the requirement for beneficiaries to deposit an upfront commitment fee. The contributions varied depending on capacity; however, this requirement proved challenging for a number of individuals who had been successful in their initial applications. This is why fewer beneficiaries (six) received disbursements during the lifetime of the project than those who had successful applications (18 out of 60).

Expansion of the Malawi Fisheries financing initiative was also affected by the onset of Covid-19 and the subsequent lockdown restrictions. These disrupted project activities, including the gathering of fishers to increase awareness of the financing product.

The Covid-19 pandemic also caused the Youth Agripreneurs project to face challenges in engaging with banks. As banks changed their priorities or processes to contain the impacts of the pandemic, financing arrangements with the project were disrupted. The project team managed to use county government financing options instead, but this had less impact on the agribusinesses due to the smaller amounts they were able to loan. The team also acknowledged the importance of involving branch representatives of the financing institutions, and not just the head office, to ensure they are aware of the project and can coordinate effectively.

**Conclusions**

Financing was a key challenge faced by most of the CultiAF projects; not just the availability of credit or money to purchase and access technologies, but the combination of access to finance, business skills, and de-risking of farmers. It is not just about throwing money at the challenge: the key is to think about the business modules – including training and mentoring – that can make financing more accessible to users for greater impact.

---

**BEANS MEANS BUSINESS**

One female bean farmer in Isingiro District, Uganda, benefited from using the MFN platform as a member and an agent for a local farming cooperative – Manyakabi Area Cooperative Enterprise (MACE). She mobilized over 150 farmers (including 120 women) – to grow the NAROBEAN 1 variety which was sold to MACE in bulk using the app.

She said: “MFN has eased my work, and most of it is now done using my smartphone instead of filling out papers. Now, I can register farmers and report expected harvests using MFN without having to travel to the MACE office in the hills of Isingiro District.” She also used her income from bean farming and agency work to start a piggery production business.
Credit/capital is undeniably important and starter loans are helpful to support youth to build their credit rating and apply for other loans, so they are ‘de-risked’. The Youth Agripreneurs team stressed that youths should also be enabled to use available assets as collateral, such as bicycles, to apply for loans. However, it is critical to emphasize resource mobilization to make women and youth more open to taking advantage of available resources, including input and support requirements and resources throughout the value chain – rather than having them only focus on money. Youths should also be encouraged to come together to establish group savings accounts to enable them to apply for finance as a formal entity or a registered group and negotiate for essential resources, such as farming inputs.

The Youth Agripreneurs project also emphasized that smaller microfinance organizations have community connections, better understand challenges faced by small agripreneurs, and can provide technical support to young entrepreneurs. Targeting these local financial institutions/savings associations as partners, rather than national banks, may therefore be more effective in providing finance to small businesses, especially for women who may not have collateral to access bank loans.

- It takes time to establish financing mechanisms, so innovative financing approaches need to start early in the project along with other activities to work well and impact beneficiaries, as demonstrated in the Malawi Fisheries project. However, it is important to first identify market opportunities and then seek sources of finance.

- Beneficiaries (including women and youth) need to be trained on how to apply for loans and other financial services; they often lack knowledge and skills for how to access and apply for finance. Thus, it is important that technical assistance is made available to agripreneurs to help them achieve bankable businesses and be ready for financing or financial linkages.

- It is important to publicize a project’s work to attract other financial stakeholders who might be interested in its services or products, as this builds investment cases for others to contribute to the project work or scale-up the innovations.
Innovative financing for inclusive value chains
6 Influencing policy to scale impact
What did CultiAF do?

Engaging policymakers and stakeholders is vital for project impact, scaling, and sustainability. It is essential to determine early on in a project the opportunities for interacting with policymakers – and at what level – and where policy might be influenced or enhanced. In the second phase of CultiAF, national regulatory certification and standards agencies were specifically targeted to support scaling ambitions, but also to commercialize and guarantee the safety of products developed and/or being targeted under the various projects.

For example, engaging policymakers in the INSFEED project led to the development of food and feed safety standards in Kenya and Uganda. This has been critical for value-added insect-based product development, certification, and commercialization at national and international levels.

To enhance the marketing potential of fish products produced under the Malawi Fisheries project, two standards (one for smoked and one for dried fish products) were developed in collaboration with the Malawi Bureau of Standards (MBS). The project initially only targeted the development of the dry fish standard, but at the request of the Ministry of Agriculture, a smoked fish standard was also developed.

Meanwhile, in Uganda, five high-value nutritious products, derived from small silver fish (Mukene) and developed under the NutriFish project, were certified by the Uganda National Bureau of Standards (UNBS) to support their sale in retail outlets. To help monitor the fisheries system in Lake Albert and Victoria in Uganda, the NutriFish project also customized the use of an existing fisheries mobile app known as the electronic Catch Assessment Survey (e-CAS). The comprehensive data collected via the app will enable lake management officials, researchers, and policymakers, among others, to continue making informed decisions around fisheries’ management.

Finally, to sustain interventions beyond the Youth Agripreneurs project in Kenya, county governments were supported by the Global Agribusiness Management and Entrepreneurship (GAME) Centre (the project lead). Together, they implemented county-specific agribusiness strategies, including partnering with Equity Bank to offer funding to aid up to 10,000 promising young entrepreneurs in developing their businesses.

Achievements

Engagement between INSFEED and policymakers from the Kenya Bureau of Standards (KEBS) and UNBS led to the development and approval of three new standards. These have been critical for developing value-added insect-based food products, certification, and global trade. “These standards, the first in Africa, are an important milestone in supporting farmers and industry players who are interested in farming insects. With the standards, insect farmers,
harvesters, and processing industries can now get accreditation enabling them to sell their products in local, regional and international markets,” states KEBS Food Standards Manager, Peter Mutua. Through extensive training programs undertaken by KEBS and UNBS, 15 SMEs had their insect-derived products certified and gain the Standardization Mark, enabling them to mass produce and market insect-based food, feed, and insect-composted organic fertilizer products. Countries already enjoying the benefits of edible insects standards include Ethiopia, Kenya, Rwanda, Tanzania, and Uganda. However, relevant policies to govern the insect sector need to be formulated.

Prior to the Malawi Fisheries project, fish product standards were absent. With standards now established for small dried fish and larger smoked fish, MBS can routinely monitor fish products sold in supermarkets, and fish producers are able to sell products in formal markets for a higher price. Fish consumers are also protected against poor-quality products and food that is unsafe to eat.

The project also influenced Malawi’s Department of Fisheries, whose activities previously focused on fishing alone – a male-dominated area. However, after working with Malawi Fisheries, the Department of Fisheries took a more gender-inclusive approach and is now actively interested in fish processing, a female-dominated activity. In addition, the evidence generated on the quality of fish processed using the improved solar tent dryers and smoking kilns promoted by Department of Fisheries, contributed to revisions to the National Export Promotion Strategy and formulation of the Food Safety Policy.

In Uganda, over 670 stakeholders now use the e-CAS application, including the Department of Fisheries Resources and the Fisheries Protection Unit. By the end of the project, local enumerators trained by NutriFish had collected and transmitted over 12,000 records of catch data through the e-CAS system. “Real-time e-CAS data is leading to improved fisheries management and regulation, including better monitoring of fish catches to ensure sustainability, informed
licensing of new boats and fishers to support livelihoods, and increased availability in fish for consumption,” states Jackson Efitre, principal investigator of the NutriFish project. Further, the previous approach of manually collecting this type of data cost the government about CAD 145,064/AUD 163,725 per year but e-CAS lowered the cost to around CAD 29,000/AUD 32,745.

Engaging county governments proved key for the Youth Agripreneurs project, as these stakeholders were more familiar with the context and challenges faced by youths at the local level. For example, in Siaya County, county officers were an integral part of the project and its implementation – leading them to apply the concept in another youth project funded by the German development agency, GIZ. Similarly, in Nyandarua County, agriculture officers participated keenly in the project and the GAME Center has been invited to further scale-up activities. Following county-level successes, the national government (through the UWEZO Fund, a Kenya Government fund that promotes businesses and enterprises run by women, youth, and persons with disability), also approached the GAME Center seeking to replicate the Youth Agripreneur project’s mentorship model amongst youth beneficiaries as a de-risking strategy in their funding program.

Challenges

Policymakers were brought on board to the INSFEED project through the provision of an economic assessment. This set the scene regarding benefits to the economy, potential for job creation, and reduced fertilizer and animal feed costs for farmers. Identifying and involving partners from KEBS and UNBS from the beginning was also key; they were given full responsibilities and lead roles to drive the policy components, which was a significant factor in the project’s success. However, this was not the case with the Kenya Wildlife Service (KWS), which initially restricted mass breeding of insects for food, feed, and other uses by requiring farmers to apply for permits and/or license. However, following productive and engaging consultations, KWS reconsidered minimizing these bottlenecks to allow this emerging and innovative industry to grow while a more appropriate framework is developed for...
the sector. This process is currently under development in partnership with the African Union through the African Organisation for Standardisation to develop and harmonize standards and conformity assessment for edible insect-based food and feed products, and insect-composted organic fertilizer, among others.

Several projects struggled to get policymakers fully on board. For instance, following training sessions among the Malawi Fisheries project team, a decision was made to be more aggressive in engaging the Department of Fisheries. After showing little initial support for the project, the intervention of the President ensured that the policymakers did what was necessary to move the project forward. Nevertheless, the project felt that the department was slow to promote products that emphasized the value of fish, and perhaps a more efficient process would help to realize greater impact of innovations.

In addition, the Malawi Fisheries team felt that MBS could have done more to implement and champion the standards. In particular, the team felt that MBS needed to implement a public awareness campaign about the importance of the standards, so that the public was more aware of the benefits of purchasing and consuming certified fish.

“Policymakers are ready to listen. But don’t just share your results: share what your results WILL DO.”

Professor Fanuel Tagwira, Permanent Secretary, Ministry of Higher Education, Innovation, Science and Technology Development, Zimbabwe
Conclusions

- A key lesson learnt through all CultiAF projects is the imperativeness of identifying and collaborating with the most influential policy making bodies – whether national, local, or regional – for effective results. This will not only impact how quickly project policies are actioned but, in turn, also influence how other key stakeholders interact with the project.

- Engaging policy stakeholders early on in a project is critical, as it allows them to feel a sense of ownership over the outcomes and gain an effective understanding of the objectives and intended direction of travel. The provision of evidence-based, dynamic, and actional research in a format that can be easily interpreted is key to getting policymakers on board.

- There is a missing link between what researchers do and what policymakers know, so it is important that researchers share not just their results, but what their results will do. Greater interaction and dialogue between science and policy is needed to meet this gap and effectively influence policy making.

- Interacting and engaging with policymakers is not easy. Policymakers have their own agendas and timelines, and relationships built with contacts can be quickly cut if they are promoted or move on. Engagement can be particularly challenging for researchers who have no prior experience in this area, and training may be needed. Project teams must have the confidence to persevere and be persistent if they are to influence policy, even in the face of pushback. Overcoming this barrier is imperative to securing the necessary attention and policy action.
7 Conclusions
Over the 10 years of the program, CultiAF showcased several impressive innovations with the following results:

- Intentional integration of gender. The CultiAF program supported not just women farmers, but the capacity building of female researchers and their institutions to be gender responsive through all aspects of the project. This was a deliberate requirement, especially in Phase 2. This program was ahead of its time in this respect, and learnings have influenced not just more recent Australian and Canadian research investments, but many activities across the globe.

- A cross boundary approach. The CultiAF program enabled strong regional collaboration and knowledge sharing to maximize impact across the region. Problems and opportunities do not observe country borders and it is hoped these connections are maintained beyond the life of the program.

- Strong Southern leadership. The implementing partners involved in the CultiAF program were fundamental to its success. This was particularly evident during the Covid-19 pandemic when teams had to pivot their activities; the research continued to be as strong as at any stage in the program, which was testament to the commitment of the scientists and their managers.

- Honoring farmers. Project teams worked hard to recognize the challenges of farmers – particularly women – by not assuming what they need, but really understanding the pain points that farmers experience. Improvements in agriculture can only come once the system is properly understood, and farmers’ knowledge of the context in which they work is required as they play a key role in improving and transforming the food system.
Innovations across the value chain. CultiAF’s innovations considered the barriers and enablers for farmers and consumers, including access to finance, insurance, time-saving measures (in the case of precooked beans), novel use of waste, and value addition for increased incomes, to name but a few.

Nevertheless, there are key aspects for future research initiatives that need to build on these foundations to achieve even greater scale and impact.

Innovations – whether technologies, methodologies, or processes – must move beyond pilots and proof of concept. It is essential to go farther than proving the utility of those innovations and ensure greater adoption and use by those actors along the food system who need them the most. However, time is also critical, and impacts at scale cannot be achieved unless sufficient time is given to build on the foundations of success with the right milestones in place.

Women, youth, and men are not homogeneous groups. In designing innovations, it is essential to identify who the individuals are, where they are, and what skills they need to unlock their potential. Interventions must be appropriately targeted to address the barriers that each of these groups face, ensuring even the most excluded populations benefit.

Data is key. There is no shortcut to great science but, equally, there should be no shortcut to providing quality data and insights to inform the research and provide the evidence required by policymakers. More effort needs to be given to generate necessary sex-disaggregated data. However, good data collection requires adequate planning and resources which need to be well thought through and integrated into projects from the proposal stage.

Projects need to be commercially minded and focus on the entirety of the value chain. Productivity is moving beyond agriculture.
to take a food systems approach, but a focus on how to get products to market is key and must be planned for from project concept.

- A focus on finance and business models is vital. Finance is not just about access to financial resources; it is the combination of access to finance, business skills, and de-risking farmers, and more innovative approaches and focus on this critical area are essential.

- Having the right partners is crucial. Different actors bring different expertise and skills, but scale and sustainability cannot be achieved without the private sector.

- Knowledge sharing and effective communication is essential. Data needs to be communicated to policymakers in a way they can clearly understand, keeping in mind that the focus should not be only on communicating the results, but also what the results can do and how they will make a difference. To be most effective, policymakers should be part of the research development process so that they are engaged at every step and are able to explore ways of applying the research evidence.
CultiAF2 projects
Malawi Fisheries:
Gender Inclusive Financing for Scaling up Improved Fish Processing Technologies in Malawi

- University of Malawi
- Malawi Department of Fisheries, Fisheries Research Unit, Ministry of Natural Resources and Climate Change
- WorldFish (CGIAR)
- FDH Bank Limited
- People's Trading Centre (PTC) Limited

Precooked Beans:
Scale-up Supply of Precooked Beans for Food and Nutrition Security by Leveraging on Public-Private Partnerships in Kenya and Uganda

- National Agricultural Research Organization (NARO)
- Kenya Agricultural and Livestock Research Organization (KALRO)
- International Centre for Tropical Agriculture (CIAT)
- Community Enterprises Development Organization (CEDO)
- Lasting Solutions Limited (LSL)
- Smart Logistics Solution (SLS)
- CARITAS Homa Bay

Youth Agripreneurs:
The Effectiveness of the Metro Agri-Food Living Lab for Gender Inclusive Youth Entrepreneurship Development in Kenya

- United States International University (USIU) – Africa
- Busara Centre for Behavioral Economics
- Signifide Group Limited

Contact
Dr. Levison Chiwaula,
University of Malawi
lschiwaula@unima.ac.mw

Dr. Michael Ugen,
NARO
michaelugen@gmail.com; michael.ugen@naro.go.ug

Prof. Francis Wambalaba,
USIU
fwambalaba@usiu.ac.ke
Enabling Resilient, Equitable and Sustainable Food Systems

**Project Organizations**

**INSFEED:**
Insect Feed for Poultry, Fish and Pig Production in Sub-Saharan Africa
- International Centre of Insect Physiology and Ecology (icipe)
- United States International University (USIU) – Africa
- Kenya Agricultural and Livestock Research Organization (KALRO)
- Kenya Marine and Fisheries Research Institute (KMFRI)
- Value Addition and Cottage Industry Development in Africa (VACiD-Africa)
- Treasure Industries Ltd.
- Kenya Bureau of Standards (KEBS)
- Makerere University

**IPM Fruit Flies:**
Alien Invasive Fruit Flies in Southern Africa: Implementation of a Sustainable IPM Programme to Combat their Menaces
- International Centre of Insect Physiology and Ecology (icipe)
- Ministry of Lands, Agriculture, Water, Climate and Rural Resettlement, Zimbabwe
- Zambia Agriculture Research Institute, Ministry of Agriculture and Cooperatives
- Department of Agricultural Research Services, Malawi
- Eduardo Mondlane University, Mozambique

**Ethiopia Sorghum:**
Climate-smart Interventions for Smallholder Farmers in Ethiopia
- Ethiopian Institute of Agricultural Research (EIAR)
- The University of Queensland

**Contact**

Dr. Chrysantus Tanga,
icipe
cjtanga@icipe.org

Dr. Samira Mohamed,
icipe
sfaris@icipe.org

Dr. Taye Tadesse,
EIAR
tayabo@gmail.com
**NutriFish:**
Harnessing Dietary Nutrients of Underutilized Fish and Fish-Based Products in Uganda

- Makerere University
- National Fisheries Resources Research Institute (NaFIRRI), National Agricultural Research Organization
- Nutreal Limited
- McGill University

**Picture Based Insurance:**
Improving Agricultural Productivity and Resilience with Satellite and Cellphone Imagery to Scale Climate-Smart Crop Insurance

- Agriculture and Climate Risk Enterprise (ACRE Africa) Limited
- Kenya Agricultural and Livestock Research Organization (KALRO)
- Wageningen University and Research (WUR)
- International Food Policy Research Institute (IFPRI)

**Mozambique Irrigation:**
User Driven Approaches to make Government and Farmer led Smallholder Irrigation in Mozambique more Productive

- Universidade Eduardo Mondlane (UEM)
- Instituto Nacional de Irrigação
- Instituto Superior Politécnico de Manica
- Instituto Superior Politécnico de Gaza
- Penevy Services Pty Ltd
- Strategy, Evaluation and Engagement for Development (See4d)
- Resilience BV

**Contact**

Dr. Jackson Efitre,
Makerere University
jackson.efitre@mak.ac.ug;
jeitre@gmail.com

Ms. Lilian Waithaka,
ACRE Africa
lwaithaka@acreafrica.com

Dr. Emílio Magaia,
UEM
emiliomagas@gmail.com