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Final report

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Generally, ACIAR has collaborated with government agencies as primary in-country partners to implement the ACIAR Myanmar country strategy. Most of the government agencies still need to follow the traditional collaborating agreement requirements and have limited capacity to organize an efficient project management system. There are other collaborating partners in-country that are well equipped for efficient project implementation at the field level. The 2021 military coup in Myanmar, and subsequent sanctions, require alternative modes of engagement for Myanmar's development partners such as the Australian government. This includes clearly not providing support to the military or military-connected organisations, which includes all government agencies whilst the military is in power. Our study aimed to identify collaboration strategies with various partners, under different political scenarios in Myanmar, which are in keeping with the foreign policy environment of donor countries (such as Australia).

The approach used leveraged expertise from researchers with extensive experience and broad knowledge of Myanmar to collate and assess potential partnering arrangements. Research and development gaps in the Central Dry Zone (CDZ) and upland areas in Myanmar were identified for future possible investment in agricultural research for development (AR4D). ACIAR and other development partners such as LIFT, JICA and USAID have trialed different technologies for AR4D in the CDZ and Shan State, however farmers are still struggling with their agricultural enterprises. Innovative technologies are also available such as precision agriculture and climate smart agriculture technologies. The gap between the scientific research and practical application of research outcomes needs to be addressed to provide a strong platform for introducing and testing new technologies. An important output of our project is input into the design of future AR4D projects in Myanmar that will engage suitable non-government partners that disseminate information to farmers in bottom-up approaches.

Our Specific objectives were:

Collate who (non-government, international research and development providers, private sector, key individuals) is working in relevant upland environments (CDZ and Shan State). This will include the potential for Australian research institutes and CGIAR centres to be direct partners in upland cropping systems.

Assess the track record and execute a preliminary due diligence of promising future partners.

Identify high priority research and development gaps in AR4D that align with the strategic objectives of ACIAR, with assessment of the practicality of executing an effective investment model without direct funding to government agencies.

The study encompassed: a review of existing information, published reports, grey literature; semi-structured interviews through different communication platforms with implementing agencies (phone, social media, Zoom, Google Meet, Microsoft Teams, and Webex); a review of project reports, related information available on different organization governance structures and their track records on delivering project achievements, unpublished reports which are not accessible to International audiences, and successful case studies.

ACIAR's earlier investment in the multi-disciplinary "MyFarm" program and related subsequent projects, provided a central framework for identifying partners who have already worked with ACIAR projects (either directly or as next users) to build our synthesis of who is working in relevant upland areas on AR4D topics. A subset of these agencies was included in our interviews. Agricultural reports from Government departments, and development agencies were reviewed to identify different Institutes and individuals who are working on AR4D in the CDZ and Shan State in Myanmar. A total of 47 people were interviewed, and 263 reports were assessed.

Possible non-government collaborators and collaboration modalities were developed through our review of published reports, findings from sub-structural interviews, and 21 agriculture case studies in the CDZ (n = 11) and Shan State (n = 10). Recommendations on modes of partnering for ACIAR were developed by developing a stakeholder power/interest grid.

Findings

Whilst the negative impacts of the *coup* on safety, communication and bank transfers are becoming key challenges for project logistics, there are several agriculture projects being implemented through collaboration with experienced local partners. The proponents of these projects have developed their own strategies to overcome the challenges. There are possibilities for international development partners to maintain their network through collaborating with Non-Government Agencies. Some international funding for development project activities is continuing without including any military-related entities. However, approximately 41% of project activities were suspended due to the constraints for renewing Memorandums of Understanding (MoU), security reasons, and limited funding sources. Overseas development agencies and non-government implementation agencies have different requirements for executing their activities in Myanmar. Among the various procedures, signing a Memorandum of Understanding with Government Institutes was the most complex process before and after the coup, and took a significant amount of time. No MoU is required for Myanmar-based NGOs, CSOs, the private sector and individuals.

Over the last two decades ACIAR has invested in agricultural research and development in Myanmar, and investment outcomes have greatly contributed to the agriculture sector development of the country, particularly through capacity building of local researchers inside the Ministry of Agriculture, Livestock and Irrigation (MoALI). MoALI still stands as the only agency fully equipped with both infrastructure and human capital resources for AgR4D. Moreover, all ACIAR investment in the past have involved MoALI. Following the coup many key researchers exited their research positions. This represents a great risk of permanently losing much of the country's research capacity that has been built up through collaborative research projects. There is an imperative to facilitate ongoing engagement of researchers in AgR4D to enable a rapid recovery of capability. This project initially aimed to focus on two modes of partnering; working with partners on projects without involving government agencies; and working with non- government partners as primary in-country leads whilst accepting secondary connectivity to government personnel through these partners without funding to government agencies. Given the resource availability of Non-government Institutes and MoALI, we focused to develop the second mode of partnering (to involve MoALI without providing funds).

Some **69 collaborators** were identified as possible primary partners. Their appropriateness as a partner would depend on the type of project, geographic location, and different political scenarios in the country. Our review of recent projects in Myanmar clearly indicates that AR4D is critically under-funded compared with neighboring Asian countries. Only one research project was recorded by INGOs and NGOs, with MOALI is the main organization which has capacity to conduct research. There are still many crucial research gaps in Myanmar in AR4D. Many of these gaps significantly affect the ability of Myanmar to reach numerous UN Development Goals. Our report highlights a number of research gaps and we identify promising areas for long term investment.

Recommendations

(i)   High priority should be given by development partners to maintaining and developing Myanmar's future research capability, through capacity building activities in neighboring countries and the conduct of limited in-country research in Myanmar.

(ii)   Given the current sanctions and travel advice related to Myanmar, most CGIAR Institutes, Australian Research Institutes, and Universities are not able to be primary in-country leads on AR4D projects. Some INGOs, NGOs, private sector agencies, experienced consultants and ASEAN-associated agencies, were identified as possible primary in-country leads. However, international research institutes will still need to provide key roles for developing the research technologies for urgent food security issues in Myanmar. INGOs, local organisations and ASEAN agencies have limited experience on cutting edge AR4D. It is recommended that development partners continue to commission leading Australian and international research organisations to conduct activities to benefit Myanmar, utilizing experienced and trusted entities and agencies within and near Myanmar.

(iii)   The recent development of the One-CGIAR model of operation could have an impact on the governance changes in CGIAR Institutes. However, under the One-CGIAR system, World Fish and IFPRI are maintaining a significant, if somewhat reduced, research momentum in Myanmar. It is recommended that the success (and challenges) of the collaboration model used by these two Institutes is monitored over the near future.

(iv)   ACIAR has had highly successful research projects in Myanmar under different political situations since the late 1990s. All successful projects started with project designs based on successful research outcomes from neighboring Asian countries. Regardless of the considerable challenges raised by the current difficult country situation, potential Small Research Activities (SRA) for AR4D are urgently needed. Based on our findings, there are several options for ACIAR to build and maintain critical research capability in the Government, University, and NGO sectors within Myanmar without direct collaboration with Government and Military related organisations.

(v)   We propose that government personnel be considered as a secondary connection through non-government partners. Government research and extension networks in Myanmar, although typically poorly resourced, are extensive in their reach. Therefore, we propose that the *Ministry of Livestock, Agriculture and Irrigation (MoALI)* should still have connectivity, although of a secondary nature, with AR4D projects. Therefore, it is important to monitor the political changes inside MoALI and assess who is directly aligned with the military government. Careful selection of government collaborators is paramount.

(vi)   Given that collaborating with INGOs, NGOs, CSOs, and consultants are more feasible for project implementation, they can be considered as the primary in-country partners. Their capacity on managing research projects needs to be mentored and supported by international research institutes.

(vii)   The private sector was strengthened during 2015-2020, however, they are more business and profit oriented. Only research projects with existing business models are likely to successfully collaborate with the private sector. Again, as a duty of care, an audit of links with the military government needs to be done.

(viii)   The national Agriculture Development Strategy (ADS) developed from 2015-2017 is still maintained by both the Government and Donors as the dominant guide for investing funds for AR4D. We recommend that ACIAR still refers to the ADS for their Myanmar country strategy for investing in AR4D.

(ix)   Investment in Myanmar's agriculture development sector in the upland area increased during 2015-2020 compared with pre-2015. However, the progress and achievements during 2015-2020 need to be maintained or any gains for smallholder farmers will be quickly eroded. Value chain projects, capacity building on soil and nutrient management, and crop diversification are key priorities and can be implemented through collaboration with research institutes (international and national), local partners and training centres.

(x)   In the past decade, there has been more investment in AR4D in the Sagaing region in the CDZ compared with Magway and Mandalay regions. Livestock and crop production are closely aligned in the CDZ. Thus, an integrated approach is required to improve both livestock and crop production. We suggest investment in an innovation platform approach for a more integrated Food Value Chain for crops and livestock. Capacity building activities we identify for upland areas in Shan State are also applicable for the CDZ.

(xi)   The COVID pandemic and military *coup* have had a substantial impact on the food security of the people of Myanmar; more than 13 million people are facing moderate to severe food insecurity. Based on our research, we provide possible collaboration modalities for developing SRAs with a focus on the following: (i) to increase the scale of delivery of outputs from ACIAR-Myanmar projects to extension professionals and the rural sector, (ii) the urgent need to strengthen the food value chain so that smallholder farmers will benefit and thence the general rural community, and, (iii) to ensure that the capacity built in the agricultural sector over the past 15 years is not rapidly eroded. We suggest detailed processes for developing and implementing AR4D projects under the current military governance.

3 Background

Arrangements for joint agricultural research and development investments in partner countries, between in-country organisations and Australia, occasionally need to adapt to rapidly changing governance conditions. Important research and development activities can become delayed or abandoned through unnavigable bureaucratic labyrinths or disruption in governance structures that make it impossible for diligent investments to be executed. Whilst there may be an abundance of skilled individuals and non-government organisations in a partner country, ACIAR's traditional focus on government agencies as primary in-country partners can leave these people and organisations as stranded resources. This inhibits the development of some partner countries and represents major lost opportunities for Australian assistance aspirations.

Many Australian and CGIAR research providers and researchers have relevant experience, particularly through ACIAR projects. They provided an excellent resource for insights about potential partnering arrangements and research/development gaps, as well as potentially being effective in-country partners utilizing personnel on the ground (should they have the required authorization). Given the current difficult political situation in Myanmar, this project proposed that Myanmar be the focus of a study on alternative partnering arrangements. To be of a manageable scale, the project focused on productive upland agricultural environments in Myanmar, particularly upland cropping system in the Central Dry Zone (CDZ) and Shan State.

CDZ and Shan States are a priority for the country because of their economic and social importance, and agricultural research needs to be coupled with development objectives to achieve impact that improves livelihoods of rural communities. ACIAR–DFAT Multidisciplinary Research Program for Food Security and Farmer Livelihoods (MRPFSL), better known as 'MyFarm' was funded by the Department of Foreign Affairs and Trade and ACIAR, Australia, from 2011-2017 in Myanmar. It was a multidisciplinary research program among International Research Centers (International Rice Research Institute, World Fish Centre, International Crops Research Institute for the Semi-Arid Tropics, International Livestock Research Institute), Australian Research Groups and Institutions (University of Queensland, University of New England, Australia National University, and Commonwealth Scientific and Industrial Research Organisation), and Ministry of Agriculture, Livestock and Irrigation (MoALI) (Department of Agriculture, Department of Agricultural Research, Department of Fisheries, Livestock Breeding and Veterinary Department, Yezin Agriculture University, University of Veterinary Science).

Many research outcomes from the 'MyFarm' program have been well adopted, with their impacts on smallholder farmers documented through a most significant change study (http://aciarblog.blogspot.com.au/2017/10/the-myanmar-myrice-project-has-improved.html).
However, the multidisciplinary research model still needs to be tested in much of the CDZ and Shan State. In addition to the MyFarm suite of projects several other projects have worked in relevant areas. There are numerous development agencies, international and local research organisations and NGOs, as well as private sector organisations actively supporting and operating in agricultural development in Myanmar.

Farmers in upland areas are still living below the poverty line. They often have limited direct engagement with the Food Value Chain (FVC) and are vulnerable to inequitable profit distribution in the agriculture sector. The FVC comprises an entire system of production, processing and marketing, from inception to the finished product and its consumption. It consists of a series of value chain actors, including farmers, traders, processors, wholesalers, retailers, and consumers, linked together by flow of products, finance, information and services. Chain supporters such as government regulators, financial institutions, research, extension, and transporters provide various services to the chain and enable it to function. There is a need for farmers in Myanmar to improve the quality of their product to meet market demands, whilst adopting more sustainable farming production practices. Agriculture programs developed by the Ministry of Livestock, Irrigation and Agriculture mainly focus on agricultural productivity without careful consideration of the FVC and how they can be incorporated into National programs. Farmers in Myanmar often acknowledge the need for education on new production techniques for crops and livestock to enable them to adopt new practices so they can produce the quality and quantity required at the right time to strengthen their capacity for linking with local and international markets. One example is promotion of the Sustainable Rice Platform standards that are recognized internationally, promote sustainable rice production, and provide a price premium.

4 Objectives

The aim that this project contributes to is that ACIAR invests diligently and effectively in a timely manner in jurisdictions confronting governance issues. At the project level we provide guidance to ACIAR about who ACIAR, and their commissioned organisations, can effectively and appropriately work with on upland agricultural issues in Myanmar. We also developed research and development pathways that engage non-government organisations.

We addressed the following specific objectives:

1. Collate who (non-government, international research and development providers, private sector, key individuals) is working in relevant upland environments (CDZ and Shan State).
2. Assess the track record and execute a preliminary due diligence of promising future partners.
3. Identify high priority research and development gaps, with assessment of practicality of executing an effective investment.

5 Methodology

5.1 Approach 1. Review of reports (ACIAR reports, reports and grey literature from other Myanmar development partners such as LIFT, JICA, CGIAR) and lived experience of project participants.

Reports from the Ministry of Agriculture, Livestock and Irrigation, Livelihood and Food Security Fund (LIFT), Myanmar information Management Unit, and Development Aid agencies (such as UNOPS, USAID, SWISSAiD) were reviewed to develop the list of different implementation partners working in the agricultural sector in Myanmar. We focused on the type of project, the quality of outputs and outcomes of their project, their success in delivering project objectives, and information available on organization governance structures. In some instances, we had access to unpublished reports that are not accessible to international audiences.

The number of INGOs in Myanmar has significantly increased after cyclone Nargis in 2008 and the forming of a new government in early 2011. The Livelihoods and Food Security Fund (LIFT) established in Myanmar in 2009 with funding from the United Kingdom, the European Union, Switzerland, Australia, the United States of America, Canada, New Zealand, Ireland and Norway. LIFT operated under the management of the United Nations Office for Projects Services (UNOPS). From 2009 to 2015, LIFT restricted collaboration and money flows to Government Implementation partners. LIFT worked closely with INGOs, NGOs, CGIAR and CSOs. All implementation partners needed to follow the LIFT regulation to not provide financial and infrastructure support directly to the Government. During the National League for Democracy (NLD) Government, from 2015 to 2020, the restrictions of working with Government were lifted and LIFT worked closely with diverse implementation partners in-country and played a key role in the sphere of "Agriculture for development" as well as private sector development and policy advocacy. LIFT became the biggest development partner in the Agriculture and Livelihood sector (https://www.lift-fund.org/en).

The Myanmar Information Management Unit (MIMU) plays the lead role in information management services. MIMU provides data from various sources on all sectors from village level to country level in Myanmar. It is under the management of the United Nation Resident and Humanitarian Coordinator and maps, databases and other supporting tools for project planning and implementation from their website are widely accessible (https://themimu.info/).

LIFT reports were reviewed to identify the different implementation partners. We focused on the following: (i) who has been working in Myanmar over the long term (>10 years), (2) who has been working since 2011 until now, and (3) who has been working since 2015 till now. Since private sector involvement in agricultural development has played a big role in the last five years, private sector agencies that can perform both research and business were included in the list. LIFT has funded livelihood projects in conflict affected areas where Government and Ethnic Armed Organizations (EAO[2]) have developed an agreement for autonomy administration zones. It is important to note here that the government has limited presence in EAO areas. Some INGOs, local NGOs and CSOs, have already developed effective working relationships in the Autonomy Administration area and they were identified from reports. Updated information about who is doing what, in which area, was reviewed.

After 2015, the "Agriculture Strategies" for Myanmar strongly encouraged private sector development. Donors invested significant amounts of funds in empowering the private sector and engagement with private partners. Development partners such as USAID and GIZ invested significant funds in private sector development and trade. In 2021-2022, the private sector still plays an important role in Food Value Chains projects.

From the Government, the Ministry of Commerce plays an important role for facilitating trade (export, import and domestic). The ministry provides focal persons for all projects that relate with trade. The Ministry of Natural Resources and Environmental Conservation plays an important role in projects on climate change and agroforestry.

5.2 Approach 2. Semi-structured interviews of key CGIAR and Australian personnel of relevant ACIAR projects, mostly by phone, with in-person interaction with up to four organisations with the strongest links with Myanmar. CGIAR former and current personnel were interviewed through an electronic meeting platform.

Semi-structured interviews were conducted through different communication platforms with implementing agencies. We used a variety of methods to engage with people: telephone, social media, zoom, google meet, Microsoft Teams, and Webex.

A total of **47** people from different implementation partners were identified to interview. A list of people interviewed from different organizations is provided in Appendix 1. Questionnaires were developed to capture track records of agencies under different challenges, their strategies used to overcome the constraints, strengths and weaknesses, and their collaboration strategies under different circumstances. A list of possible collaboration partners was assembled based on a preliminary desktop review, and feedback from interviews. The collaboration of non-government agencies under different governments were reviewed to develop collaboration modalities under different scenarios. The strengths and weaknesses of collaborative arrangements also were reviewed. Information on financial management indicators (audited accounts, sponsor satisfaction) were collected. A collaborator satisfaction score was developed and became part of the interviews. We tabulated scores for individual organizations. The collaborator score was ranked from 1-5 (1 = very poor, 2 = poor, 3 = good, 4 = better, and 5 = best) and collaborators with score 3.5-4 were deemed to be satisfactory to work under any different government situations. The results are provided in Supplementary Document Table 2 as a separate document to this report to reflect the dynamic nature of this assessment. Some **68** collaborators were identified as possible collaborators. Possible collaborators were selected based on the type of project, geographic location, and the different political scenarios they have worked under in the country.

5.3 Approach 3. Review of information available on potential non-government organisation partners with preliminary assessment and due diligence of their capability, capacity, record of development delivery and governance standards, and the experience of project participants

We reviewed project reports to validate information collected during interviews. From these reports we collected detail information about projects specific agencies have done in the past, and their current active projects. The track record of a particular agency was reviewed to develop a synopsis of their capability and capacity.

We conducted a systematic search on policies, strategies and project reports from government Institutes (n = 14), United Nations Organization (n = 62), institutes within the Consultative Group for International Agriculture Research (n = 40), international research institutes (n = 34), International Non-Government Organizations (n = 43), Local Non-Government Organizations (n = 40), Learning and Knowledge sharing Center (n = 5), Social business and enterprises (n = 7), and private institutes (n = 18). Some of the government reports have not yet been made public to an international audience.

Section one provides a synthesis report of who is working in agriculture research and development in Myanmar and is derives from our review of reports (desktop study) and findings based on interviews. Section two summarised our assessment of major research and development gaps derived from a systematic literature search, 'data mining' of national statistics that have not yet been made public to an international audience, and interview findings.

6 Achievements against activities and outputs/milestones

Objective 1: To collate who (non-government, international research and development providers, private sector, key individuals) is working in relevant upland environments (CDZ and Shan State).

no.	Activity	outputs/ milestones	completion date	comments
1.1	1.1.1Review of reports (ACIAR reports, reports and grey literature from other Myanmar development partners such as LIFT, JICA, CGIAR)	List of organizations worked/working in upland environments	Aug 2021	Used to identify potential best partners for specific agroecological areas.
1.2	Review of information available from Donor agencies, INGs & NGOs, CGIAR, and Government reports	Identified the type of Agriculture projects	Oct 2021	Used to identify approaches and current activities.
1.3	Desktop collation of potential partnering arrangements. This will utilise a contractor or contractors with intimate knowledge of the Myanmar agricultural research and development landscape. This will include the potential role of the CGIAR system outside of the Ayeyarwady Delta.	List of different types of collaboration arrangements based on types of projects and implementation partner.	Oct 2021	Used to identify and assess collaboration arrangements being used.

PC = partner country, A = Australia

Objective 2: To assess the track record and execute a preliminary due diligence of promising future partners.

no.	Activity	outputs/ milestones	completion date	comments
2.1	Identified stakeholders to interview	list of people from potential collaboration organizations	Aug 2021	Used to find the most appropriate information sources for 2.2

2.2	Develop interview framework and test the survey framework	Interviewed questionnaires for different Institutes have been developed, tested and reviewed.	Nov 2021	Used in 2.3
2.3	Semi-structured interviews of key CGIAR (IRRI, World Fish, IWMI, ICRISAT), Australian personnel of relevant ACIAR projects (up to four organisations with the strongest links with Myanmar (most likely University of Queensland, University of Melbourne, CSIRO, University of New England, Southern Cross University, Australian National University), Donors & Developing partners, INGO&NGOs and Private Sector	Key Informant interviews with up to 20 key project personnel	Nov 2021	Used to find out how people are really managing their projects, their appetite and capacity for engagement, and identifying issues and opportunities.
2.4	Review of information available on potential non-government organisation partners with preliminary assessment and due diligence of their capability, capacity, record of development delivery and governance standards.	Detailed analysis of strength and weakness of potential collaborators based on their success and failure stories	Nov 2021	Used to assess usefulness of potential collaborators, in part also for 2.7.
2.6	Review of reports (Reports from Myanmar Government agencies, local and international NGOs and Myanmar development partners) and lived experience of project participants.	Comparison with the results of key informant interview and exploration of links between different stakeholders	Nov 2021	Used for further assessing the stakeholder ecosystem. Used also for 2.7.
2.7	Desktop assessment of capability and due diligence of promising partners.	Interpretation of collaboration trends within the system, and their impact on achieving the project's/ program's goal	Sep 2021	Used to assess potential usefulness of potential partners.
2.8	Synthesis report of who is working in relevant upland environments, including a track record and capability assessment and preliminary due diligence of potential in-country partners	Draft report results presented to ACIAR	Feb 2021	Used to inform international development partners of potential implementation partners consistent with current engagement restrictions.

PC = partner country, A = Australia

Objective 3: To identify high priority research and development gaps, with assessment of practicality of executing an effective investment.

no.	Activity	outputs/ milestones	completion date	comments
3.1	Review of reports (ACIAR reports, reports and grey literature from other Myanmar development partners such as LIFT, JICA, CGIAR)	Overview of the policy framework Alignment to national policies and political situations	Jan 2022	Used to broadly identify key areas of need.
3.2	Review of reports (Reports from Myanmar Government agencies, local and international NGOs and Myanmar development partners) and lived experience of project participants.	List of planned Agriculture for development projects/programs	Jan 2022	Used to identify recent, current and planned investments that may represent good value to "buy into".
3.3	Desktop assessment of highest priority research and development needs, and practicality of making effective investments.	Identified research and development gaps	Jan 2022	Used to narrow the field of critical research needs and practically possible approaches given the current (July 2022) conditions.
3.4	Assessment report of major research and development gaps in the Food Value Chain of upland cropping/livestock systems.	Draft report results presented to ACIAR Melbourne	March 2022	Used to inform international development partners of best value investments in AR4D.

PC = partner country, A = Australia

7 Key results and discussion

7.1 Who has worked in relevant upland environments, including an assessment of their track record and capability, and preliminary due diligence of potential in-country partners.

Collaborating with Myanmar researchers under difficult political situation is not a new experience for *ACIAR and Australian research Institutes/Universities*. During the previous military regime projects were conducted: *Increasing food security and farmer livelihoods through enhanced legume cultivation in the central dry zone of Burma (ICRISAT, SMCN/2006/013)*; *Control of Newcastle disease and identification of major constraints in village chicken production systems in Myanmar* (UQ, AH/2002/042) and *Ecologically-based management of rodents in rainfed cropping systems in Myanmar (CSIRO SFS/2002/041)* were successfully implemented in the early 2000s. Australian Institutes were able to find effective collaborators in the Department/Ministry to implement the projects successfully. All these successful projects under the previous military regime were implemented with simple project models, including effective transfer of successful project outcomes from neighbouring Asian countries into Myanmar. Their project impacts contributed significantly to the Myanmar Agriculture Sector. Since the country opened up in 2010, ACIAR had made great contribution in both crops and livestock sectors through the MyFarm program, Food value change project, and Fisheries project. The ACIAR MyFarm program contributed to the development of national rice and pulses crop management recommendations and those were adopted and extended at a national level after the completion of the MyFarm program.

All ACIAR investment in last two decades contributed significantly not only for agricultural development of Myanmar, but also significant capacity building of local researchers through learning by working together with Australian Scientists. Some researchers inside the Ministry or other Organizations became local ambassadors for ACIAR and Australian/other international agricultural development partners. For example, in-country collaborators from an ACIAR project on rodent management (2003-2006) were key contributors to a successful project on best practices for rice production in the lower Ayeyarwady delta funded by the Swiss Agency for Development and Cooperation (2006-2012). Indeed, the key contact in MoALI for the rodent project had been promoted to the top advisory position to the Minister. Such spill-over benefits of early ACIAR projects in Myanmar similarly had an important impact on the impressive implementation and outcomes of the MyFarm Program (2012-2017). It is crucial for ACIAR and Australian government agencies to maintain their long-term investment in agriculture for development in Myanmar.

The Military has not restricted the international funding of projects (to June 2022). This could be because of the need to focus on suppressing civil unrest (through protest, Civil Disobedience Movement and attacks by the People Defence Federation throughout Myanmar) and to show the international community the people of Myanmar can be supported by international agencies. The number of organisations working in October 2021 was higher than May 2021 in some regions such as Ayeyarwady (43:34), Yangon (68:55),Mandalay (47:40), Bago (East) (35:30), Chin (32:24), Kayin (63:58), Shan (South) (48:41), Bago West (15:11), Kayah (31:28), Magway (36:33), Mon (54:50), Nay Pyi Taw (15:13), Rakhine (63:61), Shan (East) (16:13), Shan (North) (52:50),and Tanintharyi (33:30). Generally, these data indicated organisations are still able to implement project activities in the region where their target beneficiaries exist. These data also indicated donors were still providing funding in support of the livelihoods of the people in Myanmar by using the model implemented by LIFT in 2009 (without providing direct funding to the Military Government). LIFT and other Funding organizations such as USAID introduced the 'Adapt and Adjust' strategy after the coup in February 2021. Most of the projects signed by these agencies with the Government were adjusted accordingly. They hired private companies/ freelancers to continue project activities, which are supposed to work together with the government resource persons. All international funding projects need to meet the requirements set up by the government since 2010 and these still are the current requirements as well. Memorandum of Understanding (MoU) signing is the requirement for development partners, international research institute and INGOs (see detail MoU process in the Box-1). Once an MoU needs to be extended/reviewed, INGOs will have to meet all new restrictions developed by the new Military government in order to get approved. This is one reason the number of project activities by different implementation organisations has decreased significantly (MIMU 2021). Some 41% of agricultural projects were suspended in 2021 due to access/security constraints, unspecified reasons, and funding constraints (MIMU, 2021). And this number will climb rapidly with time.

Box-1 Detail procedures of MoU signing
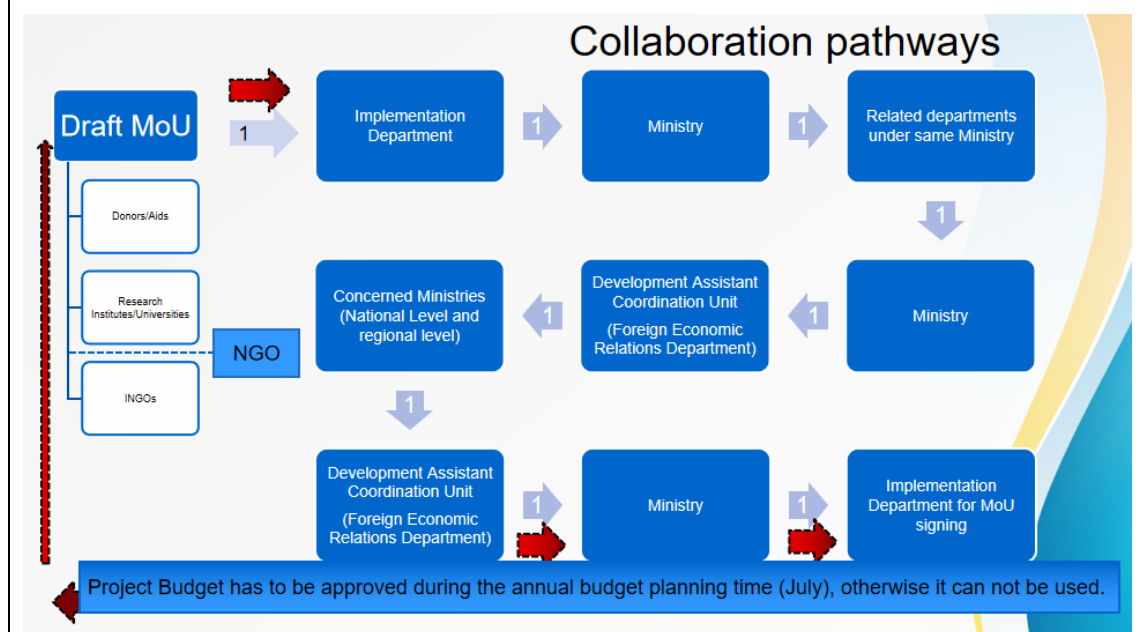
This pathway shows why obtaining permission to operate is a challenge for all development partners and implementation partners. The government will check the MoU first and then endorse the MoU to the Ministry office. The MoU prepared by development/implementation partners is sent to other related departments under the specific Ministry for their concern and that Ministry provides feedback. After getting no objection comments inside a Ministry, the Ministry office will submit the MoU to the Development Assistant Coordination Unit (DICA) under the Foreign Economic Relations Department. DIA has to circulate the MoU to other related Ministries and to the regional governments of the project area. If there are no objections from them, DICA will send it back to the Ministry for signing. If there are concerns from any parties, the process will start back from the beginning as shown by the red arrows. In early 2016, the Ministry of Agriculture and Irrigation merged with the Ministry of Livestock, Fisheries and Rural Development to form the Ministry of Agriculture, Livestock and Irrigation (MoALI). This is the primary Ministry responsible for promoting food availability and access in Myanmar. There are three Ministries related to agriculture, MoALI, the Ministry of Commerce (MoC), and the Ministry of Natural Resources and Environmental Conservation MoNREC). MoALI has 15 departments, whilst the other two have 4-5 departments. Signing a MoU with MoALI takes more time compared with other two. Moreover, there are limited staff with capacity of international project management because the Government previously had limited access to international development assistance. Among the different departments under MoALI, Department of Fisheries was identified as the most convenient Department to collaborate with. MoU signing process is time consuming and challenging.

However, all ACIAR investment in last two decades existed inside MoALI. Almost all resources ACIAR established including the research capacity of local staff landed in this Ministry. We still need to consider MoALI as the secondary in-country partners. We paid more attention to review the collaboration modalities of other development partners after the coup and before 2010 previous military regime, to develop collaboration modalities that do not include military-related organisations without budget flow to the government system.

Regardless of different political views by people, food security problems in Myanmar after the COVID pandemic and the coup are rising and urgently need to be addressed. We will discuss possible collaborators, collaboration modalities and risk management when developing agricultural research projects for Myanmar in the current political climate.

7.1.1 Possible collaborators

Based on the desktop reviews of reports, we developed a list of implementation organizations who have a long-term track record of working in the Myanmar agriculture sector and their area they work (Supplementary Document Table 1). A total of **63 institutes** (three government institutes, eleven development partners/donors, three United Nation Agencies, one regional organisation (ASEAN), six CGIAR Institutes, five International Research Institutes, 12 INGOs, four NGOs, one CSO, 12 private sectors, two social enterprises, and two learning and knowledge sharing Institutes) were identified with expertise for working in an upland agricultural landscape and on food value chain projects. Apart from projects involving the CGIAR and ACIAR, the research experience of institutes were mainly focussed on social science and desktop research.

Some **69 collaborators** were identified as possible collaborators; government Institutes (n = 1), Donors (n=7),United Nations Organization (n = 4), institutes within the Consultative Group for International Agriculture Research (n = 5), international research institutes (n =11), Regional Institute (n=1), International Non-Government Organizations (n = 7), Local Non-Government Organizations (n = 5), Learning and Knowledge sharing Centre (n = 2), Social business and enterprises (n = 2), private institutes (n = 11), ACIAR Alumni (n=6), and consultant (n=7) (**See details about their capability and preliminary due diligence of each collaborator in Supplementary Document Table 2**). Possible future collaborators could be selected based on the type of project, geographic location, and different political scenarios in Myanmar.

i) ***Ministry of Livestock, Agriculture and Irrigation (MoALI)*** has human and infrastructure resources to play the key role for AR4D in Myanmar. MoALI personnel should serve as the **secondary connectivity** for AR4D projects given the extensive national extension network and the need to improve capacity of researchers. Therefore, it is important to be aware of the politic changes inside MoALI. Since the military coup on the first of February 2021, most international collaboration projects that collaborated with MoALI were suspended except for projects which were to be finished soon (Interview with staff from Department of Fisheries, University of Veterinarian Science, Department of Agriculture, and Department of Agricultural research). Moreover, some government staff stopped working in the Government system and participated in the Civil Disobedience Movement (https://en.wikipedia.org/wiki/2021_Myanmar_protests). The Military Government suspended them from their workplace as a first warning call and then removed those who did not go back to their workplace after the suspension period. Most declined to return and have lived with limited or no income since that time. They are driven by the hope that they can work for a democratic government if their democratically elected government regained power in the near future. The attitude towards staff remaining in the Government system has become negative and they would request their future democratic Government to remove them from the system (interview with CDM staff). The tension between two different groups needs to be taken into account when planning future projects. Nevertheless, researchers in both groups have essential skills that must be maintained and they are the people who can play important roles for urgent applied research and development activities that address poverty and food security in Myanmar. After the COVID pandemic and the coup, ***the country poverty index has fallen dramatically back to the 2005 level; more than 13 million people are facing moderate to severe food insecurity (OCHA, 2022).***

Risk management strategies need to be set up carefully in developing feasible collaboration modalities. There are some INGOs, NGOs and consultants who have high reputation inside the Ministry and can be selected for project implementation if there are requirements to access the breadth of resources from the Ministry. Given the current situation of military involvement, collaborators who could have connection with the Myanmar-military and military-owned entities should be carefully screened (please see the detailed list of possible collaborators in Supplementary Document Table 2). A successful project modality for working together with the Ministry through local NGOs such as the Network Activity Group (NAG) can be explored. At the time of writing (July 2022), Myanmar's "National Unity Government" is establishing an alternative diplomatic representation of Myanmar to Australia in Canberra, Australia. Whilst beyond the remit of this project to counsel about forging formal links, this represents a network resource to assist in processes of due diligence.

ii) Four ***United Nations (UN) Organizations*** are long standing organizations in Myanmar. In response to COVID-19 and the crisis following the military coup, LIFT strategies for 2022-2023 have

been adapted (LIFT 2021; personal interview with LIFT personnel). Project activities of UNOPS and LIFT which involve direct collaboration with Government Organizations needed to be adjusted and adapted in response to the sanctions applied on Military-related Institutes. Allocated funds for Government Institutes were re-allocated to other activities such as COVID-19 response activities. FAO collaboration projects with the World Bank and Asia Development Bank were suspended after the coup (https://www.worldbank.org/en/news/statement/2021/02/01/developments-in-myanmar; personnel interview with FAO project staff). However, FAO regional projects are still being implemented. Given their experience of working in Myanmar under different political situations and agricultural research experiences, LIFT and FAO could be possible future collaborators for long term poverty/food security applied research (details SWOT in Table-2). Downsides of collaboration with UN organizations include going through an exhaustive and lengthy audit process, and high operating costs. An example of the latter is that at least 40% of the donor funds directed through LIFT were spent on project management and review. Given their due diligence and that they are long standing agencies in Myanmar, long term research programs can be negotiated with UN agencies but small research projects are not advised to collaborate with them due to the overhead costs.

iii) As we have discussed above, the capacity of INGOs, NGOs and local partners for managing research project still need to be mentored and supported by international research Institutes. **CGIAR institutes** such as IRRI, World Fish, IFPRI, ICRISAT, and IWMI have been playing key roles for AR4D and capacity building of local researchers. A majority of project activities led by CGIAR Institutes were suspended after the coup; the exceptions are IFPRI and World Fish, although their project activities were curtailed. Implementing project activities through government institutes were suspended and collaboration depended on private social research companies (IFPRI) and local consultants (World Fish; https://unjobs.org/vacancies/1641561147992).

Projects led by CGIAR Institutes are recognized in-country for high quality research and their scientific contribution to the development of national researchers. However, feedback received from donors indicated that most of their project activities were too research oriented and less development oriented. Agricultural scientists inside the government system and other national institutes are more independent compared to 15-20 years ago. The CGIAR institutes played a key role in this progress through their support of post-graduate studies. Appreciation of local knowledge is required, and projects can be developed together with local expertise and International Research Institutes/ Universities (especially Australian universities associated with ACIAR projects) expertise that reflect Myanmar farmers' needs. In the immediate term, we recommend developing new research and development projects together with those who already have developed effective networks with collaborators inside the country.

The development of the One-CGIAR system may lead to administration changes in how individual CGIAR institutes engage with national projects (https://www.cgiar.org/food-security-impact/one-cgiar/). The goal is to provide more efficient collaboration especially involving multidisciplinary approaches. The One-CGIAR system may have an impact on the governance structure of key CGIAR Institutes in-country. The One-CGIAR is still at its early stages and so it is beyond our remit to comment on likely strengths and weaknesses in a Myanmar context. Due to sanctions and restricted travel advisories, the challenges for CGIAR could be (i) how to organize logistics inside the country, (ii) what possible arrangements they could manage from outside of Myanmar, and (iii) which CGIAR Institute to appoint as a lead Institute for Myanmar (Southeast Asia Regional Hub). The possible solution for One-CGIAR could be to identify their collaborators inside countries (INGOs, NGOs, CSO, private, consultants) for implementation of their project activities during the travel restriction and politically unstable period. The current project management and collaboration model of World Fish could be a successful model for the immediate term.

iv) Agriculture Ministers in *Associations of Southeast Asian Nations (ASEAN)* countries can still maintain their relationship with MoALI. Therefore, ACIAR collaborators (ACIAR Alumni researcher) at a regional level (such as Cambodia, Laos, Thailand and Vietnam) could still collaborate on research projects with Myanmar researchers. ACIAR and other Australian research institutes could develop research projects through the regional ACIAR Alumni network or through the ACIAR Alumni Research Support Facility (ARSF) or SRA. Tripartite agreement with one leading country such as Thailand could also be developed for the long-term agriculture for development program in Myanmar upland areas.

v) We reviewed the track records on implementation of aid projects and executed a preliminary assessment of due diligence of promising future partners. These included INGOs, NGOs, CSO and the private sectors (see details in Supplementary Document Table 2). The collaboration requirements for NGOs and CSOs are flexible among different organizations. We suggested working together with

NGOs and CSOs to replace the time-consuming process of MoU development and approval, and to increase separation from the military. Not requiring a MOU with the government makes it easier to work with Ethnic Armed Organizations and the private sectors under travel restriction situations (such as COVID pandemic time/ political situation unstable period) inside the country. However, how well NGOs and CSOs can perform to sustain the technologies and practices in the community after the project ends is still very uncertain and the involvement of international research institutes is still crucial.

vi) Private companies such as Myanma Awba and private associations such as MFVP who already have experience in agricultural research could be selected to promote and engage with "research for development" projects. Since the private sector is mainly focused on the profitability of their business, they continue their business operations under any circumstances. Most of them have been running their business under different Governments and keep their good relations with different governments under difficult political situations. The private sector is output oriented rather than research oriented. Applied research projects that already have proven results in regional countries can provide good models for collaboration with the private sector in Myanmar. The interest of the private sector is more on business, therefore projects that include economic impacts will catch their interest. One key challenge could be how to balance between economic and environmental impacts. Clear understanding of project goals and agreements need to be made during the project development stage.

7.1.2 Current challenges and constraints

Based on our study, challenges under the current political climate and strategies to overcome key challenges were also identified. We address some of these issues below.

A "conflict indicator" from the recent World Bank report on Myanmar suggested the conflict intensity in the Sagaing region is the highest followed by Yangon, Mandalay, and Shan. Other high conflict intensity areas are Chin, Kachin, Kayah, Kayin and Bago East. Nay Pyi Taw was the place where there was the least conflict (World Bank 2022). Regardless of the rising conflicts indicator the number of organizations working in the south-eastern area (where most upland ecosystem exists) is significantly high compared with the number of projects countrywide (as of October 2021). Organisations are still able to implement project activities in the region where their target beneficiaries exist (MIMU 2021 Dec). ***Based on the conflict indicator data, developing a large project in the high conflict indicator areas is not advisable under the difficult political situation. As we discussed above, small research agreements based on promising research outcomes from previous research could be developed through collaboration with recommended collaborators in Supplementary Document Table 2.***

Outgoing call charges and Internet data price have almost doubled since December 8, 2021, and that has an impact on social media users. Moreover, using Facebook, Wikipedia and Telegram faced restrictions within Myanmar and the tax on the SIM was put as 20,000 kyats. Some of the regions in Myanmar experience regular internet outages between January to December 2021 (World Bank, 2022). These changes will have an impact on low-income families who will not be able to afford the higher costs. This will also have negative impacts on researchers and farmers who want to learn via an on-line classroom. Country COVID restriction allowed international collaboration via on-line learning. In the immediate future, on-line learning activities can be done more efficiently through collaboration with local organizers or facilitators in less conflict intense areas, according to the World Bank 2022 indicator. There are also NGOs and learning institutes such as Golden Plain and Dekina Agribusiness schools, that have been hired by development partners to conduct on-line training. International Institutes that have developed on-line courses such as the Centre for Agriculture and Bioscience International (CABI) (https://academy.cabi.org/?fbclid=IwAR2duyZCiUDY257ZLgccmAmTBuIWiMNQU0UcQIGBhkg1sYsxCGaZBu4xapY) and IRRI (https://www.irri.org/our-solutions/irri-education) can play leading roles of capacity building activities for agriculture through collaboration with in-country collaborators such as Golden Plain, Dekina Agribusiness school and Greenway. One good example was the recent event organized by Organization for Woman in Science for Development (OWSD). The Myanmar National Chapter joined the OWSD 6th General Assembly and International conference as a local hub from Bagan, Myanmar in November 2021. All Myanmar OWSD fellows had the chance to actively

participate   in   the   conference   personally   and   virtually (https://www.youtube.com/watch?v=AjCFKnNjh4Q).

The main constraint that all organizations experienced after the coup is international fund transfer. Usually, funds will flow into their bank account via the Myanmar Foreign Development Bank (MFDB). In the past, the fund withdrawal process did not need additional documents. Since the coup, there is a strict regulation on the withdrawal process. Moreover, there is limited amount of Myanmar money available from private banks, and this has become the bigger challenge associated with fund transactions for the implementation of project activities. Feasibility of international funds transfer is one of the key criteria to select the possible collaborators. Limited withdrawal amounts of US dollars from the bank became a major constraint for different types of transactions. The possibility of collaborators having accounts outside of Myanmar is provided in Supplementary Document Table 2. The use of cryptocurrencies is increasing in the region (https://www.asiacryptotoday.com/report-asian-nations-are-increasing-cryptocurrency-usage/). There is some awareness about cryptocurrencies (Bitcoin, Ethereum, Polygon and ERC 20) in country recently through https://www.unitedbonds-nug.org/. The draft Cyber Security Law developed by the Military government in January 2022 was circulated on social media (https://www.facebook.com/groups/538194616772495/permalink/1000043000587652/). It restricts the usage and trading of cryptocurrencies and using a Virtual Private Network (VPN). Private mobile phones were checked for using VPN after the draft Cyber Security Law had been circulated. The option of cryptocurrencies electronic transfer from international to inside Myanmar legally is still a long way off.

7.1.3 Recommendation for ACIAR

Based on the interview results (interview with ACIAR regional manager and country assistant manager), the most successful ACIAR projects are the ones which use the proven research outcomes from other Asian countries such as Vietnam, Cambodia and Laos at a large-scale demonstration level. Future projects can be developed based on the lessons learned from the previous successful ACIAR projects. ACIAR has supported the ACIAR Alumni Regional Network since 2019. This has helped Myanmar ACIAR alumni researchers to extend their scientific networks at a regional level. Myanmar ACIAR alumni inside the Ministry or other organizations could become local ambassadors for ACIAR and Australian/other international agricultural aid projects.

Apart from Australian research institutes and universities, ACIAR worked together with the Australian Volunteers program for Farmers Without Borders program. The outreach Small Research Activity associated with the project *Increasing productivity of legume-based farming systems in the central dry zone of Myanmar* (SMCN/2011/047; known as MyPulses) brought Australian farmers to the CDZ. Nyaung Oo farmers were keen to learn the experiences from Australian farmers and asked many questions to them during the farmers' workshop. Within a short time, they learned how to change their traditional persistent farming system into economically beneficial farming businesses (interview with former AVP). Farmers in Myanmar were keen to learn how Australia's farmers conducted their farming and to compare with their farming systems. Transferring knowledge from farmers to farmers is an efficient dissemination system. Given the decline in food security in Myanmar, it is recommended that applied research projects with short paths to impact and built-in out scaling strategies be the focus for investments in Myanmar at this stage.

If despite the sanctions, ACIAR was able to maintain their Assistant Country Manager in-country and consider new projects without involving military related personnel, we foresee that project activities could   be   implemented   through   collaborating   with   INGOs,   NGOs,   CSOs,   private companies/associations, consultants and ACIAR alumni. The ACIAR Regional Manager could also travel inside the country to assess logistics. There will need to be some level of interaction at the Department level within MoALI to facilitate the support of visas for international scientists and to take advantage of the impressive extension network at a State and Regional level. Australian scientists who have long-term experience in working under different political situations, and who have effective in-country collaborators, could fly-in and fly-out of Myanmar to oversee projects as World Fish is currently practicing.

If there was no ACIAR responsible person in-country, ACIAR, Australian Research Institutes/ Universities, and Australian Volunteer programs need to consider collaborating with an international organization that has access both inside and outside of the country. Since 2012, foreign governments witnessed the progressive development of democratic transformation in Myanmar. They invested

and impressive progress was made on poverty and nutrition indices in the past five years. Currently the international sanctions applied to the country are different to the situation with the previous military regime. Countries are directing their sanctions primarily to the military, however many multi-national companies have withdrawn or substantially curtailed their operations. Some development partners (e.g., USAID, SDC through Helvetas) are still providing aid for Myanmar people without contributing funds to the military-related Government senior officials (Director level up to the Ministers). However, of concern is that the impressive progress in reducing poverty and nutrient deficiencies in rural communities over the past decade will quickly erode. *World Fish colleagues who still have a large project in-country have already reported that nutritionally balanced diets for agricultural communities, an important focus of previous projects, is being rapidly unwound.*

Whilst respecting the current sanctions towards Myanmar by the Australian Government, one potential workable option is to develop Small Research Activity (SRA) projects to maintain some continuity and look to build these into major projects once changes happen in a positive way. We will discuss possible collaboration modalities for ACIAR SRA project(s) in the Section 7.2.

7.2 Research and development gaps

7.2.1 Agriculture Development activities by Government at National level (until 2021)

A national Agriculture Development strategy (ADS) was rolled out in 2018 after several public consultations and reviews in all States and Regions in Myanmar (from 2015-2017). Agriculture and Rural Development Sector Coordination Group – ARDSCG assisted MoALI in the development of the ADS to align with SDG goals based on the country requirements. Detailed analysis for the agriculture development gap was conducted through several consultation meetings at State and Regional Level and the activities were developed to fill the gaps (see the ADS strategic frame in Fig 1). Development gaps were categorized under three pillars: governance, productivity, and competitiveness.

Agricultural research for crop, livestock and fisheries occupied only 6% under pillar 2 (Productivity) and MoALI called upon ACIAR, Canada, GIZ, JICA, KOICA, SDC, USAID, WB for their assistances. The research performance system in Myanmar is of a low standard compared with neighbouring Asian countries and it was recommended to increase the performance by seven-fold. Research capacity is still lacking in aquaculture and fisheries, livestock breeding, food science and nutrition, natural resource management, forage production, cropping systems agronomy, soil and water management, pest and disease management, agricultural mechanization, and socio-economic analysis (ASTI 2021).

ADS has been used as the country Agriculture Development Plan since 2018 and the current Minister of MoALI is following ADS in planning Ministry activities. Their activities have a strong focus on pillar 3 (Agribusiness) based on the strategies developed (2015-2020). This reflects the difficult country situation for the mobility of farm workers and producers, organizing logistic for field activities and the current Minister's interest (and his long-term expertise) (https://www.agri.com.mm/). The agri-food export business became limited to a handful of countries after the coup. China, India, Russia, Belarus, and Thailand are the main countries receiving agricultural exports from Myanmar.

The ADS includes an investment plan from 2018-2023 for the Government, the private sector and donors. Most of the funds were planned to come from the Government (Pillar 1 = 34%, Pillar 2 = 75%, Pillar 3= 65%) and donors (Pillar 1- 22%, Pillar 2= 35%, Pillar 3= 31%). Recent ACIAR research investment in pillar 2 and the FVC in pillar 3 reflects the ACIAR mandate to contribute to the in-country strategy of the collaborator country.

Fig 1. Agriculture Development Strategies Strategic Framework
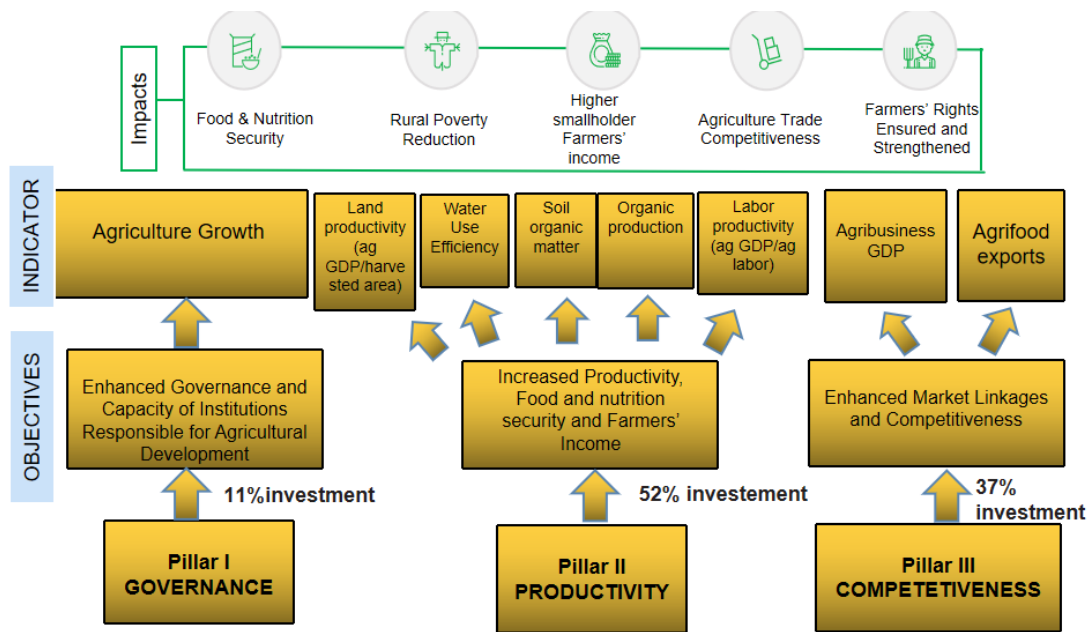
7.2.2 Agriculture development activities by Non-Government Institutes at National level (until 2021)

After reviewing the projects and programs from different organizations, activities were categorized into 21 groups. The livelihood category includes nutrition, resilience of internally displaced people, rural community empowerment, and food security (Fig 2). Livelihood and crop production projects appeared as the highest number followed by value chain and market development.

Water activities targeted sanitation. Activities on water management systems are lacking. Fisheries activities were more focused on production. Most of the livestock project activities were related to livestock health and our review results confirm the finding from ASTI that there are still limited activities on livestock breeding and nutrition. Climate change technologies and climate adaptation areas still need to be developed as well as crop-fisheries integration (Diversification), Agroforestry, Forestry, Gender, Natural Resource Management, and Food Safety.

Fig. 2 Number of projects under different categories by different organizations
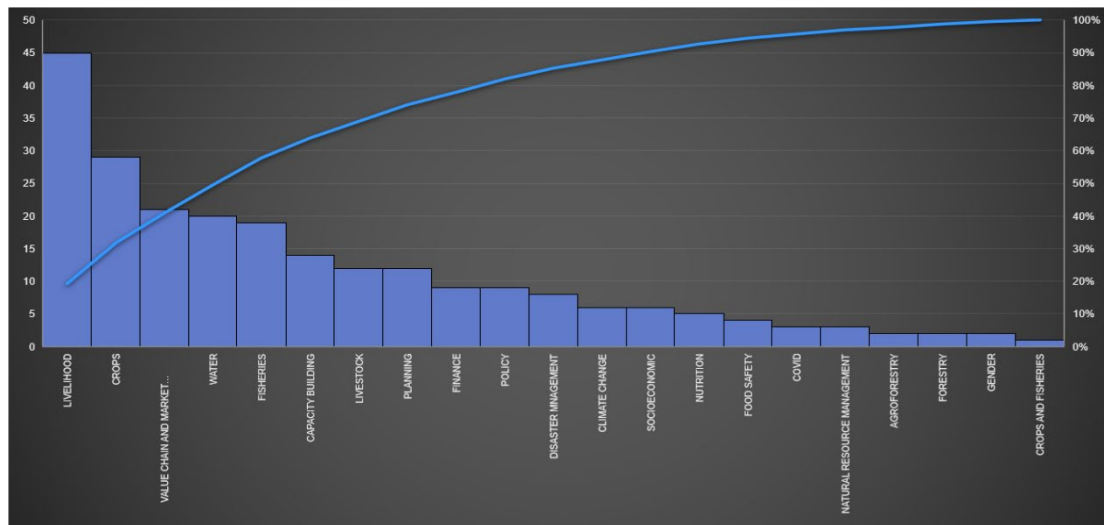
Based on the MIMU report comparing 2020 May and 2021 May, the number of villages involving agricultural development project have decreased, whilst the number of villages that had capacity building, crop input and fisheries projects were more than last year. Investment in agricultural research has not changed over time. Based on this figure, we cannot say what type of agriculture research is ongoing. Social survey research has been used as the main tool to develop the policies and identify development gaps. These figures also confirm a decrease in investment and interest in AR4D research in Myanmar (Fig 3).

Fig 3. Comparison of number of Agriculture projects in 2020 and 2021
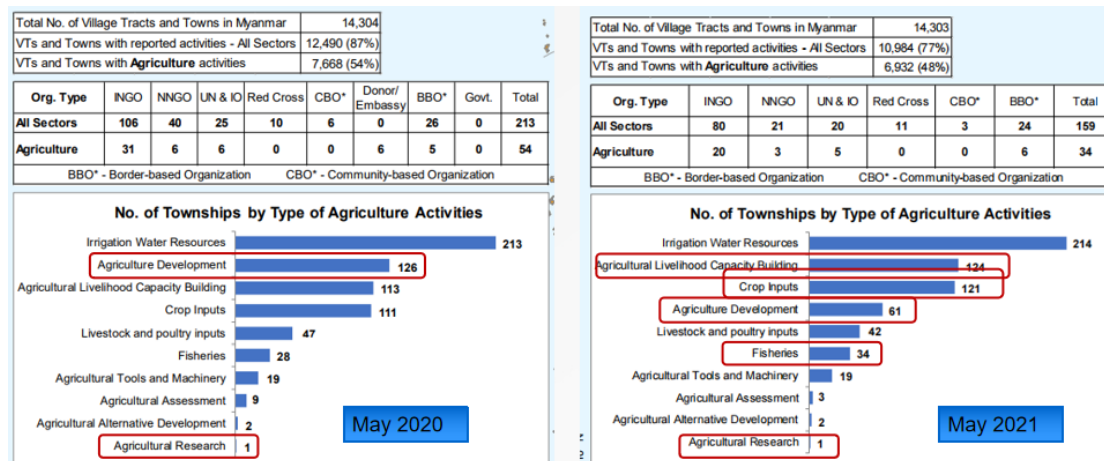
7.2.3 FVC gaps in upland and dry zone

Improving the Food Value Chain (FVC) was one of the most important priorities followed by rural development planning under pillar 3 (competitiveness) in ADS. This pillar was funded mainly by donors (Netherlands aids, GIZ, ADB, JICA, USAID, Canada, LIFT, FAO, and SDC). FVC roadmaps for rice & pulses, oil crops, industrial crops, upland crops, horticulture crops, livestock and fisheries were published in 2017, which was the outcome of a collaboration effort of MoALI and the Ministry of Agriculture, Forestry and Fisheries, Japan (MoALI and JICA 2017). JICA was the lead organization for implementing FVC projects and their approach to FVC was not a standalone project. For instance, under the title of "Rice Value chain in the CDZ", there were seven separate projects; SME Two Step Loan for Service Providers and Agriculture and Rural Development Two Step Loan (JICA),

Agriculture Income Improvement Project (JICA), Project for Improvement on Accessibility of Rice Certified Seed (JICA), Project for Collaboration between Participatory Irrigation Management and Agricultural Extension (JICA), Introduction of agricultural machinery (GoM, other donors), Climate-friendly Agribusiness Value Chains Sector Project in the CDZ (CFAVC) (ADB, FAO), Agribusiness centre (MRF). Except for CFAVC, none of the projects mentioned value chains in their document and project personnel from the DoA were not aware these projects are under value chain agenda. A rice certified seed project was a success in the Sagaing region as a stand-alone project. CFAVC supported implementing ADS activities in the CDZ with the complete set of Value Chain stakeholders and it started in 2020 (ADB 2018). However, project activities were suspended in the CDZ after the coup as ADB withdrew their investment for the project. Unlike farmers in the delta region, crop and livestock systems are more integrated for the farmers in the CDZ and there has been little done to develop an integrated FVC for crop and livestock. This deficiency needs to be addressed.

USAID funded a melon value chain project implemented by Windrock International in the CDZ. The project finished in 2019 and raised the awareness of farmers to produce quality melons (USAID 2019). Melon farmers in the CDZ are retaining their quality standard (following GAP guidelines) in producing melons. Their project collaboration model, however, could not be applied during the difficult country situation. USAID has also been funding ACDI VODCA through Feed the Future Burma Agriculture and Food System Development Activity for the private sector development (https://www.acdivoca.org/news/by-country/myanmar/). UK Aid has been funding private sector associations such as MFVP through DANA Facility for strengthening their capacity. All projects were implemented through MFVP and it indicated MFVP has already developed a significant network among upland farmers.

The Arise Plus project funded by the European Union has completed value chain analysis on fresh fruits and vegetables, and bean, pulses and oilseed with technical assistance from ITC and defined the needs for FVC (Arise Plus 2020). As we briefly mentioned when discussing the horticulture project implemented by UNOPs, ACIAR also had a successful vegetable value chain project in Shan State (AGB/2014/035). The project outcomes still need to be maintained and outreach activities on the results of this project is recommended. The challenge is to implement and adapt the project model to suit the current travel restrictions and the conflict intensity level. A potential collaboration modality will be discussed.

The Innovation Platform (IP) is a development tool used increasingly in developing countries to support the stakeholders in complex systems for Food Value Chain (Brown and Darbas, 2018; https://cgspace.cgiar.org/handle/10568/33667/recent-submissions). IPs offer a practical way to deal with the complex issues and multiple stakeholders involved in value chains. It is a space for "learning and change management" where a group of actors with different backgrounds and interests come together to identify challenges and opportunities to find ways to achieve their goals (Homann-Kee Tul et al., 2013). The other possible approach for FVC is Learning Alliances (LAs). LAs provide a mode for a practical implementation of IPs. LAs have been trialled in the Ayeyarwady Delta in Myanmar to improve farmer adoption of best practices for rice production, including improved post-harvest management. The LAs led to positive interactions between farmers, the private sector and researchers leading to adjustments of farmers' behaviour in rice production, and improved engagement of farmers with millers and rice traders (Flor et al. 2017).

Under the difficult political situation, all research gaps cannot be filled for different reasons (sanctions, safety, communication, and logistic). However, an Innovative Platform/ Learning Alliance could be organized by a private company (such as MyanSeed)/consultants/ Local NGO (NAG/ Dear Myanmar/ Golden Plain) which has experience working on Food Value Chains (see list of consultants in Table-2). The collaboration modality will be discussed in section 7.2.2.

7.2.4 Agriculture development gaps in upland areas

The key challenge in upland areas in Myanmar (Kachin, Shan, Chin, Kayah, Kayin, Mon and Tanintharyi) is continued active armed conflict between Military and Ethnic Armed Organizations (EAO, see different EAO groups in the map). The common agricultural challenges in all upland areas in Myanmar are delicate soil conditions because of deforestation, shifting cultivation, acute water shortage, limited income generating options, limited infrastructure, lack of land ownership, and inadequate education system (LIFT 2015; MMID 2019; LIFT 2020; Actionaid 2020).

FIGURE 2.4
Armed groups in Myanmar's subnational conflicts (2016)[33]

PRESENCE OF ETHNIC
ARMED ORGANIZATION(S)

- **AA**: Arakan Army
- **ABSDF**: All Burma Students' Democratic Front
- **ALP**: Arakan Liberation Party
- **CNF**: Chin National Front
- **DKBA**: Democratic Karin Benevolent Army
- **KIO**: Kachin Independence Organization
- **KNPP**: Karenni National Progressive Party
- **KNU**: Karen National Union
- **KNU/KNLA-PC**: Karen National Union/Karen National Liberation Army-Peace Council
- **LDU**: Lahu Democratic Union
- **MNDAA**: Myanmar National Democratic Alliance Army
- **NDAA ESS**: National Democratic Alliance Army/Eastern Shan State
- **NMSP**: New Mon State Party
- **NSCN-K**: National Socialist Council of Nagaland-Khaplang
- **PNLO**: Pa-Oh National Liberation Organization
- **PSLF/TNLA**: Palaung State Liberation Front/Ta'ang National Liberation Army
- **RCSS/SSA**: Restoration Council of Shan State/Shan State Army
- **SSPP/SSA**: Shan State Progress Party/Shan State Army
- **UWSA**: United Wa State Army
- **WNO**: Wa National Organization

Development partners are interested to invest more funding for upland regions from 2015-2020 and until now. Based on the review of reports, in upland regions investment on crop production, livelihood and value chains were the highest compared with others areas of agricultural development. Value chain projects were mainly done on vegetables and fruits. However, the investment in the main challenging regions is still limited and includes sustainable upland agriculture system management and development of agriculture extension in conflict areas. ACIAR project on soil-based challenges for cropping in Shan State (nutrient acquisition) SLAM/2018/190 filled the research gap in upland regions and more research similar to this project is urgently needed. Under this difficult situation, projects that include laboratory activities will not be easy to manage. ACIAR has developed the capacity in DoA, DAR and YAU for filling this gap. Maintaining the in-country capacity is essential. Crop diversification can provide not only better income for farmers, but can also provide land improvement. This area can be considered for ACIAR investment when the country political situation improves or ACIAR can develop the tripartite agreement through ASEAN or with one of the bordering countries (such as Thailand/ Laos).

Food value chain projects that include a series of meetings with different stakeholders can still be manageable through collaboration with in-country partners. ACIAR can consider SRAs for FVC and capacity building activities for upland areas as a short term investment plan under the difficult political situation.

7.2.5 Agriculture development gaps in CDZ

A majority of farmers in the CDZ obtain their most of their income from cropping (43%), while 23.1% of farmers obtain their main income from livestock production. The remainder of the rural population receive their income from off-farm jobs, remittances and trade (Win et al., 2021). The CDZ plays a major role in providing sesame, groundnuts, pulses and livestock in Myanmar. During a farmers' meeting in Nyaung Oo, farmers from the CDZ identified numerous constraints and challenges to improving productivity, profitability and sustainability of their farming systems including:

- labour availability and price,
- limited source of investment,
- uneven rainfall,
- limited access to machinery,
- pests and diseases (mainly rodents, weeds, and fungal diseases),
- lack of market linkages,
- poor agronomic techniques,
- poor quality of inputs,
- limited access to irrigation (primarily tube wells),
- poor quality of animal feeds,
- limited information China border trade for cattle,
- lack of interest in farming from the next generation,
- appetite for risk for changing cropping practices.

Farmers know their challenges and they need assistance with how to overcome their challenges to improve their livelihoods. The definition of agriculture in Myanmar refers only to crops and excludes pastures and livestock. The CDZ agroecology zone could provide a favourable environment to diversify Crop-Pasture farming systems, integrated with livestock production. A LIFT study indicated farmers profit more by synchronizing animal rearing and cropping systems (LIFT 2019). The different departments within MoALI have poor linkages with the private sector and CSOs, and therefore have limited engagement with the Food Value Chains. There is a need for MoALI to strengthen linkages with alternative in-country research and development providers to enable implementation of multidisciplinary solutions with development partners and the private sector. USAID, JICA and KOICA have introduced value chain approaches for horticultural crops, however the FVC agenda for cereal crops and livestock is still lacking in upland environments.

7.3 SUGGESTED COLLABORATION MODELITIES FOR DIFFERENT SCENARIOS

After reviewing the success stories of different Institutes, we used power/interest grids, power/influence grids, and impact/influence grids to identify collaboration patterns among the different stakeholders (in this case possible collaborators). Each of these techniques supports a grouping of stakeholders according to their level of authority (power), level of concern about the project's outcomes (interest), ability to influence the outcomes of the project (influence), or ability to influence change to the project's planning or execution. Recent ACIAR project activities in Myanmar were reviewed and a suggested collaboration model was developed.

The "Fish passage" project supported by ACIAR was highlighted by local collaborators for achieving large impacts within a short time. Applied research which has provided good results in South East Asia/ Regional level can be implemented at a large scale in similar agro-ecological zones in Myanmar. The project collaboration model can be adapted according to the new collaboration regulation.

7.3.1 Suggested collaboration pathway for current projects and recently finished project with promising project outcomes; eg. Development of Rice-Fish systems in the Ayeyarwady Delta, Myanmar

Since the coup in Myanmar, DFAT has a new collaboration directive to not work with the Government directly. In the power grid analysis, DFAT, Department of Fisheries (DoF), and Department of

Agriculture (DoA) are the highest level of authority stakeholders (Level of authority score 10). Research Project Managers such as ACIAR, DoF and DoA have the highest interest level of project outcomes (their Influence the outcomes of the project, influence/ability to cause changes to the projects' planning or execution score was 10). However, they cannot work together directly under the new restriction of DFAT. CGIAR centres such as World Fish and IRRI also have instigated a temporary directive to not work directly with DoF and DoA to accomplish the project goals (relationship show with dash line in Fig 4). Based on the results from the desktop review and interviews, Network Activity Group (NAG) has promising experience collaborating with International Institutes, Government and local farmers (their relationship with different Institute shown in solid line in Fig 4). NAG has a positive relationship status with all stakeholders involved. The suggested collaboration modalities would be to continue project activities through collaboration with NAG. However, DFAT and ACIAR could have variable influence. The Australian Government sanctions of the military government in Myanmar would complicate the implementation of an ACIAR project. There would be limited direct input on the execution of a project. DFAT and ACIAR could observe negative results on the project development and outcomes. If there was not careful implementation of key project activities then the outcomes could be severely compromised and DFAT ACIAR influence on the outcomes of the project influence/ ability to cause changes to the projects' planning or execution score could also be -10 in Fig 4. Our recommendations for the management of Rice-Fish activities in Myanmar relating to broader adoption of previous project outputs are:

i) ACIAR needs to provide project adjustment document/ other informal presentation with DFAT key person if it is required

ii) ACIAR RPM needs to make an adjustment in the project document to provide DFAT for justification of continuing project activities; and negotiate with World Fish and IRRI for new adjustment on the project document

iii) ACIAR regional manager/ country coordinator needs to work together with ACIAR RPM to negotiate with NAG, World Fish and IRRI for new adjustment on the project document

iv) World Fish and IRRI needs to adjust the project document and contract with NAG to facilitate project activities

The model needs to be tested. The conflict intensity rank in the Ayeyarwady Delta area during the review period was lower than for the Central Dry Zone and the Upland Region in Shan State (World Bank, 2022).

Fig 4. Stakeholder power grid for Rice-Fish Value Chain project in Delta area
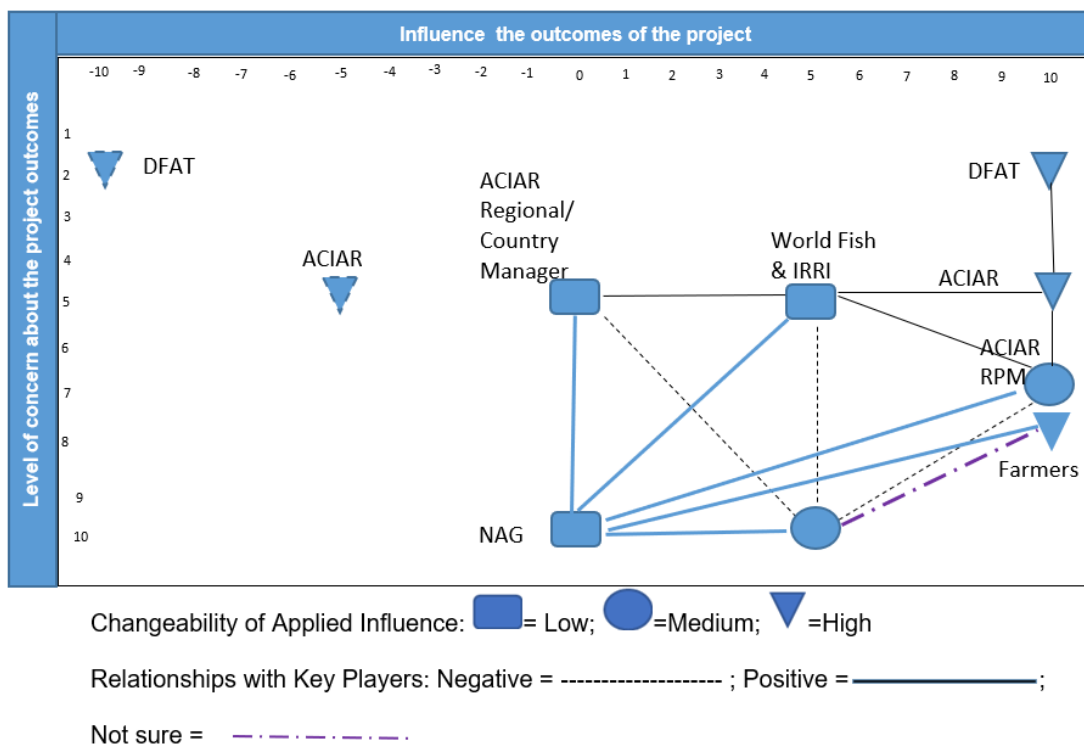
7.3.2 Smallholder farmer linkages with crop and/or meat value chains in the Central Dry Zone and upland areas

As discussed in the introduction, there is a need for CDZ farmers to strengthen their capability to integrate their production of crops and livestock. Previous scoping studies by farmer volunteer program in 2019 identified which MyFarm technologies have been taken up by farmers and the challenges faced by farmers to adopt the developed technologies into their farming business. Farmers have been using new varieties introduced by the MyFarm program. However, farmers acknowledged the need for more education on new production techniques for crop and livestock production. They are keen to improve the quality and quantity of production and to ensure they are providing products in the time window required by markets. The different departments within MoALI have poor understanding of market forces and thus there is need for strengthening the linkages of farmers to the food value chain. To make satisfactory progress, a multi-disciplinary approach will be required that links rural producers, development partners and the private sector. Farmers in upland areas mainly rely on maize, vegetables and fruit crops production as their main income.

The stakeholder power grid for this project (Fig. 5) is similar to that developed for the Rice-Fish project. This innovative platform/learning alliance approach to strengthening the capacity of farmers in decision making for food value chains could be target for the upland regions in Shan State to take advantage of the successful outcomes of the ACIAR vegetable value chain project and the crop and meat value chain project in CDZ.

In this collaboration model, the private company such as MyanSeed or local NGOs such as NAG and Dear Myanmar can be the primary in-country collaborator who can work directly with farmers in CDZ and upland areas. Scientists from international Research Institutes such as CSIRO or IRRI can be the leading scientist to develop the research questions and designs for the project. Farmers in some part of CDZ area (South Magway Region) and Southern Shan State (e.g. Inlay and Nayaung Shwe) who participated in Value Change project have good communication with the MoALI and they can work indirectly with MoALI if it is required.

Fig 5. Stakeholder power grid for Smallholder farmer linkages with crop and/or meat value chain in Upland & CDZ

7.3.3 Suggested collaboration pathway for Capacity Building on Land Suitability/Plant Health/Rice Production/Fish Breeding/Vegetable agribusiness value Chain

DFAT, the Land Use Division (LUD), the Plant Protection Division (PPD), the Department of Agriculture (DoA), and the Department of Fisheries are the stakeholders with the highest level of authority. The authority level of Government staff who participated in Civil Disobedience Movement (CDM) was severely diminished during the coup. Hopefully this could be reversed if the political situation switched from Military to Civilian government. It is important to include CDM staff in capacity building activities for two reasons; firstly, to maintain their skills for future urgent food security research and outreach; and second, to maintain existing networks that are dependent on their involvement. The interest of ex-government staff for project outcomes is currently not high given their limited income. They are focused on their own safety and access to food and shelter, plus they would have very limited access to the internet. This problem could be partially solved through collaboration with an organization that has received trust from different groups of people with different political views such as Golden Plain.

The interest of project outcomes by ACIAR regional and country manager is likely to be higher than if the focus was limited to a Rice-Fish project. There would be a broader set of Myanmar researchers involved, many of which are ACIAR Alumni who previously had impressive achievements through prior ACIAR projects. Capacity building activities are feasible and desirable to maintain the existing network of ACIAR in Myanmar during the current difficult political situation.

As we discussed in section 7.2.1, capacity building activities can be done through either on-line training courses, webinar training and regional workshop/conference attendance. It could be organized by experienced resource people (CSIRO (or) University of Western Australia (UWA) for Land Suitability; CABI for Plant Health; IRRI for Rice Production; WF for Fish Breeding; ACIAR for Vegetable Value Chain Agribusiness) through collaboration with local organizations trusted by all stakeholders such as Golden Plain (Fig 5).

Other Capacity building options include the following:

(i) Strengthening the capacity and learning experience through "on-the-job" involvement in international research projects,
(ii) Awards and fellowships (for example JAF, JDF, Meryl Williams Fellowship, Australian Award), research funds for researchers (for example ARSF-ACIAR alumni research fund, OWSD Early Career Fellowship),
(iii) Regional exchange visits (for example link to annual meetings of ACIAR projects)
(iv) Research conferences/Research travel grants that provide opportunities for young Myanmar researchers to attended science meetings (e.g. https://twas.org/opportunities/scientific-meetings)

Fig 6. Stakeholder power grid for the capacity building for Capacity building of Land Suitability project/Plant Health/Rice Production/Fish Breeding
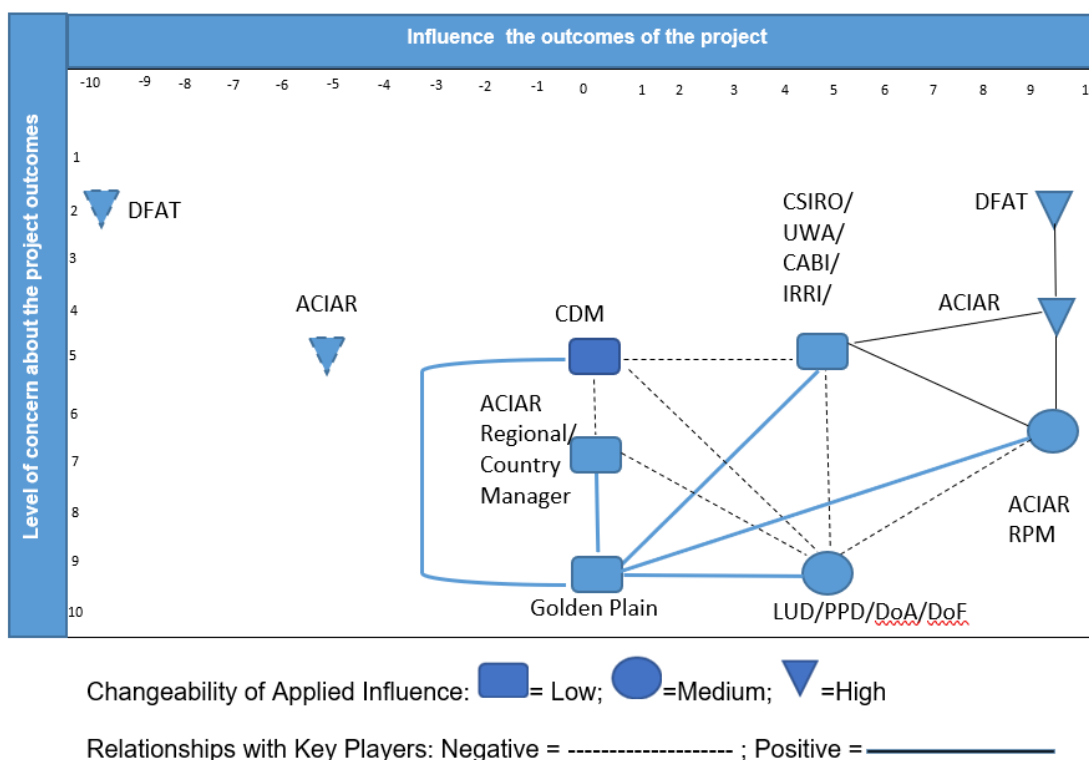
7.3.4 Suggested collaboration pathway for Sustainable upland management in upland areas

Tripartite collaboration agreement model is not the traditional collaboration approach of ACIAR. Given that the difficult political situation in Myanmar, urgent need of food security and maintaining the capacity of ACIAR trained local researcher inside MoALI, tripartite collaboration through ASEAN/Thailand/Laos could maintain the agriculture for development investment momentum inside Myanmar. It will require a series of discussions to determine how all three countries will benefit through this collaboration model.

Fig 7. Stakeholder power grid for sustainable upland management system
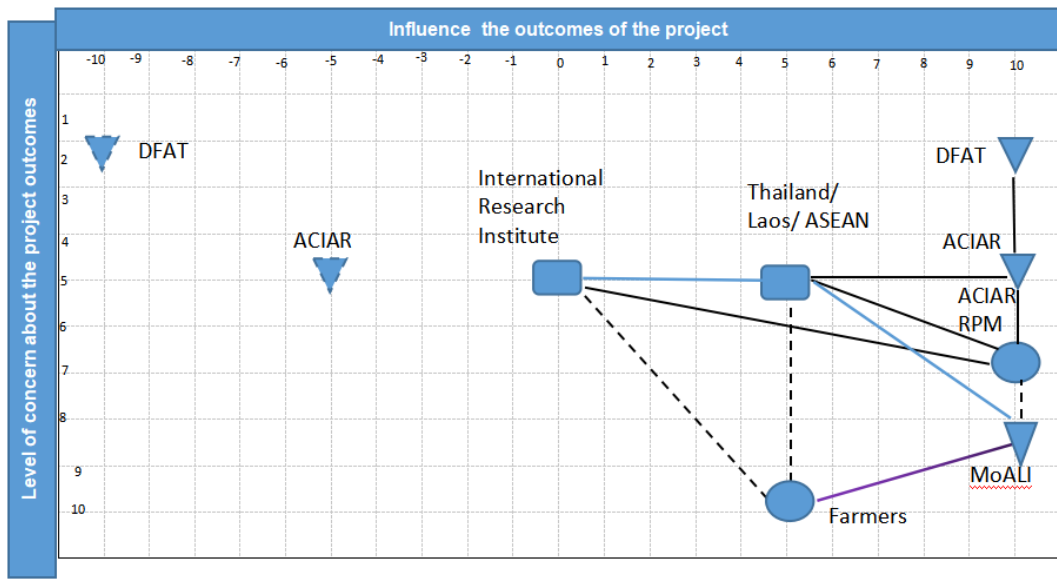
8 Impacts

8.1 Scientific impacts – now and in 5 years

Finding the right partners to work with will assist future projects to successfully realise substantial scientific impacts. Given the current situation it is not possible to estimate these impacts.

8.2 Capacity impacts – now and in 5 years

Project personnel have participated in remote training activities for agriculture researchers in Myanmar, having some immediate impact on capacity building and maintenance of engagement of researchers with their fields. It is expected that implementation of recommendations will have significant impacts in 5 years' time through maintenance of capacity for rapid redeployment into future AgR4D projects.

8.3 Community impacts – now and in 5 years

There is enormous uncertainty surrounding community benefit of this and other projects, with much relying on the trajectory of governance in Myanmar. As an enabling project, this project's impact aspirations lie in increasing the likelihood of success of subsequent investments.

8.3.1 Economic impacts

Our project findings point to a strong relative value proposition for investing in food value chain research in the CDZ and Shan State. Whilst not providing tools directly, a project on the food value chain will accrue substantial impact through assistance to subsequent project design and operations.

8.3.2 Social impacts

As elsewhere described, the main pathway to impact will be through some assistance in the design and conduct of subsequent investment. We identified some direct social impacts in the researcher community, by being a dim beacon, a light left on above the door, showing the resolve of the people of Australia to walk with the people of Myanmar.

8.3.3 Environmental impacts

As elsewhere described, the main pathway to impact will be through some assistance in the design and conduct of subsequent investments.

8.4 Communication and dissemination activities

Seminars were present in Australia (The University of Melbourne and Australian National University), and briefings to ACIAR and DFAT.

Aspects of this report are being adapted for publication in the Journal of International Development or similar. An article for The Conversation is being negotiated.

9 Conclusions and recommendations

9.1 Conclusions

Myanmar is a country with rich natural resources including large areas of agricultural lands that occur across a wide range of agro-ecosystems. Myanmar had limited international aid and markets until 2011. Post 2011, the election of a more democratic government led to greater engagement with international donors that led to an increase in agricultural production (crops, fisheries and livestock) and, in turn, a marked improvement in not only national food security but also in the academic development of young agricultural researchers. After a decade of improved investment in AR4D both internationally and domestically, Myanmar is still one of the least developed countries in ASEAN. Further international investment in AR4D is a high priority to alleviate poverty, improve the livelihood of people, and continue to build the capacity of agricultural research and extension specialists. The combined impact of COVID and the February 2021 *coup* in Myanmar resulted in the country's poverty level doubling since early 2020 (pre COVID pandemic) (World Bank 2022). It is estimated that 22 percent of the country's population (some 12 million people) currently face moderate food insecurity and 1.2 million people are severely food insecure (UN OCHA 2022). Since February 2021, donor funds have declined appreciably. There is still limited international support for humanitarian aid, including Agricultural development. Ongoing projects are managed by a limited set of international research Institutes, INGOs, NGOs, CSOs and individuals (consultants). Regardless of the unstable political situation, it is important that the gains from the previous decade are maintained. Unfortunately, the withdrawal of expertise nationally (via departure of staff from MoALI) and internationally is leading to a rapid erosion of the advances made from 2011 to 2020. We recommend that, if possible, ACIAR explores avenues to maintain the impressive advances in AR4D via the network of national researchers that has been carefully expanded and nurtured over the past 20 years. We provide an analysis of possible effective collaboration for ACIAR projects without including military and military related individuals. Given the uncertainty in country, we recommend that SRAs be established initially to test these models of collaboration.

9.2 Recommendations

Based on our study, we suggest to develop Small Research Activities on capacity building, Food Value Chain Innovation Platform and to continue to outscale the research outcomes of ACIAR-Myanmar projects such as Rice-Fish project under travel restrictions for International Researchers and Local collaborators. These SRA projects can be implemented through collaboration with recommended potential collaborators identified in our study. Suggested collaboration modalities need to be tested.

We also suggest other research development gaps under different themes such as; Food Value Chain Development under Agribusiness; climate change resilience research in Upland and Dry Zone; Potential crops such as Rubber, Coffee, Tea, Cassava, Avocado production under Crops; Aquaculture Business under Fisheries; Agro Forestry under Forestry; Vegetables and other potential Export crops such as Banana and Mango production under Horticulture; Pasture crops, profitable livestock system and Animal Health under Livestock Systems; Behaviour change and Extension system under Social Sciences; Dry Zone & Upland, Land Suitability, Diversification, Conservation, cropping pattern Laboratory upgrading under Soil and Land Management; Water quality, Flood Management, and Community Irrigation system under Water; Sustainable Agriculture; Value added (crop and Fisheries) Food Future Research Program; Mechanization; Agrometeorology; and Innovation ICT.

Specifically, we recommend:

(i) High priority be given by development partners to maintaining and developing Myanmar's future research capability, through capacity building activities in neighboring countries and the conduct of limited in-country research in Myanmar.

(ii) Given the current sanctions and travel advice related to Myanmar, most CGIAR Institutes, Australian Research Institutes, and Universities are not able to be primary

in-country leads on AR4D projects. Some INGOs, NGOs, private sector agencies, experienced consultants and ASEAN-associated agencies, were identified as possible primary in-country leads. However, international research institutes will still need to provide key roles for developing the research technologies for urgent food security issues in Myanmar. INGOs, local organisations and ASEAN agencies have limited experience on cutting edge AR4D. It is recommended that development partners continue to commission leading Australian and international research organisations to conduct activities to benefit Myanmar, utilizing experienced and trusted entities and agencies as partners within and near Myanmar.

(iii)   The recent development of the One-CGIAR model of operation could have an impact on the governance changes in CGIAR Institutes. However, under the One-CGIAR system, World Fish and IFPRI are maintaining a significant, if somewhat reduced, research momentum in Myanmar. It is recommended that the success (and challenges) of the collaboration model used by these two Institutes is monitored over the near future.

(iv)   ACIAR has had highly successful research projects in Myanmar under different political situations since the late 1990s. All successful projects started with project designs based on successful research outcomes from neighboring Asian countries. Regardless of the considerable challenges raised by the current difficult country situation, potential Small Research Activities (SRA) for AR4D are urgently needed. Based on our findings, there are several options for ACIAR to build and maintain critical research capability in the Government, University, and NGO sectors within Myanmar without direct collaboration with Government and Military related organisations.

(v)   We propose that government personnel be considered as a secondary connection through non-government partners. Government research and extension networks in Myanmar, although typically poorly resourced, are extensive in their reach. Therefore, we propose that the *Ministry of Livestock, Agriculture and Irrigation (MoALI)* should still have connectivity, although of a secondary nature, with AR4D projects. Therefore, it is important to monitor the political changes inside MoALI and assess who is directly aligned with the military government. Careful selection of government collaborators is paramount.

(vi)   Given that collaborating with INGOs, NGOs, CSOs, and consultants are more feasible for project implementation, they can be considered as the primary in-country partners. Their capacity on managing research projects needs to be mentored and supported by international research institutes.

(vii)   The private sector was strengthened during 2015-2020, however, they are more business and profit oriented. Only research projects with existing business models are likely to successfully collaborate with the private sector. Again, as a duty of care, an audit of links with the military government needs to be done.

(viii) The national Agriculture Development Strategy (ADS) developed from 2015-2017 is still maintained by both the Government and Donors as the dominant guide for investing funds for AR4D. We recommend that ACIAR still refers to the ADS for their Myanmar country strategy for investing in AR4D.

(ix)   Investment in Myanmar's agriculture development sector in the upland area increased during 2015-2020 compared with pre-2015. However, the progress and achievements during 2015-2020 need to be maintained or any gains for smallholder farmers will be quickly eroded. Value chain projects, capacity building on soil and nutrient management, and crop diversification are key priorities and can be implemented through collaboration with research institutes (international and national), local partners and training centres.

(x)   In the past decade, there has been more investment in AR4D in the Sagaing region in the CDZ compared with Magway and Mandalay regions. Livestock and crop production are closely aligned in the CDZ. Thus, an integrated approach is required to improve both livestock and crop production. We suggest investment in an innovation platform approach for a more integrated Food Value Chain for crops and livestock. Capacity building activities we identify for upland areas in Shan State are also applicable for the CDZ.

(xi)   The COVID pandemic and military *coup* have had a substantial impact on the food security of Myanmar people; more than 13 million people are facing moderate to severe food insecurity. Based on our research, we provide possible collaboration modalities for developing SRAs with a focus on the following: (i) to increase the

scale of delivery of outputs from ACIAR-Myanmar projects to extension professionals and the rural sector, (ii) the urgent need to strengthen the food value chain so that smallholder farmers will benefit and thence the general rural community, and, (iii) to ensure that the capacity built in the agricultural sector over the past 15 years is not rapidly eroded. We suggest detailed processes for developing and implementing AR4D projects under the current military governance.

10 References

10.1 References cited in report

Actionaid. 2020. Strengthening Rural community Development in Chin state, Myanmar.

ASEAN Regional Integration Support from the EU ASEAN Regional Integration Support from the EU Plus(ARISE[+]). 2016. National Export Strategy (2015 vs 2020).

Asian Development Bank (ADB). 2018.The Republic of the Union of Myanmar: Climate Friendly Agribusiness Value Chains Sector Project.

Brown P and Darbas T. 2018. Workshop and review of Innovation Platforms to enable scaling out of Conservation Agriculture-Based Sustainable Intensification in the Eastern Gangetic Plains. Australian Centre for International Agricultural Research. Canberra, Australia.

Department of Agriculture (DoA). 2021. Land Use Department (LUD). Available at http://www.doa.gov.mm/doa/index.php?route=product/category&path=33_67.

Department of Agriculture (DoA). 2021. Postharvest. Available at http://www.doa.gov.mm/doa/index.php?route=product/category&path=33_68

Department of Agriculture (DoA). 2021. Rice Section. Available at http://www.doa.gov.mm/doa/index.php?route=product/category&path=33_66

Department of Agriculture (DoA). Plant Protection Division (PPD). 2021. Available at http://www.doa.gov.mm/doa/index.php?route=product/category&path=33_64

Digital 2021. https://datareportal.com/reports/digital-2021-myanmar. Access on December 2021.

Directorate of Investment and Company Administration. 2014. *Myanmar Investment Guide*. http://dica.x-aas.net/dica/en/myanmarinvestment-guide.

Duncan Boughton and Su Su Win. 2019. Agricultural Research Capacity and Extension Linkages in Myanmar: assessment and recommendations Research Paper 131.

Flor RR, Leeuwis C, Singleton G, Maat H, Gummert M. 2017. Adaptive Research with and without a Learning Alliance in Myanmar: Differences in learning process and agenda for participatory research. NJAS - Wageningen Journal of Life Sciences 81, 33-42.

Food and Agriculture Organization. 2013. FAOSTAT (FAO–FAOSTAT). Available at http://faostat.fao.org/

Government of Myanmar (GoM). 2018. Multi-Sectoral National Plan of Action for Food and Nutrition (NPAFN) (2018/2019-2022/2023). 2018. The Republic of the Union of Myanmar. Pp 64

Government of Myanmar (GoM). 2020. Myanmar Economic Relief Plan. Pp 15.

Herridge. 2006. Report on a review of ACIAR-funded projects on Rhizobium during 1983–2004. Australian Centre for International Agricultural Research. Canberra, Australia.

International Crop Research Institute for the Semi-Arid Tropics (ICRISAT). 2011. *Myanmar and ICRISAT.* Improving lives with better agricultural practices

International Food Policy and Research Institute (IFPRI). 2021. Opportunities and constraints for production and income growth in rural Myanmar. Inter-regional variations in the composition of agriculture, livelihoods, and the rural economy.

International Food Policy and Research Institute (IFPRI). 2021. Agricultural Science and Technology Indicators (ASTI) Data Tool. Available at http://www.ifpri.org/dataset/agriculturalscience-and-technology-indicators-astidata-tool

International Rice Research Institute (IRRI). 2015. Myanmar Rice Sector Development Strategy (2015). Los Banos, Philippines.

International Water Management Institute (IWMI). 2013. Improving water management in Myanmar's Dry Zone for food security, livelihoods and health.

Livelihoods and Food Security Trust Fund (LIFT) . 2019. *Farming Systems in Myanmar.* Available at: https://www.lift-fund.org/farming-systems-myanmar

Livelihoods and Food Security Trust Fund (LIFT). 2012. Increasing the Efficiency and Effectiveness of Pumped Irrigation Schemes in the Central Dry Zone of Myanmar

Livelihoods and Food Security Trust Fund (LIFT). 2015. LIFT Uplands Programme: Scoping Assessment Report.

Livelihoods and Food Security Trust Fund (LIFT). 2021. 2022-2023 strategies. Available at https://www.lift-fund.org/en/lift-flyer-en-mm

Lundy, M., Gottret, M.V., Ashby, J., 2005. Learning Alliances: An Approach for Building Multi-Stakeholder Innovation Systems. International Center for Tropical Agriculture (CIAT), Cali, Colombia, ILAC Brief 8.

Luthur Myanmar Newsflash. International Non-Governmental Organizations in Myanmar – Renew or change your registration?Myanmar digital Economy roadmap https://oxfordbusinessgroup.com/overview/connection-roadmap-new-digital-strategy-government-trade-and-investment-improve-sector-development. Access on October 2021.

McCartney, M. and Kaing, O. 2014. A country in rapid transition: Can Myanmar achieve food security? In: Food security and development: Country case studies, ed., Nagothu, U.S. Oxon, UK: Routledge.

Melanie Connor, Reianne Quilloy, Annalyn H. de Guia & Grant Singleton. 2022. Sustainable rice production in Myanmar impacts on food security and livelihood changes, International Journal of Agricultural Sustainability, DOI: 10.1080/14735903.2021.1918471

Ministry of Agriculture, Livestock and Irrigation (ASTI). 2016.Agricultural Sector Policies and Thrusts for Second Five Year Short Term Plan of MOALI (October 2016).

Ministry of Agriculture, Livestock and Irrigation (MoALI) website. https://moali.gov.mm/en/. Access on December 2021.

Ministry of Agriculture, Livestock and Irrigation (MoALI). (2004). "*Study on variations in Support Activities in different Agro-ecological Zones and Socio-Economic situation of Myanmar*".

Ministry of Agriculture, Livestock and Irrigation (MoALI). 2017. Food Value Chain Road Map (2021-2025).

Ministry of Agriculture, Livestock and Irrigation (MoALI). 2018. Agriculture Sector Development Policies in Myanmar (2018/2019-2022/2023). The Republic of the Union of Myanmar. Pp 147

Ministry of Natural Resources and Environmental Conservation (MONREC). 2019. Myanmar Climate Smart Agricultural Strategy (2018-2030). The Republic of the Union of Myanmar. Pp 154.

Myanmar Centre for Responsible Business (MCRB). 2015. Myanmar ICT Sector-Wide Impact Assessment September 2015. Institute for Human Rights and Business (IHRB), and Danish Institute for Human Rights (DIHR), September 2015.

Myanmar Information Management Unit (MIMU). 2021. Comparison of 3W results - 2020 to 2021. Available at https://themimu.info/node/113425.

Myanmar Institute for Integrated Development (MIID). 2019. Agroecology case study: Addressing the challenges of upland Farming in Southern Shan state for Climate resilience.

Myanmar-SECO-UN Trade Cluster Project annual report. 2020 presentation

National Economic and Social Advisory Council (NESAC). 2016. White Paper from Rice Bowl to Food Basket.

National Economic and Social Advisory Council (NESAC). 2016. White Paper Vegetables.

Telenor. 2021. https://www.telenor.com/wp-content/uploads/2018/02/Telenor-Realising-Digital-Myanmar-Report-06-February.pdf. Access on December 2021.

United Nation Office of the Coordination of Humanitarian Affairs (UNOCHA). 2022. Humanitarian response plan 2022.

US Agency for International Development (USAID). 2019. The melon value chain: How collaboration with the national horticulture trade association improved prospects for farmers of Myanmar's most valuable fruit crop.

Voice of America (VOA). 2021. How Myanmar's Civil Disobedience Movement Is Pushing Back Against the Coup (voanews.com). https://www.voanews.com/a/east-asia-pacific_how-myanmars-civil-disobedience-movement-pushing-back-against-coup/6202637.html. Access on December 2021.

Win TTZ, Campbell A, Magalhaes RJS, Oo KN, and Henning J, 2022. How can we compare multispecies livestock rearing households? – An analysis of the impact of health and production parameters on multispecies livestock rearing outcomes. BMC Veterinary Research 18:158.

Win TTZ, Campbell A, Magalhaes RJS, Oo KN, and Henning J. 2019. Characteristics of Livestock Husbandry and Management Practice in the Central Dry Zone of Myanmar. Tropical Animal Health and Production, 51:643–654. https://doi.org/10.1007/s11250-018-1738-9

World Bank, 2021. Contending with constraints. Special focus: Digital Disruptions and Economic Impact. Myanmar Economic Monitor.

World Food Program (WFP). 2018. Strategic Review of Food Nutrition Security in Myanmar-Road Map to 2030.

Young Scientist Initiative (YSI). 2020. Unpublished data. Department of Agriculture, Ministry of Agriculture, Livestock and Irrigation. Myanmar.

Yueming S., Weaver T., Defang L. and Huachun L., 2017. Tracing Cross-Border Cattle and Buffalo Movement from Lao People's Democratic Republic and Myanmar to the People's Republic of China and assessing associated Foot and Mouth Disease risk, Theme 3: Toward Value Chains for SEAP Discussion Paper No. 8, ,Greater Mekong Subregion's (GMS).

10.2 List of publications produced by project

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11 Appendixes

Appendix 1: List of people interviewed

Name of organization	Type of Institute	Respondent	Contact point	Interviewer
SWISSAID	Donor	Ms. Moe Moe Than Win	Moe Moe Than Win - Senior National Program Officer - Embassy of Switzerland in Myanmar | LinkedIn	NMHtwe
USAID	Donor	Mr. Khun Thein Soe	Khun Thein Soe | Facebook	NMHtwe
GIZ	Donor	Dr. Win Pa Pa Soe Former project coordinator	Win Pa Pa Soe - Technical Key Account Manager - GLOBALG.A.P. c/o FoodPLUS GmbH | LinkedIn	NMHtwe
KOICA	Donor	Ms. Pwint Phyu	Pwint Phyu (Assistant Manager) KOICA Myanmar Office Tel : 01-3500801 Fax : 01-3500802 Mobile: 09-797711856 koica.pwintphyu@gmail.com	NMHtwe
UNOPS	UN	Dr. Bhone Nay Htoo	National Coordinator | SECO UN Trade Cluster Trust Fund| UNOPS Myanmar | SECO PMU Office, KBZ Trade Center, Ye Aye Kwin Ward, East Circular Road, Taunggyi, Myanmar | Mob.&Whatsup: +95 9456 364123 | Skype: bhone.htoon | www.unops.org | UNOPS is ISO 9001 certified bhonenayh@unops.org	NMHtwe
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		Ms. Myint Myint Aye	**Extension Specialist** Myint Myint Aye - Extension Specialist - FAO | LinkedIn mmayeysg@gmail.com	NMHtwe
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		Ms. DulceSimmanivong	Dulce.Simmanivong@aciar.gov.au	NMHtwe
		Dr. John Copland Former ACIAR Research Project Manager (until 2005)	jws@tpg.com.au	NMHtwe
Australian Volunteer Program		Mr. Stephen Rodger	Technical Officer | Plant Division | Plant Import Operations Phone: +61 2 6272 2142 | Email: stephen.rodger@awe.gov.au	NMHtwe
Michigan State University	Research Institute	Dr. Ducan Boughton	Professor Department of Agricultural, Food, and Resource Economics Phone: 517-432-6659 <boughton@msu.edu>	NMHtwe
CSIRO	Research Institute	Dr. Anthony Ringrose-Voase	Principal Research Consultant - Soil Science Anthony.Ringrose-Voase@csiro.au	REdis
IRRI	CGIAR	Martin Gummert	Senior Scientist, Mechanization and Postharvest Resilient Agri-Food Systems Group, Research Delivery & Impact Division	NMHtwe and GRSingleton

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		Mr. Zin Wai Aung	Former Research Analyst zinwaiaungyau@gmail.com	NMHtwe
Welthungerhilfe	INGO	Hteik Htar Oo		NMHtwe
GRET	INGO	Dr. Htet Kyu	Htet Kyu - National Network Coordinator - Gret Myanmar | LinkedIn htetkyu@gret.org	NMHtwe
International Rescue Committee (IRC)	INGO	Moe Moe Than Win	Former PLE Coordinator/Livelihood Specialist Project for Local Empowerment	NMHtwe
Consortium of Dutch NGOs	INGO	Ms. Chit Chit Swe	Former Sr. Agriculture Trainer Consortium of Dutch NGOs chitchitswe21@gmail.com	NMHtwe
Mercy Corps	INGO	Mr. Thet Oo	Agriculture Technical Advisor Thet Oo - Agriculture Technical Advisor - Mercy Corps | LinkedIn	NMHtwe
Network Activity Groups (NAG)	NGO	Mr. Bobby Mung	Bobby Maung - Chief Executive Officer - Network Activities Group | LinkedIn 72.bobby@gmail.com	NMHtwe

|				
DEAR Myanmar	NGO	Kyaw Naing Lin	(Project Coordinator) DEAR Myanmar (Development of Environmental-friendly Agriculture Rural Life of Myanmar) Building (794), 4th Floor, Kyaw Thu (21) Street, South Okkalapa Township, Yangon, Myanmar E-mail PR@dearmyanmar.org Contact no. 09-421742662 Mobile no. 09778178667	NMHtwe
Golden Plain Livelihood Development Ltd (YAU graduate and retired person)	NGO	Daw Htwe Htwe Aung	htwe aung - Myanmar | Professional Profile | LinkedIn htwehtweaung@goldenplain.org	NMHtwe
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Appendix 2: **P4 (PULSES, PEOPLE, PLANET & PROFIT PROJECT) Project collaboration model**

NAG collaboration model for P4 Project
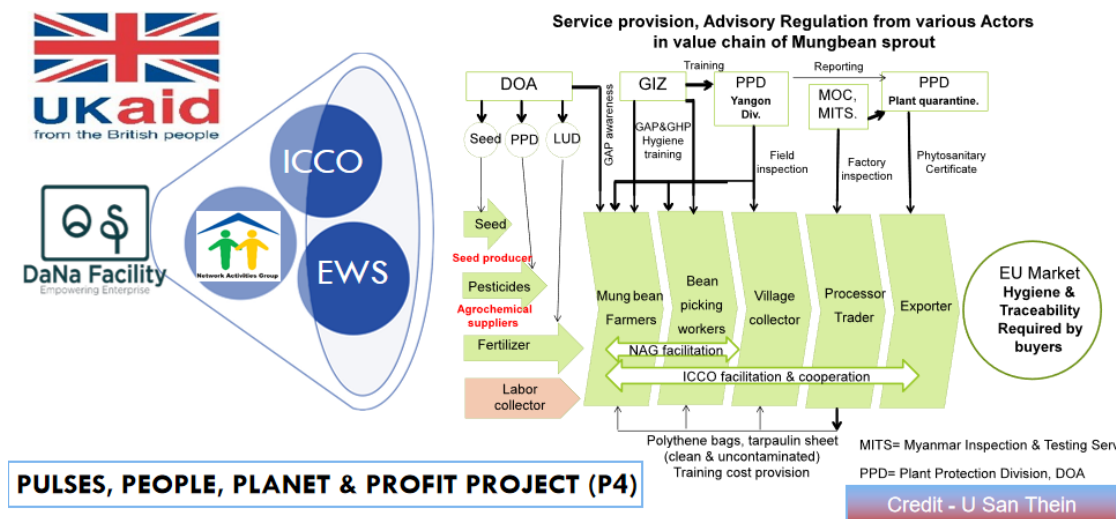
P4 project was funded by DFID (UK aid) through Dana facility. It was a collaboration among local NGOs, the Network Activities Group (NAG), East West Seed Company and ICCO Cooperation. The goal of the project was to increase the income of mungbean farmers and female labourers. ICCO took responsibility for Capacity building of NGOs/CSOs/CBOs and developed an inclusive business model for buyers and input suppliers. East West Seed Company were service providers on GAP, CSA and CM develop key farmers who operate demo farms and promote good seed. NAG set up seed multiplication farms and organize for farmers training. Through this collaborative project, 10,000 smallholder mungbean farmers (including 2,000 landless female farmer labourers) benefited. Farmers income increased 20% (10% increased income from improved productivity, 5% increased income from improved quality harvest and 5% increased income from collective marketing and price incentives) and female labourer's income increased 30% (10% increased income from the elimination of debt-bonded labour, 10% increased income from higher volume and quality of harvest, 5% increased income from employment in collective enterprise, and 5% increased income from collective input retailing profits). This project model has achieved success through collaboration among an International Institute, private company, local NGOs and a Government Institute. This project provides a potential model for operation under travel restrictions for International Institute inside the country.

Given the fact that MoU signing process with Government Institute takes time, ACIAR could find the collaborator such as NAG to facilitate and organize project implementation at the local level.

Appendix 3:. Interview questionnaires

11.1.1 Questionnaires for Research Institutes and Universities

Objectives:

To identify the challenges in collaboration with Implementation partners

To document the different strategies used to overcome their constraints

To identify the strength and weaknesses of different Institutes

To develop the collaboration pathway under different circumstances

How many Myanmar projects you have managed during 2000-2010 and 2010-2020? If possible, please list down the name of the project

2000-2010	2010-2020

Which project was/ were the most successful projects?

2000-2010	2010-2020

In all successful projects you have mentioned in Q-2, who played the key role to achieve the goal of the project/program?

What are/were main challenges you have encountered in the project management? (Project personnel/collaborators/ACIAR/Administration)

How did you choose your collaboration partner in Myanmar? Please provide us criterion you used for selecting your collaborators.

What are/were main challenges you have encountered working with your collaboration partners?

How did you overcome all these challenges? Could you please highlight the key approach which worked well to overcome the problems, and which did not?

Did your collaborator perform as you expected during the project? If not, what were their constraints?

During your working experience in Myanmar, have you been able to identify any local champion who made things happen for your project to achieve the goal? How did she/he/they tried to achieve the goal under different circumstances?

If you could choose your key collaborator without any restriction, which Institute or association you would you like to choose in Myanmar?

How do you see the future prospect of Agricultural for Development in Myanmar in next 5 years? Which area could be developed?

How do they manage their current project in Myanmar (Logistic and project activities)?

What is their capacity to run the future projects in Myanmar?

What is/are requirements for them to implement the future project in Myanmar?

Which role they can take in collaboration projects?

 What areas of expertise do you think it is essential to try to maintain in Myanmar?

What areas do you think should be avoided?

Are there groups not connected to the military that you think could be engaged by Myanmar development partners (like ACIAR)?

If CSIRO are completely out because that's easiest, are there Australian partners who could help with capacity building (bearing in mind that we are absolutely not looking to suggest workarounds to subvert Australian foreign policy)?

Any other comments/suggestions etc

11.1.2 Questionnaires for Donors and Development partners

How many International collaboration projects you have managed during 2000-2010 and 2010-2020? If possible, please list down the name of the project

2000-2010	2010-2020

Food Value Chain project?

Which project was/ were the most successful projects?

2000-2010	2010-2020

What were the key priority you set up for International Collaboration project (2000-2010 vs 2010-2020)?

2000-2010	2010-2020

How did you choose the project Implementation partners? Please provide criteria you used for selection process?

2000-2010	2010-2020

How many outstanding project partners have you been able to identify among your IPs? What qualifications need to be considered to become the outstanding IPs for your investment? Any differences between 2000-2010 and 2010-2020?

2000-2010	2010-2020

What policy briefing strategies you used for the policy development in the Myanmar?

2000-2010	2010-2020

What were main constraints you encountered?

2000-2010	2010-2020

What approaches did you use to overcome the challenges you experienced (2000-2010 vs 2010-2020)?

What were weaknesses factors you encountered (2000-2010 vs 2010-2020)?

How do you see the future prospect of Agricultural for Development in Myanmar in next 5 years? Which area could be developed and invested?

Food Value Chain project?

Which organization (Government/ Institute/ Private sector) would you like to collaborate with and why?

11.1.3 Questionnaires for INGOs, NGOs, CSO, Private sectors, and consultants

What were main sources for you to find international funding for the International collaboration projects?

2000-2010	2010-2020

Who approached you for international funding collaboration projects?

2000-2010	2010-2020

What were the process for project agreement signing?

2000-2010	2010-2020

What were the challenges you experienced to get the project agreement signing?

2000-2010	2010-2020

What approaches did you use to overcome the challenges you experienced (2000-2010 vs 2010-2020)?

2000-2010	2010-2020

What were weaknesses factors you encountered (2000-2010 vs 2010-2020)?

2000-2010	2010-2020

How do you choose your collaboration partner in Myanmar?

2000-2010	2010-2020

Constraints and coping strategies

	What are the main constraints you have encountered working with your collaboration partners?	What strategies you used to overcome the challenges?
Donors		
Government (eg; Ministry of Agriculture, Livestock and Irrigation and Departments)		
UN Agencies (UNOPS, LIFT, FAO, WFP, UN women etc.)		
CGIAR (IRRI, World Fish, IFPRI etc;)		
University and Research Institute		

Development partners (USAID, JICA, KOICA etc;)		
Private Sector (Awba, UMFCCI, MRF etc;)		
Others		

What was/were your most successful project/projects?

Which key factors contributed to become a successful project in Myanmar?

2000-2010	2010-2020

Which key factors contributed to failure the project in Myanmar?

2000-2010	2010-2020

What could be done to transform from failure project to success project? What were weaknesses factors you encountered (2000-2010 vs 2010-2020) to practice this?
How do you see the future prospect of Agricultural for Development in Myanmar in next 5 years? Which area could be developed and invested?

Which organization (Government/ Institute/ Private sector) would you like to collaborate with and why?