The Republic of the Philippines
Office of the Presidential Adviser on the Peace Process
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The Republic of the Philippines

The Project for Capacity Building for Community Development in Conflict-Affected Areas in Mindanao

FINAL REPORT

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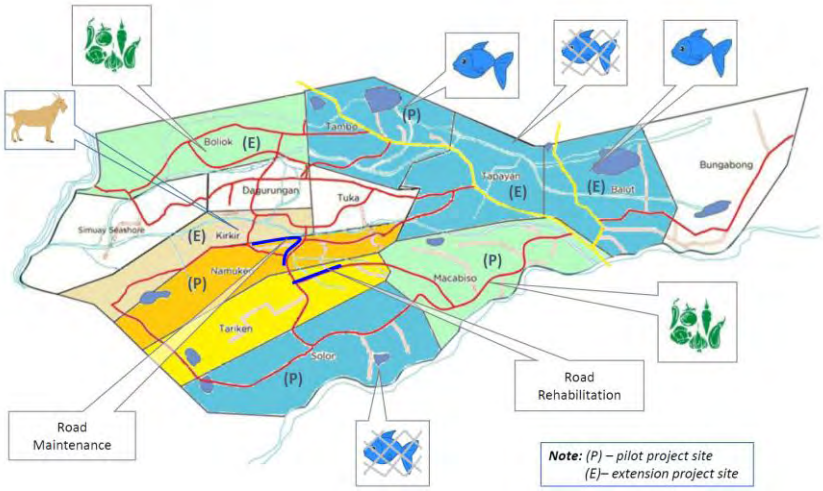
TABLE OF CONTENTS

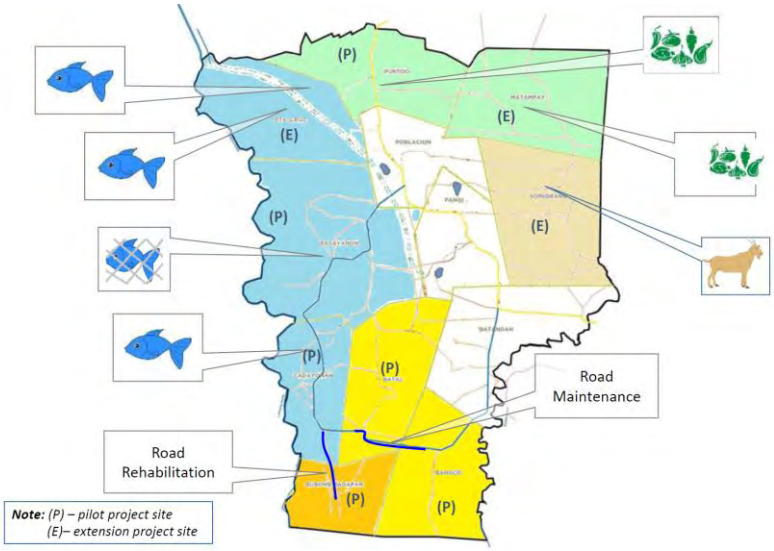
MAPS

【Map 1: Map of Mindanao】
http://mapsof.net/uploads/static-maps/mindanao_and_islands_map.jpg

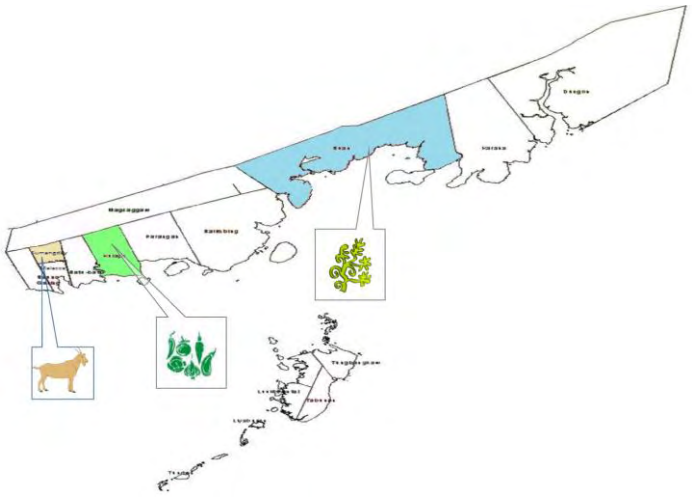
【Map 2: Target Municipalities】
https://en.wikipedia.org/wiki/File:Ph_locator_maguindanao_sultan_mastura.png
https://en.wikipedia.org/wiki/File:Ph_locator_lanao_del_norte_matungao.png
https://en.wikipedia.org/wiki/File:Ph_locator_Tawi-Tawi_panglima_sugala.png



【Map 3: Project Sites in Sultan Mastura】



【Map 4: Project Sites in Matungao】



【Map 5: Project Sites in Panglima Sugala】

Abbreviations

ABW	Average Body-Weight
ARMM	Autonomous Region in Muslim Mindanao
ANC	African Night Crawler
ATI	Agricultural Training Institute
BDA	Bangsamoro Development Agency
BFAR	Bureau of Fisheries and Aquatic Resources
BFAR-MFFTC	Bureau of Fisheries and Aquatic Resources - Mindanao Freshwater Fisheries Training Center
BLGU	Brangay Local Government Unit
BTC	Bangsamoro Transition Commission
CAAM	Conflict-Affected Areas in Mindanao
CAB	Comprehensive Agreement on the Bangsamoro
CD-CAAM	The Project for Capacity Building for Community Development in Conflict-Affected Areas in Mindanao
CDA	Cooperative Development Authority
CDD	Community-Driven Development
CDG	Community Development Guidelines
CDP-ELA	Comprehensive Development Plan – Executive Legislative Agenda
CenMin	Regional Management Office of Central Mindanao
CEPSEL	Community Empowerment Program for Sustainable Economy and Livelihood
CMO	Central Management Office
CO	Community Organizer
DA	Department of Agriculture
DAF-ARMM	Department of Agriculture and Fisheries in the Autonomous Region in Muslim Mindanao
DGR	Daily Growth Rate
DO	Dissolved Oxygen
DOLE	Department of Labor and Employment
DPWH	Department of Public Works and Highways
FAB	Framework Agreement on the Bangsamoro
FCR	Feed Conversion Rate
FPJ	Fermented Plant Juice
FT	Farmer Trainer
FTF	Farmer to Farmer
GAP	Good Agricultural Practices
GDI	Gender Development Index
GPH	Government of the Philippines
GOJ	Government of Japan
IMO	Indigenous Microbial Organism
ILO	International Labor Organization
IP	Indigenous people
IRA	Internal Revenue Allotment
J-BiRD	Japan-Bangsamoro Initiatives for Reconstruction and Development
JICA	Japan International Cooperation Agency
LBT	Labor-Based Technology
LGU	Local Government Unit
MAO	Municipal Agriculture Officer
MBRLC	Mindanao Baptist Rural Life Center
ME	Municipal Engineer
MILF	Moro Islamic Liberation Front
MLGU	Municipal Local Government Unit

MNLF	Moro National Liberation Front
MSU	Mindanao State University
MOA	Memorandum of Agreement
MPDC	Municipal Planning and Development Coordinator
MTF-RDP	Mindanao Trust Fund-Reconstruction and Development Program
OHN	Oriental Herbal Nutrients
NSCB	National Statistic Coordination Board
OJT	On-the-Job Training
O&M	Operation and Maintenance
OPAPP	Office of the Presidential Adviser on the Peace Process
ORG	Office of the Regional Governor
PAGASA	Philippines Atmospheric, Geographical and Astronomical Services Administration
PAMANA	Payapa at Masaganang Pamayanan
PAO	Provincial Agriculture Office
PCM	Project cycle management
PDCA	Provincial Development Catalyst
PDCA	Plan-Do-Check-Act
PHP	Philippine Peso
PMO	Provincial Management Office
PMU	Project Management Unit
PO	People's Organization
POO	Plan of Operation
PPIP	Pilot Project Implementation Plan
PPOO	Provincial Project Operation Officer
RC	Regional Coordinator
R/D	Record of Discussion
RDESP	Research Development, Extension Services and Production
RMO	Regional Management Office
RPOO	Regional Project Operation Officer
RRA	Rapid Rural Appraisal
SERD-CAAM	Socio-Economic Reconstruction and Development of Conflict-Affected Areas in Mindanao
SWOT	Strength, Weaknesses, Opportunities, and Threats
TESDA	Technical Education and Skill Development Authority
TOT	Training of Trainers
TRAC	Tawi-Tawi Regional Agricultural College
UAS	Upi Agricultural School
USM	University of South Mindanao
VET	Value Enhancement Training
VTT	Value Transformation Training
WB	World Bank
WFP	World Food Program

List of Tables and Figures

Tables

Figures

4.1.2 LGU invited the CD-CAAM personnel to school graduation
4.1.3 Active participation of women
4.1.4 Matchmaking between producers and buyers
4.1.5 Integrated farming with tilapia and ducks
4.1.6 FTF extension

Appendix

2.2.1 Capacity assessment matrix
1. Community development guidelines
2. Operation handbook on community development through the CD-CAAM model
3. Basic manual for vegetable production and marketing (English and Filipino)
4. Handbook for training of trainers and farmer to farmer extension for vegetable production and marketing (English and Filipino)
5. Basic manual on tilapia production, processing and marketing (English and Filipino)
6. Handbook for training of trainers and farmer to farmer extension for tilapia production, processing and marketing (English and Filipino)
7. Basic manual on seaweed farming, post-harvest improvement and marketing (English and Filipino)
8. Basic manual for community road rehabilitation and maintenance by Labor Based Technology (LBT)
9. Basic manual for small scale goat raisers (English and Filipino)

Executive Summary

1. Background and Objectives of the CD-CAAM Project

Development in the conflict-affected areas of Mindanao (CAAM) has been stalled for the last four decades. Prolonged conflict in these areas has further exacerbated poverty among the population. In 2001, peace talks commenced between the Government of the Philippines (GPH) and the Moro Islamic Liberation Front (MILF). This led to the signing of confidence-building agreements on security and on rehabilitation and development. These agreements provided for the cessation of hostilities between government forces and the MILF, and the start of rehabilitation and development of the CAAM. Against this background, the Bangsamoro Development Agency (BDA) was created to determine and to lead and manage the relief, rehabilitation, and development projects in the CAAM.

The Government of Japan (GOJ) has undertaken an active role in the peace process in Mindanao. The Japan International Cooperation Agency (JICA) conducted the Study for Socio-Economic Reconstruction and Development of Conflict-Affected Areas in Mindanao (SERD-CAAM) in 2007–2009, which aimed to formulate a socio-economic development plan in the CAAM for promoting the consolidation of peace in Mindanao. Following the results of the SERD-CAAM, the GPH requested the GOJ for community development and capacity building projects for the BDA. In response to this request, the Project for Capacity Building for Community Development in Conflict-Affected Areas in Mindanao (CD-CAAM) was launched in February 2012.

In October 2012, the GPH and MILF signed the Framework Agreement on Bangsamoro (FAB), and subsequently, in March 2014, signed the Comprehensive Agreement on Bangsamoro (CAB). The CAB stipulates the process leading to the establishment of the Bangsamoro Government in 2016. The BDA is expected to coordinate the development programs with the Bangsamoro Transition Commission (BTC) to contribute further to peaceful and sustainable development in Bangsamoro.

The implementation of the CD-CAAM project is largely divided into two phases: the pilot phase (from February 2012 to April 2015), which includes the preparation and compilation phase, and the extension phase (from May 2015 to August 2016).

During the pilot phase, the BDA, the Local Government Unit (LGU) of Sultan Mastura and Matungao, and the JICA expert team jointly conducted three different pilot community development projects on agriculture, fisheries, and road rehabilitation and maintenance in two municipalities. The joint implementation of the pilot projects greatly enhanced the capacities of the BDA to manage more conflict-sensitive community development interventions. Moreover, the approaches, process, and methods of community development, as well as specific technologies tested during the pilot project

implementation were compiled in the Community Development Guidelines and basic technical manuals. In the Guidelines, the more conflict-sensitive community development approach is named the CD-CAAM model, which is underlined by the so-called Six Pillars of CD-CAAM. Built upon the results of the pilot phase, the extension phase was conducted to strengthen further the BDA's capacities to promote the CD-CAAM model to the wider population within future Bangsamoro areas. The extension phase particularly emphasized the BDA's capacity on the Farmer-to-Farmer (FTF) extension approach, internal technology transfer, identification and implementation of new community development projects, as well as financial management and procurement for community development projects.

2. Establishment and Strengthening of the CD-CAAM Model

The CD-CAAM model was formulated based on the results of the pilot phase and it includes the following processes/steps and activities.

SN	Major Process/Step	Description
1	Selection of municipalities	Following set criteria and processes, target municipalities are selected through short listing and field validation survey.
2	Social Preparation 1	Social Preparation 1 is conducted in two tiers of mutually supplemental activities, namely community profiling and a technical survey. Community profiling aims to deepen the understanding of the target municipalities and barangays through a questionnaire survey, semi-structured interviews, and resource mapping. A technical survey aims to emphasize further a detailed sector study within the target municipalities, and to identify the most relevant community development projects.
3	Formulation of the Project Implementation Plan (PIP)	Based on the results of Social Preparation 1, detailed project plans are prepared to guide the implementation of the respective projects. During this process, project sites are selected in line with the barangay selection criteria and processes, thereby ensuring objectivity and transparency in selecting the most appropriate project sites.
4	Social Preparation 2	Social Preparation 2 aims to prepare for the actual implementation of the community development projects, which includes selecting the direct beneficiaries of the projects and sensitizing them, the relevant community leaders, and stakeholders to the contents, visions, and values underlining the projects. This step also aims to collect basic data on the direct beneficiaries of each project. In particular, a baseline survey is used to collect data and information on the initial household situation of the beneficiaries of the agriculture and fisheries pilot projects, as well as data and information related to each pilot project.
5	Implementation of the pilot projects	Following the PIP, a series of training is conducted for projects mainly through workshops and on-the-job training (OJT), while regular monitoring/follow-ups are also conducted to ensure effective and sustainable capacity building at the target communities.
6	Technology transfer through the FTF extension approach	Activities of the FTF extension approach start with the training of trainers (TOT), wherein farmers who have already acquired relevant technologies are trained as farmer trainers (FT), and then they in turn provide training to other farmers.

During the extension phase, the CD-CAAM model was further established through strengthening the FTF extension approach, starting new community development projects, and implementing the model in a remote island province.

The following six distinct characteristics or pillars describe the CD-CAAM model.

Pillar 1: Balancing "development needs" and "development potential"

The first pillar addresses both development needs and potential in order to ensure greater impact of community development interventions. Development needs refer to communities' priorities, whereas development potential refers to whether interventions can have a wider economic and socio-economic impact in terms of area and population. The activities of social preparation, particularly community profiling and technical survey, are the linchpins that provide the planners with necessary information to determine appropriate community development interventions, training contents, project sites, participants, and so on, while considering a balance between development needs and potential.

Pillar 2: Emphasizing a strong partnership with LGUs

The second pillar emphasizes strong partnerships with the LGUs where the community development interventions are implemented. Establishing strong partnerships with LGUs is a critical task for ensuring the successful implementation and sustainability of the community development projects. The local chief executive and other development officials, such as the Municipal Agriculture Officer (MAO), the Agricultural/Fisheries Technician, the Municipal Planning and Development Coordinator (MPDC), and the Barangay LGU officials/staffers, are the key partners. The CD-CAAM model also emphasizes multi-sector interventions simultaneously within target municipalities, which bolsters an LGU's interest in and commitment to providing technical and financial support. Strong commitment from the LGU increases the sustainability, impact, and visibility of interventions, thereby attracting the attention of other potential development partners.

Pillar 3: Ensuring inclusiveness

The third pillar aims to ensure inclusiveness of community development. As a prolonged armed conflict often fragments the socio-cultural fabric of communities, it aims to contribute to bridge different socio-cultural and political groups in the communities. Under the CD-CAAM model, groups are formed for respective community development projects, and it advocates that groups include members with diverse backgrounds in terms of ethnicity, religion, gender, political affiliation, and so on. Women are also encouraged to play important roles in all aspects of activities and decision-making.

The beneficiary groups are also encouraged to register themselves as official entities, such as a Cooperative or a People's Organization (PO), which can further institutionalize their group unity, and may make the group eligible for external supports and financial credit.

Pillar 4: Promoting a comprehensive management process

The fourth pillar emphasizes the entire income generation process of livelihood projects, including planning, production, processing, marketing, distribution, sales, and internal financial management. In particular, while many community development projects in Mindanao tend to focus more on production, the CD-CAAM model looks more carefully at the marketing and selling aspects to ensure sustainable income generation. The farmer groups are continuously encouraged to innovate and add value to the products to better market products as well as maximize the benefit by reducing the production costs. For example, the introduction of organic fertilizers greatly reduced costs by decreasing the usage of chemical fertilizers and pesticides for vegetable production. Semi-organic production also added value to the vegetables at the markets. In fisheries projects, processing the tilapia into dried fish is one way of adding value. The so-called matchmaking session is another interesting initiative to link producers with markets and buyers.

Pillar 5: Mobilizing partnerships and networks with locally available resources

The fifth pillar promotes the mobilization and utilization of locally available resources—technical, material, or human. Although Mindanao has experienced prolonged conflict, it possibly has abundant valuable local resources. However, these valuable technical resources often remain untapped in the CAAM. The CD-CAAM model ensures maximum use of locally (regionally) available (technical) resources such as universities' and governmental and non-governmental technical resources, which strengthens the relevance and sustainability of interventions in the CAAM's specific contexts. By ensuring the relevancy of interventions to local contexts, community people could relatively easily replicate community development activities introduced through the CD-CAAM.

Pillar 6: Promoting farmer-to-farmer extension of technologies

The last pillar of the CD-CAAM model is the FTF technology extension approach. Given the current shortage of financial and technical resources, the extension of certain technologies within municipalities is a serious challenge faced by LGUs. Therefore, the CD-CAAM model provides the TOT, and encourages farmers to disseminate their technical knowledge and skills as a farmer trainer (FT) to other farmers in and out of their community. This FTF approach aims to not only disseminate necessary technologies on livelihood to a wider population in a cost-effective way but also contribute to social cohesion and peacebuilding through close instruction among farmers of different communities.

3. Results of Community Development Projects

Different community development projects were implemented in the communities listed in the table below.

Sultan Mastura, Maguindanao	Matungao, Lanao del Norte	Panglima Sugala, Tawi-Tawi
[Pilot Phase] Pilot Project for Vegetable Production and Marketing[1]		
• Macabiso: 20 beneficiaries	• Puntod: 20 beneficiaries	
[Pilot Phase] Pilot Project for Tilapia Culture, Processing, and Marketing1		
• Tambu (pond): 20 beneficiaries • Solon (cage)	• Cadayonan (pond): 20 beneficiaries • Pasayanon (cage)	
[Pilot Phase] Pilot Project for Road Rehabilitation and Maintenance		
• Tariken (rehabilitation) • Namuken (maintenance)	• Cadayonan/Bubong • Radapam (rehabilitation) • Bangco/Batal (maintenance)	
[Extension Phase] Promotion of Vegetable Production and Marketing through the FTF approach		
• Boliok: 30 beneficiaries	• Matampay: 30 beneficiaries	• Kulape: 10 beneficiaries
[Extension Phase] Promotion of Tilapia Culture, Processing, and Marketing through the FTF approach		
• Tapayan: 15 beneficiaries (pond) • Balut: 15 beneficiaries (cage)	• Purok 3, Sta. Cruz: 15 beneficiaries (pond) • Koriod, Sta. Cruz: 15 beneficiaries (pond)	
[Extension Phase] Project for Seaweed Production		
		• Buan: 10 beneficiaries
[Extension Phase] Project for Goat Production		
• Kirkir: 20 beneficiaries	• Somiorang: 20 beneficiaries	• Sumangday: 10 beneficiaries

(1) Agriculture Sector

In the pilot phase, technology transfer was successfully conducted through the pilot project for vegetable production and marketing in the two municipalities. The beneficiaries effectively applied most of the basic technologies on vegetable cultivation at the demonstration farm and their own farms. Their knowledge and skills of selling were also partly improved because of the marketing approaches used in the pilot project. Out of the 20 participants, 11 have since acquired market destinations for individual farming. In Sultan Mastura, a few buyers came to observe the demonstration farm to buy vegetable

[1] These beneficiaries (1st beneficiaries) transfer the technologies to beneficiaries of vegetable production/tilapia culture of the extension phase as the Farmer Trainers through Farmer to Farmer (FTF) extension.

products and to find out when the products would be harvested and ready for the market. In Matungao, through the practice of selling vegetables from the demonstration farm to Gaisano Shopping Mall in Iligan City, the beneficiaries from the pilot project and two other non-members signed an agreement with the Marketing Head of Gaisano Mall to supply 150-250 kg of pechay collectively to the mall every three days. In addition, retailers within the Municipality of Linamon and Barangay Buru-un of Iligan City also became a market destination for some beneficiaries.

The beneficiaries indicated that their attitude toward farming greatly changed due to the pilot project. Some of the beneficiaries mentioned that there was a positive change in their attitude not only toward farming but also toward life. In Matungao, the beneficiaries indicated that another impact of the pilot project in agriculture was the establishment of good relationships between Muslims and Christians. The collective work on the demonstration farm, aimed at common objectives, production, and profit, created and fostered a family-like atmosphere among them. Positive outputs in production and profit unified members from different religions. Upon completion of the pilot project, the beneficiaries group of Sultan Mastura registered itself as a legal cooperative, and that of Matungao officially registered itself as a farmer's association. These two examples of legal registration as groups is a sign of beneficiary consolidation. Most importantly, the beneficiaries realized economic gain through the pilot project. They do not want to lose this positive momentum.

Additionally, one of the innovative practices of the pilot project in agriculture is the extension activity that was conducted by some beneficiaries with other farmers in Sultan Mastura under the supervision of the Municipal Agriculture Officer (MAO). According to the MAO, a lack of workforce is one of the serious challenges that the Department of Agriculture (DA) faces in terms of technology extension/dissemination. Therefore, the MAO and BDA have mobilized the beneficiaries who were trained by the pilot project to disseminate technology as volunteer instructors.

Built on such initiatives, in the extension phase of the CD-CAAM project, the technology of vegetable production and marketing was expanded to other barangays within Sultan Mastura and Matungao using the FTF extension approach. This approach aims to supplement the agricultural extension activities of the government. Prior to conducting this approach, the TOT targeting the first beneficiaries in the municipalities was implemented. The TOT was primarily managed by the BDA, particularly the Regional Management Office (RMO), with technical support from resource organizations.

Farms established for the extension purpose are called "practice farms" to differentiate them from the demonstration farms that were established as learning sites for the first beneficiaries in the pilot phase of the CD-CAAM project. The second beneficiaries started cultivating vegetables as part of FTF activities. Unfortunately, the production was very poor in Sultan Mastura because drought affected the plants before and during the harvesting season; hence, only tomatoes produced a profit. However, as the

effects of technology transfer became tangibly recognizable, some second beneficiaries began to apply the technologies that they had learned through the FTF on their own farms. The second beneficiaries of Matungao also understood the importance of most technologies that were introduced during the FTF. The extent of application of the technologies seems to depend on the land tenure situation among the beneficiaries. As a new effort for marketing of the products, a matchmaking activity was organized in both municipalities, which provided an opportunity to not only the producers but also the buyers to learn more about the production capacity of the producers. Through this activity, the relationship between farmers and buyers was strengthened, and the second beneficiaries were able to sell their products constantly. The number of walk-in buyers/traders increased as well.

The results of the extension phase proved that technology transfer using the FTF is more understandable and an acceptable extension method by farmers. According to the second beneficiaries and FTs, the FTF has the following major advantages.

First, FTs use the same language as the beneficiaries. This helps ease communication between them, which makes technology transfer more efficient and effective. Moreover, both FTs and second beneficiaries are farmers, and thus they do not hesitate to interact with each other. Open communication in terms of farmer terminology can be maintained, which increases comprehensibility for both sides.

Second, FTs teach technology by practically illustrating how they work, following a theoretical explanation in the lectures. The DA's extension activity only involves talking without any practical demonstration. In addition, the FTF follows a two-way learning process, because FTs also learn from the good practices of the second beneficiaries during vegetable cultivation by observing the practice farms.

Third, the FTF establishes a good network among the second beneficiaries and FTs. For example, the FTs can share markets, and the second beneficiaries can ask the FTs if they can sell to the FTs' buyers or vice versa. Moreover, FTs can refer buyers to the second beneficiaries when they do not have sufficient supply in order to maintain a stable supply of vegetables for the buyers. Additionally, uniformity and standardization of vegetable cultivation, particularly organic-conscious farming, can be practiced in Matungao so that the municipality becomes a well-known site that produces vegetables with fewer chemicals.

While the FTF was effectively implemented and both second beneficiaries and FTs recognized the advantages of the approach as an agriculture extension method, the FTF should be institutionalized using the budget plan of the LGU to mobilize FTs who are now present in the municipality.

Although problems and difficulties occurred during the implementation process, the BDA is experienced

in taking counter-actions to mitigate various challenges during a project's implementation. In particular, the RMO staff member in charge of agriculture (the Regional Project Operation Officer, RPOO) has acquired vegetable production technology at a remarkable level. For example, the BDA radio program, which is now aired every Monday, is hosted by the RPOO of the RMO Central Mindanao (CenMin) and it includes topics on vegetable production and a question-and-answer segment with SMS senders and callers. The RPOO of RMO Ranaw was also invited to provide a lecture on vegetable production technologies on a daily program of a Local ICOM Radio within the Province of Lanao del Sur.

The vegetable production and marketing project was also implemented in the municipality of Panglima Sugala of Tawi-Tawi Province by applying the so-called internal technology transfer method. The BDA, particularly the RMO, supported the activities conducted in this municipality by applying experiences and lessons learned from previous activities implemented in Sultan Mastura and Matungao. The implementation mechanism used for the beneficiaries of Panglima Sugala was essentially the same as that used in the pilot phase. However, the absence of direct intervention by Japanese experts meant that the BDA Central Management Office (CMO) and RMOs, who experienced project management at the ground level in the pilot phase, provided supportive actions to the PMO Tawi-Tawi throughout the planning and implementation stages.

The degree of technology transfer shows a positive result. More than 30% of the participants in the group interview had already applied 19 of the 21 technological topics in their farming. Matchmaking was also conducted. Buyers from the Batu-Batu public market in Panglima Sugala participated in the activity. Most of the vendors showed interest in the vegetables on the farm, and some even discussed buying them. One of the buyers told the beneficiaries that they were happy to know about the vegetables grown in this area, because of the short supply of vegetables due to hot weather, resulting in a high cost of farm products in the market.

Eventually, farmers established the Kulape Kaadilan Farmers Association by registering at the Department of Labor and Employment (DOLE), Province of Tawi-Tawi, ARMM. The long-term goal of the association is to work together to sustain organic vegetable production in the province.

(2) Fisheries Sector

The fisheries sector project in Sultan Mastura and Matungao introduced two different types of fish culture: pond and cage culture. During the pilot phase, in both practices, the beneficiaries managed to feed fish sufficiently throughout that culture's period. The growth trend of cultured fish at all locations smoothly increased. They sold most of the harvested fish directly to local people in the municipalities at reasonable prices: PhP 100–120/kg. Most of the customers admitted that their tilapia had a better taste and was fresher. The results of the harvest in the two municipalities suggest that the profitability of the

cage culture is better than that of the pond culture.

To add to the variety of fish culture practices, the pilot project introduced red tilapia seeds into the pilot sites. Additionally, after selling almost all of their marketable fish, the beneficiary groups tried to process dried tilapia (tilanggit) with the smaller fish, which remained in the ponds. They sold this too at a local market. The result indicates that smaller fish can be sold for a better price by processing them as dried fish. Training for community-based tilapia seed production was also held in both target municipalities. The beneficiary groups successfully produced tilapia seeds at their own sites. Some of the fish seeds were nursed in hapa nets in preparation of the next fish production cycle, while the other seeds were sold or given to other communities or farmers for their fish culture activities.

During the implementation of the pilot project, many local people from the neighboring communities visited the project sites to observe directly the fish culture activities and to obtain some advice from the beneficiary groups on preparing for fish culture. A few community groups and families who were stimulated by the pilot project started fish culture activities using their own capital.

During the extension phase, while culture technologies were transferred to the new farmer groups through the FTF, the fishery sector also implemented two new technologies in tilapia farming: integrated fish farming using duck and mono-sex culture. The former approach aims to reduce feed cost by using natural organisms and planktons that grow in pond water through fertilization with livestock manure. Integrated farming also aims to diversify the income source, as farmers can obtain income from both fish and livestock. Mono-sex culture refers to the selection of all-male tilapia through manual sexing for the cage and pen culture system. Such culture can produce a high yield compared to a mixed-sex population. Through the FTF, the new farmer groups successfully harvested tilapia and sold them at a reasonable price.

The technical and management capacities of the BDA counterparts in general drastically increased through various experiences in project implementation. During the extension phase, the BDA RMO, particularly the RPOO in charge of fisheries sector, was able to lead the preparation for activities together with the technical partner and JICA expert team. Following guidance from the JICA expert team and resource organization, the BDA personnel facilitated the TOT, and became capable of conducting the training by themselves. With regard to the actual implementation of the FTF extension, as well as new activities such as integrated farming and mono-sex culture, it is fair to say that the BDA mostly succeeded in effectively facilitating the planned activities, which produced satisfactory results given the limited time allocated for the extension phase.

Additionally, it is remarkable that the BDA initiated its own extension work to disseminate technologies of tilapia culture to the wider population. The RPOO and other staff members, along with the FTs from

Sultan Mastura, provided technical training as well as initial fingerlings, in some cases, to other farmers in Sultan Mastura and other municipalities in Maguidanao. The RMO Ranaw has also initiated its extension work to other communities. For example, it conducted on-site guidance for farmers in Barangay Cormatan and Daramba in the municipality of Poona Piagapo in Lanao del Norte, and provided them with fingerlings bought from the first beneficiaries. Remarkably, the RPOO was asked to be a resource person for the training on basic tilapia culture of the World Food Program (WFP) for the beneficiaries in the municipality of Masiu, Lanao del Sur.

The project has developed an appropriate extension model for developing community-based fish culture, especially adapted to the Bangsamoro region. Based on the experience, the extension model should be extended to other communities. However, to start the fish culture activities, a community group has to gather initial capital to cover the construction costs of the fishponds or cages and the operational costs of fish culture. According to the results of the first harvest trials, the necessary initial capital reached PhP 50,000–60,000 for the pond culture and PhP 20,000–40,000 for the cage culture. This varies according to the scale of fish culture and the stocking density of the cultured fish. It is not a small amount for the local people and their communities. In the case of fish culture development, the most serious issue is how to acquire the financial assistance needed for the initial capital. Therefore, we should consider not only extension programs for developing fish culture but also programs for financial assistance for beginning fish farmers. This means that the extension program should be developed alongside a financial program, such as a subsidy, loan, or micro-credit program.

In Tawi-Tawi, in the beginning, the project was expected to disseminate technologies of tilapia culture as an income-generating source there, through internal technology transfer within the BDA. However, based on a technical survey conducted by the BDA and JICA expert team, it was found that marine species, rather than freshwater species, are more suitable for aquaculture, considering development needs and potential in the area. Instead of internal technology transfer within the BDA, the seaweed culture was selected as a new livelihood project for the CD-CAAM model. In Tawi-Tawi, seaweed producers often experienced an uneven quality of product that led to an unstable market price. Therefore, the project aimed to improve the quality of seaweed culture, post-harvest, and the marketing of the finished product. The poly-culture of sea cucumber was also tested to give farmers further opportunity to diversify their income source.

The project adopted two types of seaweed farming methods: the stake-off bottom method and the floating method. The JICA expert teams and MSU-Tawi-Tawi effectively conducted on-the-job training for the BDA staff and beneficiaries in Tawi-Tawi. In particular, the staff member in charge of fisheries (Provincial Project Operation Officer: PPOO) was recognized by the CMO as one of the most capacitated staff member, in spite of the limited time of the project. It is remarkable that the PMO was invited to represent the BDA at the Autonomous Region in Muslim Mindanao Agriculture & Aqua-

Marine Resources Research Development & Extension Consortium (ARMMAARRDEC) Regional Research and Development Coordinating Council (RRDCC) meeting at Santa Maria, Zamboanga City.

(3) Road Rehabilitation and Maintenance

The pilot project for Labor-Based-Technology (LBT) included two different types of road works: road rehabilitation and maintenance.

The pilot road project in Sultan Mastura included Sitio Padian-Kinugkungan Pilot Road Rehabilitation in Barangay Tariken, with a total length of 1.50 km, and Sitio Dungguan-Mareges Pilot Road Maintenance in Barangay Namuken, with a total length of 2.14 km. A two-barrel box culvert was implemented in the rehabilitation of Tariken to accommodate the large volume of floodwater flow due to the insufficient capacity of existing pipe culverts. In addition, the single line of pipe culvert in the pilot road maintenance in Namuken was replaced with two lines of pipe culverts to accommodate the large volume of water during rainy season. This will also mitigate the constant flooding in the area during this time of the year. The pilot road project in Barangays Tariken and Namuken generated employment for 186 and 116 skilled and unskilled laborers, respectively, from the local community, within a period of about six months. The pilot road project in Matungao included Cadayonan-Bubong Radapan Pilot Road Rehabilitation in Cadayonan, with a total length of 1.12 km, and Banco-Batal Pilot Road Maintenance in Banco, with a total length of 1.52 km. To mitigate flooding on the low-lying sections of the pilot road in Barangay Banco, a two-barrel reinforced box culvert was installed to accommodate the large volume of surface run-off during heavy rains. The pilot project generated employment for 81 and 102 unskilled laborers from the community for road rehabilitation and road maintenance, respectively, within a period of about four months.

The pilot project established a Project Management Unit (PMU) for the infrastructure sector, comprised of individuals from the BDA CMO and RMOs, and the LGUs that engaged in all of the activities under the following three major stages: (1) planning, (2) procurement, and (3) implementation, monitoring, and supervision. The project adopted LBT and the “do-nou” method using the “Pakyaw” contract system. Under this system, community members were grouped into work teams and assigned a specific task to be finished within a fixed contract amount and specific time.

The capacity building interventions within the infrastructure sector succeeded in addressing the limited knowledge and skills of the BDA, LGU, and communities regarding LBT and the “do-nou” method. During the implementation stage, one of the impacts was a change in perception of the BDA, LGU, and community members on the effectiveness of LBT and the “do-nou” method in road rehabilitation and maintenance. They gradually began appreciating and accepting the concepts as an alternative means to improve and maintain the rural road networks instead of the commonly used equipment-based methods.

Extensive training on LBT and the "do-nou" method and hands-on application through the pilot project implementation equipped the BDA, LGUs, and communities in the target areas with the skills and knowledge to identify rural road distresses and deficiencies, their causes, and appropriate solutions and work procedures to improve road infrastructure and sustain its usefulness through proper maintenance processes and procedures.

However, as the LGUs have limited resources and technical personnel to monitor and evaluate their road network, the management of community-based road development as a whole is difficult for them to sustain. In addition, the LGUs' linkage with technical institutions, such as the Department of Public Works and Highways (DPWH), to provide technical and financial support is not yet clearly established under the Bangsamoro entity. If the local community starts its own initiatives to intermittently monitor and maintain their local roads, the guidance of the local LBT facilitators will be crucial to ensure that proper work methods and specifications are observed to achieve optimal effectiveness. Therefore, the lack of technically capable personnel or the unavailability of trained LBT facilitators might also hamper the sustainability of the interventions. The roles and responsibilities of the BDA, as the catalyst of the technology, are crucial to the institutional, managerial, and technical sustainability of the initiatives of community-based road development projects. The BDA is expected to continue to advocate the application and replication of the technology to wider areas in Bangsamoro.

(4) Livestock Sector

During the extension phase, the project for goat production was implemented as a new livelihood option in the CD-CAAM model. As the extension phase lasts only around 15 months, a period shorter than the ordinary goat production cycle, special attention was paid to the most important stages of goat production, such as fattening, breeding, kidding, and selling.

A demonstration farm was established where the beneficiaries learned the basic idea and practical and financially attainable expertise of goat production, which was finely adjusted to the local socio-economic and climatic conditions. As a one-size-fits-all model is inappropriate, three types of goat houses—commercial, semi-commercial, and backyard—were constructed in Sultan Mastura and Matungao, whereas two types—semi-commercial and backyard—were constructed in Tawi-Tawi. Farmers can choose the most suitable goat house depending on their purpose and/or technical and financial backgrounds. Among the three types of goat houses, there is no difference in production, reproduction, or flock health, including growth rate, fertility, mobility, and mortality. However, the commercial type attracts more attention from farmers, especially the financially capable ones.

In addition, improved grass pastureland was established. Goats are generally considered highly willing to eat a wide variety of plants, some of which cattle and sheep totally reject. This is one of the advantages

of a goat, because a smallholder may use many types of plants he/she may find in the environment such as roadside grasses, weeds, or scrubs. However, naturally grown plants are often not nutritionally sufficient to keep goats healthy. Therefore, two of the highly renowned and locally available improved grasses, namely Super Napier and Setaria grass, were introduced. Vermicompost preparation was also introduced in all three locations as part of integrated farming.

A series of training was conducted for the beneficiaries, LGU, and BDA, and goats were introduced to the demonstration farm. The training courses emphasized not only the technical aspects but also the business aspects of goat production. Initially, many goats suffered from stress caused by factors such as the long trip, a transfer from their original location to each demonstration farm, and adaptation to the new environments. Some of them died, especially in the early stages, but the flocks soon adapted to their new conditions. The goats are now generally in a good physical condition and the number of kids is increasing. The goat project originally did not include FTF extension because of its limited period. However, having observed and visited the demonstration farm, many local farmers in Sultan Mastura and Matungao requested the BDA for technology extension of goat keeping. In response to this request, a TOT was conducted by the resource organization to train the first beneficiaries to become FTs to promote the technologies further to other farmers.

In Sultan Mastura, considering the abundance of Napier grass and room in the goat houses of the demonstration farm, the beneficiaries decided to purchase more goats and to fatten and resell them on a trial basis, because their own growing kids needed more time to be finished for meat. The beneficiaries bought 10 does, of which they resold five. Eventually, the beneficiary group formed a farmer cooperative authorized by the Cooperative Development Authority (CDA) of the ARMM. Apart from the main products, goat farmers have other materials or by-products that are marketable. These include goatskins and goat manure for fertilizers, including vermicompost or cuttings of some improved grasses. In Tawi-Tawi, having observed the lush Napier grass at the demonstration farm, other farmers bought some cuttings from the demonstration farm to plant as pasture for their goats' grazing. While the revenue earned from the sale of the grass cuttings was small, the fact that a product or by-product of the demonstration farm was commercially attractive to local farmers seems promising. Additionally, because the demonstration farm perhaps has the best bucks for breeding in the municipality, the beneficiaries are encouraged to charge a reasonable amount from farmers who want their does serviced as commonly practiced in the livestock industry.

To promote goat production as a stable source of livelihood, marketing efforts should be undertaken further. Value adding activities such as slaughtered goat, goat dishes catering, and processed goat meat are needed. Halal goat meat is another way to add value. Goat milk should also be considered, because even in Mindanao, some institutes are already successfully exploiting goat dairy activities.

4. Results of Capacity Building of the BDA

The CD-CAAM project aimed to strengthen the BDA's comprehensive capacity to lead development activities within the CAAM. In particular, the primary objective of the extension phase was to strengthen the BDA's capacities to carry out and promote the CD-CAAM model's own initiatives. To assess to what degree the capacities within the BDA were developed, the following nine key areas of capacity to promote the CD-CAAM model were identified: (1) logical decision-making; (2) data gathering and analysis; (3) plan formulation; (4) community mobilization; (5) technology transfer through the FTF approach; (6) technology transfer for new sector; (7) internal technology transfer; (8) assessment; and (9) revision and modification. The key competencies to conduct related tasks and activities were also specified. Capacity development of the BDA also addressed financial management, procurement, and logistics arrangements.

In summary, the key capacities within the BDA CMO and two RMOs to promote the CD-CAAM model have been greatly strengthened through their engagement in the CD-CAAM project. In particular, their achievements in the remote Tawi-Tawi province during the extension phase clearly shows how much they have achieved over the past several years. While the JICA expert team often led implementation of the CD-CAAM project during the pilot phase, the BDA had to take more initiatives in Tawi-Tawi as the JICA expert team was not allowed to visit the project sites.

As the BDA had newly established its provincial office in Tawi-Tawi to implement the CD-CAAM project, it often faced many challenges. Although most staff members in the PMO had some knowledge and experience in community development, they were not familiar with the CD-CAAM model. The staff of the CMO and two RMOs provided the necessary guidance and technical support to the PMO through a series of workshops, OJT, and daily communication. The achievements of the BDA in Tawi-Tawi can be considered remarkable given the very limited budget and time for the extension phase. In particular, although the MILF historically does not have a strong presence in Tawi-Tawi, the BDA gradually but successfully established trust among the LGU and local leadership through carefully observing the six pillars of the CD-CAAM model. The BDA eventually obtained acceptance and recognition not only in Panglima Sugala but also in the whole province, laying a good foundation for future promotion of the CD-CAAM model in the island provinces.

Their commitment to the communities too was very impressive. The staff of the RMOs often stayed at the communities for a long time (and sometimes overnight) to build trust with the community leaders and members of the beneficiary groups, and to discuss various issues. The RMO CenMin, on their own initiative, also organized a monthly study circle about the holy Quran to strengthen rapport with the beneficiary groups, which, they claimed, further united and inspired the groups to commit to work together for the success of the project. They had some doubts on the FTF approach in the beginning as

they thought that FTs might not be able to work for a nominal honorarium given their own difficult livelihood. In Matungao, they found that some members of the beneficiary group of the pilot phase were quite hesitant to teach the new beneficiary group, as they did not have confidence in their technical knowledge and skills. However, such continuous community mobilization, they believe, greatly contributed to motivate the trainers to teach other farmers and their fellow community people.

5. Conclusion and Recommendations on the CD-CAAM Model

The CD-CAAM project tried to establish an approach for community development that more effectively addresses the realities in Bangsamoro. Through the pilot phase, the CD-CAAM model for community development was formulated based on experiences and lessons learned from field operations, and it was further strengthened during the extension phase. As mentioned earlier, the CD-CAAM model has six distinct characteristics or pillars. Each pillar itself is not necessarily innovative or original, but the uniqueness of the CD-CAAM model is that it combines different approaches and perspectives into a distinct whole. Through carefully ensuring the six pillars throughout the whole process of community development interventions, the model aims to foster the resilience of the communities.

The CD-CAAM model has an economical as well as a social impact. An assessment of the livelihood projects revealed that some of the beneficiaries experienced positive attitude changes not only toward farming in particular but also toward life in general. For example, a male beneficiary of an agriculture project did not have a farm and was not engaged in any productive activities before participating in the CD-CAAM training. After a year of training, he started cultivating vegetables at his backyard garden; he now keeps himself busy. With the additional money that he started earning from his garden, his daughter was able to go back to school. Similarly, the husband of a female beneficiary was a coconut climber; he could not generate a stable income from his work. The couple has now established a backyard garden in their home and has started vegetable farming. The husband helps his wife in selling the vegetables by using his motorbike, and they earn a constant income from their garden. Meanwhile, villagers who were involved in the armed struggle for a long time are now engaged in livelihood activities, facilitating their transition to normal living. In addition, different religious groups, gender groups, and groups with different political affiliations have formed friendships and partnerships through joint activities on the ground. Cooperation was sometimes extended outside group members to the wider population in the municipality. In sum, if it can be properly replicated on a larger scale, the CD-CAAM model is likely to make a substantial contribution to peaceful and productive Bangsamoro through nurturing community resilience.

The CD-CAAM project also aimed to equip the BDA with sound skills and knowledge in implementing and promoting the CD-CAAM model. It may be safe to conclude that the BDA successfully conducted the necessary tasks, and also succeeded in adhering to the six pillars of the CD-CAAM model, all of

which were time-consuming and delicate tasks given the complex realities in the conflict-affected areas. During the extension phase, the BDA also proved its flexibility and adaptability to conduct the activities and to engage with a new LGU and communities even in a remote island province. The remaining challenges for the BDA are to reconcile the needs for quick and cost-effective implementation of the community development interventions, while adhering to the six pillars of the CD-CAAM model, which inevitably requires time-consuming and costly engagement with communities, LGUs, and other stakeholders. Additionally, while proper and efficient administrative and financial management should be the foundation of effective implementation of the CD-CAAM model, it remains to be seen whether the BDA's limited involvement in those tasks during the CD-CAAM project was able to equip the BDA personnel with enough skills to handle larger workload and funds, which would be required when they attempt to manage the CD-CAAM model on a far larger scale in the future.

Meanwhile, it is remarkable that the BDA has already replicated promotional activities of the CD-CAAM model in different locations. For example, the BDA, in cooperation with the Bureau of Fisheries and Aquatic Resources (BFAR) ARMM, has provided tilapia fingerlings and breeders as well as technical guidance to the fisheries groups in municipalities such as Barira, Buldon, and Mamasapano. The RMO CenMin has also started preparing to replicate three livelihood projects in the municipality in North Cotabato with support from the FTs of Sultan Mastura. Known as development catalysts, the BDA volunteers who live in the communities play a vital role in initiatives to disseminate the experiences of the CD-CAAM model in various parts of Bangsamoro. The BDA now envisions the establishment of provincial FTs and provincial demonstration farms for agriculture, fisheries, and livestock that would facilitate the promotion of the CD-CAAM model at the provincial level. Another interesting example of the BDA's initiatives is a BDA radio program on vegetable production based on the experiences of the CD-CAAM project, which provides practical information on vegetable production, and covers the Central and North Cotabato and other areas. As a de facto leading development agency within the ongoing peace process towards establishment of the new autonomous Bangsamoro government, the BDA is expected to scale up such initiatives and promote the CD-CAAM model to the wider population in the region. It may be fair to conclude that almost five years of engagement with the CD-CAAM project provides the BDA counterpart personnel with enough capacities and confidence to become the vanguard for the CD-CAAM model in Bangsamoro.

Meanwhile, the BDA may still need external support in two major areas. First, while the CD-CAAM model was suggested based on the lessons learned from the field operation of different community development projects in the CAAM, the model is still in its infancy and has ample room for improvement. For example, choices of community development projects must be increased to match diverse development needs and potential in Bangsamoro; the CD-CAAM model so far includes five different community development projects. Additionally, it is necessary to seek new measures to expedite the time-consuming process of technology transfer while maintaining the quality of the interventions. The

quick service delivery of so-called peace dividends may greatly help in building a new Bangsamoro government, because it increases government visibility and legitimacy among hitherto marginalized communities. To strengthen the relevance and effectiveness of the CD-CAAM model, the BDA still needs to improve its expertise on community development, for which organizations such as JICA can continue to provide technical support.

Another serious challenge for the BDA may be its still weak financial foundation. While the CD-CAAM project developed capacities within the BDA relatively successfully, the lack of sustainable resources is still likely to be a serious obstacle to the BDA's ability to promote the CD-CAAM model. In fact, most of the BDA personnel whose capacity was improved in the CD-CAAM project may leave the organization upon the completion of the project because they are not regular BDA personnel and their entire salary is paid by the project. The newly established PMO in Tawi-Tawi may be closed soon after the end of the CD-CAAM project because it depends completely on the financial support from the project. A large pool of development catalysts is one of the valuable assets for the BDA to reach the wider population in the region. However, the BDA may not be able to use the asset fully without sound financial foundation. Continuous resource mobilization that can sustain the momentum created by the CD-CAAM project is one of the key issues. This has no immediate solution given the stalled peace process. Development partners such as JICA may need to continue their support in this area as well to help eventually build a peaceful and productive Bangsamoro.

Chapter 1: INTRODUCTION

1.1. Background and objectives

Development in the conflict-affected areas of Mindanao (CAAM) has been stalled for the last four decades, and the prolonged conflict in these areas has further exacerbated poverty among the population. In 2001, the peace talks between the Government of the Philippines (GPH) and the Moro Islamic Liberation Front (MILF) commenced, and confidence building agreements on Security and Rehabilitation and Development were signed. These agreements provided for the cessation of hostilities between the forces of the government and the MILF, and the start of rehabilitation and development of the CAAM. Against this background, the Bangsamoro Development Agency (BDA) was created to determine and then lead and manage the relief, rehabilitation and development projects in the CAAM.

The Government of Japan (GOJ) has been undertaking an active role in the peace process in Mindanao. The Japan-Bangsamoro Initiatives for Reconstruction and Development (J-BiRD) program was launched to contribute to peace building and socio-economic development in Mindanao in 2006. Peace and development in Mindanao was also established as one of the three pillars of the Country Assistance Strategy of the Japan International Cooperation Agency (JICA) in the Philippines. In line with this, JICA conducted the Study on the Socio-Economic Reconstruction and Development of Conflict-Affected Areas in Mindanao (SERD-CAAM) in 2007–2009 which aimed to formulate a socio-economic development plan in the CAAM, with the end purpose of promoting the consolidation of peace in Mindanao. Following the results of the SERD-CAAM, the GPH has requested the GOJ for community development projects as well as capacity building for the BDA. In response to the request, a Record of Discussion (R/D) was signed by both the Office of the Presidential Adviser on the Peace Process (OPAPP) and JICA in December 2011 to launch the Project for Capacity Building for Community Development in Conflict-Affected Areas in Mindanao (CD-CAAM).

The objectives of the CD-CAAM are to 1) establish an effective and efficient implementation mechanism for community development projects in the CAAM, and 2) build the capacity of the BDA with regard to community development projects, which are to be achieved through the implementation of different types of pilot community development projects on the ground. The CD-CAAM was also expected to document the whole process, mechanism, challenges and lessons-learned through the implementation of the pilot projects which were to be compiled in the Community Development Guidelines (CDG).

In October 2012, the GPH and the MILF signed the Framework Agreement on Bangsamoro (FAB), and subsequently signed the Comprehensive Agreement on Bangsamoro (CAB) in March 2014. The CAB stipulates the process leading toward the establishment of the Bangsamoro Government in 2016, and the

BDA is expected to coordinate the development programs with the Bangsamoro Transition Commission (BTC) to further contribute to peaceful and sustainable development in Bangsamoro.

Meanwhile, under the CD-CAAM project, three different pilot community development projects, namely vegetable production/marketing, tilapia culture/processing/marketing, and road rehabilitation/maintenance through the Labor-Based-Technology (LBT) have been carried out in two municipalities jointly by the BDA, the Local Government Unit (LGU) of Sultan Mastura and Matungao, and the JICA expert team. Given the short implementation period of nearly one year and the still vulnerable security situations in CAAM, it is fair to say that each pilot project has produced a significant impact on community development with regard to not only income generation but also peacebuilding in the conflict-affected communities. Moreover, through joint implementation of the pilot projects, the capacities of the BDA to manage more conflict-sensitive community development interventions were greatly enhanced (details are discussed in the following chapters). Additionally, all the planned activities were completed by February 2015, and the approaches, process, and methods of community development as well as specific technologies tested during the pilot project implementation were compiled in the CDG and basic technical manuals. In the Guidelines, the more conflict-sensitive community development approach is named the CD-CAAM model, which is underlined by the so-called Six Pillars of CD-CAAM[2].

Following the success of the CD-CAAM project, the CD-CAAM model is expected to become one of the initiatives that can strengthen resilience of communities, and contribute to socio-economic development and peacebuilding in Bangsamoro. To meet such expectation, the BDA must improve its capacity to lead and promote the CD-CAAM model. Against such background, the CD-CAAM project has been extended for 16 months to strengthen the BDA's institutional capacities to implement community-based livelihood projects by following the CD-CAAM model at its own initiative.

1.2. Expected outcomes

The implementation of the CD-CAAM project is largely divided into two phases, namely the pilot phase that includes the preparatory and compilation phase, and the extension phase.

During the pilot phase, one of the purposes of the CD-CAAM is to help improve the livelihoods of the people in the CAAM. As the development of primary industries, such as agriculture and fisheries which are the core means of livelihood in the CAAM, will play a key role in improving livelihoods, the pilot projects on income generation focused on improving productivity and marketing in the agricultural and

[2] (1) balancing development needs and development potentials; (2) strong partnership with LGUs; (3) inclusiveness; (4) comprehensive management process; (5) mobilizing partnerships and networks with locally available resources; and (6) farmer-to-farmer extension approach

fisheries sectors. In contrast, the pilot project on infrastructure addressed the needs for rehabilitating and maintaining community roads, which could help improve the living conditions of the community people and distribute products to the markets. These pilot projects are expected to establish an effective mechanism of community development. Secondly, through the planning, implementation, monitoring and evaluation of the pilot projects, the BDA's institutional capacity on the overall management of community development is expected to be strengthened.

Built upon the results of the pilot phase, the extension phase is expected to further strengthen the BDA's capacities to implement community development projects by using the Guidelines and technical manuals developed during the pilot phase. In particular, the BDA is expected to be equipped with the capacities to 1) carry out Farmer to Farmer (FTF) extension, 2) disseminate and institutionalize skills and knowledge of the CD-CAAM model in the BDA, 3) identify and implement a new community development project, and 4) ensure effective financial management and procurement for community development projects.

1.3. Structure of the Draft Final Report

This final report consists of four chapters including this introduction. Chapter 2 summarizes the results of capacity building of the BDA during the pilot phase up to the extension phase of the CD-CAAM project. Chapter 2 also address peacebuilding perspectives identified during the implementation of the CD-CAAM project. Chapter 3 focuses more on the results of the specific community development projects in different locations. As a conclusion, Chapter 4 summarize the lessons learned identified during the entire period of the CD-CAAM project, and provides recommendations for promotion of the CD-CAAM model in Bangsamoro.

Chapter 2: STRUCTURE OF CD-CAAM MODEL

2.1. Establishment of the overall CD-CAAM model

This chapter summarizes the major activities in the pilot and extension phases of the CD-CAAM project, and assesses the results of capacity building of the BDA. It also discusses the peacebuilding perspectives identified through the field implementation.

2.1.1. Major activities during the pilot phase

The following are the major activities in the pilot phase from February 2012 to April 2015.

(1) Review of documents related to the regional development in Mindanao

Several documents related to the regional development in Mindanao were collected and reviewed in order to assess the development needs, priorities and potentials as well as to identify relevant lessons-learned from the past and from ongoing development interventions within Mindanao. In particular, among the various issues identified by reviewing several community development projects within the CAAM, one of the most serious challenges seems to be ensuring the sustainability of the interventions. Based on observing the lessons learned from projects such as SERD-CAAM, the Mindanao Trust Fund-Reconstruction and Development Program (MTF-RDP) and the ARMM Social Fund, it was often noted that two players, i.e., the People's Organizations (PO) and LGU needed to play more active and significant roles in strengthening such sustainability. In terms of the POs' roles, their active participation in planning, implementation, and monitoring should be ensured through social preparation activities, thereby promoting ownership of the projects among the communities. Given the limited capacities of the POs and community leaders, it should also be mentioned that follow-up activities such as training, technical assistance, and financial support should be considered, following the completion of the interventions. Municipal LGUs and barangay LGUs should also be involved in the full project process. While some projects such as the MTF-RDP establish official partnerships with LGUs by signing a Memorandum of Agreement (MOA), financial partnerships between the LGUs and the projects—particularly for operation and maintenance (O&M) after completion—remains limited.

(2) Formulation of basic policy and the selection of municipalities

The basic policy was formulated in order to guide the overall implementation of the pilot projects in an effective, transparent, and sustainable manner, thereby achieving the overall objectives of the CD-CAAM. The basic policy outlined five areas of the pilot project implementation process: a) objectives; b) selection criteria for target areas; c) criteria and processes for selecting pilot projects; d) general implementation mechanisms; and e) general implementation processes.

Following the criteria and processes set in the basic policy, selection of the target municipalities was

carried out through three distinct steps. Firstly, based on the criteria and other considerations determined for municipality selection such as high incidences of poverty, high development needs and potential, conflict affectedness, and regional balance, a shortlist of the target municipalities was developed out of the municipalities in the CAAM. To select the most appropriate municipalities for the project, a field validation survey was carried out to assess the real situation in the short-listed municipalities. A joint team of the BDA and JICA experts visited the short-listed municipalities to assess them by using a simple survey tool and classified survey items into the five categories: a) acceptance of the project, b) governance, c) natural and geographical conditions, d) livelihood, and e) needs of the barangay. Each item was evaluated by different means, and the score for each item was determined by consensus among all the members of the survey team in the wrap-up meeting after each field validation survey. As a result of the field validation survey, two municipalities, namely Sultan Mastura and Matungao were finally selected as the pilot project sites for the CD-CAAM.

(3) Social Preparation 1

Social preparation was aimed to help the major stakeholders, such as the BDA, LGUs, and the communities, prepare themselves in planning and in delivering relevant community development interventions in an effective and sustainable manner. Social preparation was carried out with the full participation of those stakeholders, thus enabling the interventions to properly address the relevant development needs and potentials within the target sites and enhance a sense of ownership among the local stakeholders.

As a first part of social preparation implementation, social preparation 1 was carried out in two tiers of mutually supplemental activities namely, community profiling and a technical survey conducted in Sultan Mastura and Matungao. Community profiling was carried out to deepen the understanding of the municipalities and barangays, a questionnaire survey and semi-structured interviews were carried out, and based on these a resource map and a summary table of the barangays were developed. Parallel to the community profiling, a technical survey was carried out to further emphasize a detailed sector study within the target municipalities, and to identify the most relevant pilot projects. The technical survey included a series of interviews with municipal LGU staff in charge of municipal development, producers of major crops, processors and traders of major products as well as observations of production sites. The technical survey also included consultation with resource organizations such as Mindanao State University (MSU) which was able provide technical support in implementing the pilot projects at the field level. Based on the findings of social preparation 1, pilot projects were selected in Sultan Mastura and Matungao.

1) Profile of Sultan Mastura and selection of pilot projects

Sultan Mastura has relatively flat terrain with some rolling and steep contours. Agricultural land comprises 55% of the total land area. In all, 60% of the population is said to belong to the Iranon tribe,

25% to the Maguindanaon, 10% are Cebuano, Ilocano, Hiligaynon and others[3]. The municipality is very accessible by land, with concrete national highways from Cotabato City, Davao City, and other nearby municipalities. Farming constitutes the major livelihood sector in the area; 80% of the farming households are tenants or farm laborers. Household incomes are often below the poverty threshold level of PHP 9,530/month, as set by the National Statistic Coordination Board (NSCB) for the first quarter of 2012 for Maguindanao province.

Coconut, rice, and vegetables can be regarded as the major agricultural products of Sultan Mastura. Given the proximity to the big market in Cotabato City and the main highway, the agriculture of Sultan Mastura has been commercialized to some degree, and it has the potential for expansion. In the meantime, the presence of big landowners and the extensive practice of crop sharing between landowners and tenants also characterize the present situation in the agricultural sector of the municipality. Vegetables are produced in two ways: 1) backyard gardening for domestic consumption and 2) intercropping with coconuts or rotational cropping with other cereals in open farm areas for commercial purposes. Some active vegetable producers' groups already produce high value vegetables, such as cauliflower, to distribute at the mega market in Cotabato City. Taking everything into account, it was determined that vegetable production is comparatively appropriate for the agricultural pilot projects, and an enhanced model of peri-urban type agriculture can be promoted through redressing production and marketing issues that impede agricultural development in the municipality.

Fishery activities are still limited. In the inland areas, though there are many freshwater lakes and ponds with high potential for fishing and aquaculture, these freshwater areas are currently not used for such purposes. Although inland fisheries exist in some barangays, most have not been very successful owing to such factors as the flooding of pond water during the rainy season and low productivity due to the lack of technical support. Among the limited inland fisheries within Sultan Mastura, tilapia culture seems to be the most popular, whereas some farmers groups in barangay Solon catch different fish including tilapia, mudfish, catfish, and climbing perch from the river and release them in the lakes as a makeshift fish culture practice. Tilapia is easier to breed and culture, given its sturdy characteristics. In particular, these fish are very adaptable to environmental stress, low water quality, and crowding. Tilapia culture also requires only modest capital to start. Technology for tilapia culture is relatively simple and easy to learn, especially for beginners or rural communities with limited knowledge or experience with fish culture. Tilapia is gaining popularity as a food fish, and it also has good potential for value-adding through processing into tilanggit (boneless dried tilapia), smoked and filleted. During Ramadan, the demand for tilapia rises drastically among Muslim residents, but the quantity of tilapia at the local markets is not sufficient to absorb such a high demand. With everything taken into account, it was determined that promoting tilapia culture and marketing seems more appropriate for the pilot projects.

[3] Sultan Mastura Comprehensive Development Plan (Executive Legislative Agenda) 2008–2014

2) Profile of Matungao and selection of pilot projects

Matungao's land surface is relatively flat with rolling hills; it steeply slopes towards the Radapan River and Linamon, Lanao del Norte. 89% of the population is Muslim Maranaws and 11% are Christians belonging to the Cebuano, Tagalog, and Hiligaynon tribes[4]. Classified as a fifth-class municipality, Matungao is also listed as one of the poorest municipalities in the country[5]. Generally, the standard of living in Matungao is low.

Though agriculture in Matungao is subsistence farming so that food security is still a primary objective, several cases of commercialized agriculture exist, which sell products to Iligan City or neighboring municipalities. Major farming practices fall into roughly two categories: 1) the rotational cropping of rice and corn, which is intercropped with coconuts and vegetables in backyards, and 2) the rotational cropping of cereals with peanuts or vegetable farming under coconut trees. The former is geared toward food security—that is, producing staple food for home consumption—and the latter is partly commercialized. Most of the farmers in Matungao are landless tenants and coconut farming is controlled by a few big landowners. Therefore, a pilot project in coconut farming would not substantially benefit the tenants. Production of cereals, rice, and corn does not reach the "income generation" stage, but remains at the "food security" stage. With regard to vegetables, some are marketed in Iligan City by active farmers; however, the total volume remains small. Thus, it was determined that by enhancing basic farming technologies, selecting high value varieties of vegetables, improving post-harvest handling, and selling directly at the market, vegetable farmers can provide a model for future peri-urban agriculture in the municipality.

As Matungao is not next to the sea, inland fisheries and freshwater aquaculture are the only options for fishery development. With regard to freshwater culture, local cooperatives or associations at Cadayonan, Pasayanon, and Matampay have freshwater ponds for fish culture, but the production remains limited. Thus cultured fish is normally consumed by members of the local groups, and only a small portion is sold in neighboring barangays. Tilapia is popularly cultured within the municipality. Tilapia seed is provided mainly by the Bureau of Fisheries and Aquatic Resources (BFAR)-X hatchery at Lala, Lanao del Norte, but fish culture skills remain minimal due to a lack of training or on-site guidance. Most of the locally produced fish are consumed within the local communities and thus are not distributed to outside markets. Accordingly, a clear value chain of locally produced fish has not been established yet. Iligan City is a possible commercial market for local fishery products, given its good accessibility to the municipality. Among the freshwater fishes, Tilapia is the most popular at the market. However, most Tilapia fish sold at the market in Iligan City come from the areas of Lake Buluan and Magiundanao Province, with some coming from municipality Sultan Naga Dimaporo in the southern areas (Sulu Sea

[4] Matungao Comprehensive Development Plan (Executive Legislative Agenda) 2008–2010

[5] National Statistical Coordination Board (2003) City and Municipal level poverty estimates: http://www.nscb.gov.ph/poverty/sae/2003%20SAE%20of%20poverty%20(Full%20Report).pdf

side) of Lanao del Norte province. Very few of the local tilapia fish from Matungao and other neighboring areas are available at the Iligan markets. As in Sultan Mastura, during Ramadan, the local demand for tilapia fish generally increases, often causing a shortage of tilapia at local markets. Thus it was determined that tilapia culture and marketing is the most appropriate pilot project in the municipality.

3) Selection of the pilot project sites for road rehabilitation and maintenance

Unlike the survey for agriculture and fisheries which aimed to identify the most relevant project contents, the survey on roads in the CD-CAAM was essentially to identify the most suitable locations for piloting the LBT approach for rehabilitation and maintenance of community roads. Through consultations with the BDA and the mayor, the municipal engineer (ME), and the barangay captains, several possible barangays for the pilot project were identified within the municipalities. To further identify possible target sites, a survey undertaken jointly by the BDA, LGUs, and JICA experts was carried out, which examined with consideration of the general security situation, possible linkages with economic activities such as agriculture and fisheries, the general traffic situation and the interests and experiences of the community residents.

(4) Formulation of the pilot project plan

Based upon the results of social preparation 1, the pilot project plans were formulated to guide the implementation of the respective projects in an effective and sustainable manner. The plans included: 1) contents, 2) objectives, 3) project sites, 4) implementation mechanisms, 5) implementation processes, and 6) the implementation schedule. They also included cost estimations and the assumed economic impact of each project.

In particular, pilot project sites were selected in line with the barangay selection criteria and processes, thereby ensuring objectivity and transparency in selecting the most appropriate project sites. For the first step, barangay scoring was carried out, in which specific points were allotted to each indicator, and scoring was determined by the BDA through a comparison among barangays (relative evaluations) within the respective municipalities. This step was intended to confirm the basic conditions for each barangay in terms of development needs. While the barangays that obtained the largest scores were given special attention, sector feasibility review, as the next step, focused more on development potential by examining the most feasible and suitable barangays for respective pilot projects, thereby maximizing the impact of the interventions. This step was carried out by reviewing the findings from the technical survey of social preparation 1 and consultation among partners such as the BDA, municipal LGUs and JICA experts.

The most suitable barangays for the respective pilot projects were selected based on the results of the above-mentioned steps, as well as careful consultation among partners and stake-holders. The target barangays for the respective pilot projects are listed in Table 2.1.1.1.

Table 2.1.1.1: List of target barangays

Sectors	Sultan Mastura	Matungao
Agriculture	Macabiso	Puntod
Fisheries (pond culture)	Tambu	Cadayonan
Fisheries (cage culture)	Solon	Pasayanon
Road rehabilitation	Tariken	Cadayonan/Bubong radapam
Road maintenance	Namuken	Bangco/Batal

(5) Social Preparation 2

Social Preparation 2 aimed to prepare for the actual implementation of the community development projects, which included selecting the direct beneficiaries of the projects and sensitizing them, the relevant community leaders and stakeholders to the contents, visions and values underlining the pilot projects. For that purpose, the barangay-wide orientation and the sitio/purok[6]-level orientation were organized to inform and mobilize people and the communities at the pilot project sites. The barangay-wide orientation aimed to introduce the pilot project plans to the communities in order to generate awareness and acceptance of the projects among the community people and underscore the importance of popular participation. The sitio-level orientation aimed to orient sitios within the target barangays for the specific pilot project of each sector. Preliminary selection of direct beneficiaries was done during the sitio-level orientation.

Social preparation 2 was also aimed at collecting basic data about the direct beneficiaries of each project and making other necessary pre-implementation arrangements such as the signing of MOA with the relevant partners (including land owners of the locations of the demonstration farm and fish pond). In particular, the baseline survey collected data and information on the initial household situation of the beneficiaries of the agriculture and fisheries pilot projects, as well as data and information related to each pilot project.

(6) Implementation of the pilot projects

The sections below summarize the major activities for the pilot projects in the municipalities of Sultan Mastura and Matungao. A series of follow-up and monitoring activities were also carried out regularly to ensure effective and sustainable capacity building at all levels from the BDA to the target communities (specific activities in each pilot project are elaborated in Chapter 3 as well). Table 2.1.1.2, 2.1.1.3, and 2.1.1.4 summarizes the major activities for the pilot projects in Sultan Mastura and Matungao from September 2013 to November 2014.

[6] While the Barangays are officially the smallest political divisions, they may be subdivided into smaller areas called "Purok" and "Sitio" as a sub-locality inside a Barangay, especially in rural areas. One Purok may consist of one or more Sitio.

Table 2.1.1.2: List of activities for pilot project on vegetable production and marketing

(1) Sultan Mastura			
	Date	Activity/training	Training contents
1	4–5 October 2013	Exposure visit to the vegetable production site	Visit to vegetable production and basic facilities in Panabo Davao
2	12–14 November	Training on Basic Vegetable Production	Basic vegetable production technologies, organic and natural farming, nursery establishment and management, and companion planting
3	25 November	Training on concoction making	Natural fertilizers and pesticides
	26, 28 November	Training on vermie/worm culture	Production, maintaining and application of organic fertilizers
4	17–18 December	Training on farm management	Farm management and daily farm monitoring
5	26 December	Training on financial literacy	Financial management strategies (bookkeeping, cash flow technologies, and financial statements)
6	7–9 January 2014	Market survey	Market situation in Cotabato City, Kabacan, Kidapawan and Davao City
7	15 January	Workshop on marketing	Marketing of products and how to sustain production
8	22 January	Orientation on cooperative management and pest management	Cooperative management, pest management and farm monitoring
9	18–20 February	Exchange visit	Experience sharing between farmers of Matungao and Sultan Mastura, and visited the worm facility at the University of Southern Mindanao, Kabacan
10	7–8 April	Study tour	Bulb onion production and worm-composting and culture technology at the Tupi, onion farm in General Santos and the worm farm in Matalam
	9 April	Re-orientation on vegetable production	Review of the first cycle production, and preparation for the second cycle of crops
11	26–27 May	Training on vegetable production: second cycle cropping	Vegetable production technology on cauliflower, lettuce and bulb onions, pest and disease management, and practices on organic farming
12	13–14 August	Training on cooperative development management	Functions and responsibilities of cooperative management and governance
13	25–26 August	Training on cooperative financial management	Financial management of cooperative
14	21–22 October	Training on seed production technology	Proper selection of quality seeds for vegetable production, processing, packaging and storing
15	11 November	Training on seed production technology	
(2) Matungao			
	Date	Activity/training	Training contents
1	10 October 2013	Exposure visit to vegetable production site	Visit to vegetable production site and the basic facilities in Malaybalay, Bukidnon
2	21 October	Training on basic vegetable production	Basic vegetable production technologies, organic and natural farming, nursery establishment and management, and companion planting
3	18 December	Training on financial literacy	Financial management strategies (bookkeeping, cash flow technologies, and financial statements)
4	23 January 2014	Market survey	Market situation in Iligan City
5	24 January	Workshop on marketing	Marketing of products and how to sustain production
6	12 February	Training on farm management	Farm management and daily farm monitoring

7	18–20 February	Exchange visit	Experience sharing between farmers of Matungao and Sultan Mastura, and visited the worm facility at the University of Southern Mindanao, Kabacan
8	23 March	Technical guidance on worm-tea production	Worm-tea production
9	21–22 October	Training on seed production technology	Proper selection of quality seeds for vegetable production, processing, packaging and storing
10	12 November	Training on seed production training	
11	22 December	Farmer's field day	Sharing of technology to other farmers through observation, explanation and demonstration at the demo farm

Table 2.1.1.3: List of activities for the pilot project on tilapia culture, processing and marketing

(1) Sultan Mastura			
	Date	Activity	Training contents
1	30 September–3 October 2013	Training on tilapia farming	Tilapia biology, harvesting and marketing at MSU-Maguindanao
2	24 October	Knowledge sharing	Knowledge acquired in the training above was disseminated to the other beneficiaries at the community
3	15–19 December	Training on tilapia Processing	Basics of processing tilapia into smoked fish, labeling and packaging, and marketing at Mindanao State University (MSU) Naawan
4	14 January 2014	Knowledge sharing on tilapia processing	Knowledge and skills acquired at the hands-on training course on tilapia processing were shared with other beneficiaries at the community
5	25–27 March	Training on tilapia cage culture	Basic knowledge on tilapia culture in floating fish cages, basic biology, construction of fish cages, harvesting and marketing.
6	26–29 May	Exposure visit for the BDA, MLGU and community beneficiaries	Visit to successful cases of fish culture, processing and marketing in Panabo City, Davao del Norte, Lake Sebu, South Cotabato and the BFAR-MFFTC Kabacan, North Cotabato
7	5 June	Knowledge sharing on a study tour and pre-harvest meeting	Sharing of knowledge of experience and learning from the study tour with other beneficiaries
8	11 June	Plankton survey and water analysis	Measurement the amount of plankton in pond water
9	4–7 August	Training on aqua feed formulation	Basic techniques on home-made feed formulation
10	20 August	Knowledge sharing on aqua feed formulation	Sharing of knowledge of home-made feed formulation to other community beneficiaries
11	12 October	Tilapia processing	Actual processing of fresh tilapia into dried form, packaging and marketing
12	14 October	Training on community-based tilapia seed production	Brood stock selection, sexing, breeding
13	27 October	Training on community-based tilapia seed production	Handling and nursery rearing of fries (baby fish)
14	29 October	Tilapia processing, packaging and marketing	Actual processing of fresh tilapia into dried form, packaging and marketing
15	20 November	Training on home-made feed making	Home-made feed formulation
(2) Matungao			
	Date	Activity/training	Training contents
1	30 September–3 October 2013	Training on tilapia farming	Tilapia biology, harvesting and marketing at MSU-Maguindanao

2	21 October	Knowledge sharing	Knowledge acquired in the training above was disseminated to the other beneficiaries at the community
3	15–19 December	Training on tilapia Processing	The basics of processing tilapia into smoked fish, labeling and packaging, and marketing at MSU Naawan
4	19 January 2014	Knowledge sharing on tilapia processing	Knowledge and skills acquired on the hands-on training for tilapia processing were shared with other beneficiaries at the community
5	1–3 April	Training on tilapia cage culture	Basic knowledge on tilapia culture in floating fish cages, basic biology, construction of fish cages, harvesting and marketing.
6	5–8 May	Exposure visit for the BDA, MLGU and community beneficiaries	Visit to successful cases of fish culture, processing and marketing in Panabo City, Davao del Norte, Lake Sebu, South Cotabato, and Lake Buluan, Maguindanao
7	20 May	Knowledge sharing from the study tour and profit management meeting	Sharing of knowledge on the study tour about successful cases of fish culture, fish processing and marketing to other beneficiaries at the community
8	4–7 August	Training on aqua feed formulation	Basic techniques on home-made feed formulation
10	26 August	Knowledge sharing on organic aqua feed formulation	Sharing of knowledge on the formulation of home-made feed to other community beneficiaries
11	16 October	Training on tilapia seed production	Community-based tilapia seed production using the simple hapa-based method
12	28 October	Tilapia processing, packaging and marketing	Actual tilapia processing (dried), packaging and marketing
13	29 October	Training on community-based tilapia seed production	Proper fry harvesting and collection
13	5–6 November	Training on the establishment of the Hapa-based hatchery	Establish a hapa-based hatchery in cages for the requirement of a sustainable supply of community fingerlings
14	7–9 November	Cross visit to Sultan Mastura pilot projects	
15	20 November	Training on home-made feed making	Actual home-made feed formulation

Table 2.1.1.4: List of activities for the pilot project on road rehabilitation and maintenance

(1) Sultan Mastura			
	Date	Activity/training	Training contents
1	12–14 November 2013	Stage 1 LBT training for the BDA and MLGU	(a) knowledge on rural road standard plans and technical specifications; (b) basic procedures on LBT; (c) road maintenance concepts and common distresses of rural roads; (d) standard maintenance procedures and activities of the LBT; and (e) community organization for sustainability
2	20–21 December	Workshop on the pilot project implementation modality	Specific roles and responsibilities of the MLGU and BDA at all levels of implementation
3	7–10 January 2014	Stage 2 training on LBT	Training of trainers for the BDA and MLGU to provide LBT training at stage 3
4	27–28 January	Workshop on the pilot project implementation plan and modality	Drafting a sample project description as required by the Department of Environment and Natural Resources (DENR) for issuing a Certificate of

			Non-Coverage (CNC)[7], and the Invitation to Apply for Eligibility and to Bid (IAEB)
5	7 May	Bid opening 1	Evaluation of bid documents, preparation of the abstract of the bids, and the overall procedures for the bid opening ceremony
6	15 May	Pre-did conference	Proper conduct of pre-bid conference including procurement processes and procedures, features of the contract, and clarifications of the bid documents
7	19–21 May	Stage 3 training on LBT	(a) rural road standard plans and technical specifications (b) basic procedures on labor-based rural road rehabilitation works (c) roads maintenance concepts and common distresses of rural roads (d) standard maintenance procedures and activities adopting Labor-Based Technology (e) importance of organizing communities for the sustainability of rural road operations
8	23 May	Pre-mobilization conference 1	Background and scope of work of the project
9	29 May	Bid-opening 2	Evaluation of bid documents, preparation of the abstract of the bids, and the overall procedures for the bid opening ceremony
10	3 July	Pre-mobilization conference 2	Background and scope of the work of the project
11	16 October	Knowledge sharing Activity	Walk-through field observation tour.
12	January 2015	Sustainability mechanism	Operations and Maintenance (O&M) and Monitoring and Evaluation (M&E) structures for the sustainability of the pilot roads
(2) Matungao			
	Date	Activity	Training contents
1	25–27 November 2013	Stage 1 LBT training for the BDA and MLGU	(a) knowledge on rural road standard plans and technical specifications; (b) basic procedures on LBT; (c) road maintenance concepts and common distresses of rural roads; (d) standard maintenance procedures and activities of the LBT; and (e) community organization for sustainability
2	20–21 December	Workshop on the pilot project implementation modality	Specific roles and responsibilities of the MLGU and BDA at all levels of implementation
3	7–10, January 2014	Stage 2 training on LBT	Training of trainers for the BDA and MLGU to provide LBT training at stage 3
4	27–28 January	Orientation-Workshop on pilot project implementation plan and modality	Drafting a sample project description as required by the DENR for issuing a CNC, and the IAEB
5	27 May	Pre-bid conference	Proper conduct of the pre-bid conference including procurement processes and procedures, features of the contract, and clarifications of the bid documents
6	10 June	Bid opening 1	Evaluation of bid documents, preparation of the abstract of the bids, and the overall procedures for the bid opening ceremony

[7] CNC: a certification issued by the Environmental Management Bureau (EMB) confirming that, based on the submitted project description, the project is not covered by the Environmental Impact Statement (EIS) System and is not required to secure an Environmental Compliance Certificate (ECC)-DENR Administrative Order No. 2003- 30

7	11 June	Bid opening 2	Evaluation of the bid documents, preparation of the abstract of the bids, and the overall procedures for the bid opening ceremony
8	23-25 June	Stage 3 training on LBT	(a) rural road standard plans and technical specifications (b) basic procedures on labor-based rural road rehabilitation works (c) road maintenance concepts and common distresses of rural roads (d) standard maintenance procedures and activities adopting Labor-Based Technology (e) importance of organizing communities for the sustainability of rural road operations
9	7 August	Bid opening 3 (re-bidding)	Procedure on rebidding
10	8 August	Bid opening 4 (re-bidding)	Procedure on rebidding
11	3 September	Pre-mobilization conference	Background and scope of work of the project
12	16 October	Knowledge sharing	Walk-through field observation tour
13	January 2015	Sustainability mechanism	Operations and Maintenance (O&M) and Monitoring and Evaluation (M&E) structure for the sustainability of the pilot roads

(7) Development of the guidelines and technical manuals

Based on the experiences and results of the activities during the pilot phase, the CDG and technical basic manuals were formulated as attached as appendices.

2.1.2. Results of capacity building during the pilot phase

(1) Framework and scope of assessment

The CD-CAAM aims at strengthening the BDA's comprehensive capacity to lead development activities within areas in Mindanao that have been affected by conflict. The relevancy of this objective has been confirmed with updated BDA mandates under the resolution of the MILF Central Committee.[8] Regarding the application of a framework of assessment, the CD-CAAM referred to the capacity assessment report by the World Bank (WB).[9] In particular, the CD-CAAM assessment referred to objectives and key competencies in the WB report. Although the WB report was referenced considerably in the CD-CAAM objectives, this assessment selected appropriate key competencies in line with the nature of the CD-CAAM. Besides referring to the WB report, the CD-CAAM assessment introduced the PDCA (Plan-Do-Check-Act) cycle to explain its assessment framework. As a result, it categorized selected key competencies[10] into appropriate PDCA stages as subsets. Objectives of this assessment include: 1) to assess BDA's organizational capacities in managing development projects in CAAM, and 2) to come up with interventions for capacity needs and gaps. As mentioned above, the BDA was expected to be a developmental organizer in CAAM. Thus, the CD-CAAM contributed to capacity

[8] The relevant resolution of MILF Central Committee was issued on October 15, 2014.
[9] Report on the Organizational Capacity Assessment of the Bangsamoro Development Agency
[10] 1) Plan (key competency: data collection/analysis and plan formulation; 2) Do (key competency: coordination and monitoring); 3) Check and Act (key competency: evaluation/internal assessment); 4) Other relevant competencies (presentation and documentation)

development to ensure proper management of related projects. By identifying needs and gaps regarding capacities, the team came up with development interventions as practical recommendations for further capacity development.

Assessment of capacities of the BDA was conducted at two levels, namely at the Central Management Office (CMO) and the Regional Management Office (RMO). As its name indicates, the CMO has headquarter functions over seven RMOs in Mindanao.[11] An RMO is responsible for all activities in its coverage area. Under the CD-CAAM, RMO Central Mindanao (CenMin) covered the activities on the ground in the Sultan Mastura municipality, and RMO Ranaw covered those in the Matungao municipality. Further, the RMO is the frontline for communicating and coordinating with counterpart LGUs. In summary, overall project management responsibilities are performed by the CMO, with RMOs taking responsibility for managing regional tasks. Table 2.1.2.1 is a list of counterpart staff of BDA for the CD-CAAM project. The assessment was carried out through key informant interviews, focus group discussions, reviewing activity reports, presentation materials, handouts for seminars and workshops and photo documentation.

Table 2.1.2.1: List of BDA counterpart personnel

Location/Position		**Major Functions**
Central Management Office (CMO)		
1	Executive Director	1) Lead the overall management of the project; 2) Oversee the implementation of the project; 3) Chair the Technical Working Group (TWG); 4) Provide reports and recommendations to the Steering Committee (SC); 5) Coordinate with partners such as government agencies, and other donors; and 6) Consult with the Board of Directors of BDA on important matters related to the project.
2	Program Management Officer	1) Support the Executive Director in overall project planning and management; 2) Establish and ensure effective and efficient communication within BDA, i.e., CMO and related RMOs, on project implementation; 3) Establish close communication/coordination with JICA experts; 4) Provide guidance to RMOs in a timely manner; 5) Coordinate with stakeholders such as MLGUs and resource organizations; and 6) Conduct supportive monitoring visits to the project sites.
3	Infrastructure Engineer	1) Provide technical inputs to social preparation; 2) Review and recommend the detailed engineering designs, plans and specifications; 3) Help plan and supervise the infrastructure project; and 4) Conduct monitoring on the project during implementation to ensure compliance with technical specifications, environment and social safeguards.
4	Planning, Monitoring, and Evaluation Officer	1) Support the Program Management Officer in overall project planning and management; 2) Conduct monitoring on the project during implementation to ensure compliance with technical specifications, environment and social safeguards; 3) Help identify and analyze lessons, issues and challenges in community development; and 4) Provide inputs in evaluating the project.

[11] (1) RMO Central Mindanao; (2) RMO Southern Mindanao; (3) RMO Ranaw; (4) RMO Davao; (5) RMO Zamboanga City and Basilan; (6) RMO Zamboanga Peninsula; and (7) RMO Sulu and Tawi-Tawi

5	Information, Communication, and Learning Officer	1) Document minutes of meetings, workshops and others; 2) Help to put together Community Development Guidelines; 3) Establish networks with the media; and 4) Assist in presenting documented project outputs and other project information in different formats (including BDA website).
6	Administration and Finance Officer	1) Ensure collection and submission of all necessary documents such as official receipts, working records, and any other financial supporting documents as required by JICA and BDA for all expenses at CMO and RMOs; 2) Organize travel logistics of BDA (CMO and RMOs); 3) Provide secretarial and administrative support in the CD-CAAM project implementation and operations; and 4) Provide assistance in office clerical work.
Regional Management Office (RMO)		
1	Regional Manager	1) Lead planning and management of CD-CAAM program implementation at the RMO level in consultation with CMO; 2) Establish linkages with local government units and other development players operating in the regional project area; 3) Participate in monitoring or visits to target municipalities and barangays; 4) Review commitments of regional staff and undertake periodic performance reviews; and 5) Recommend improvements to CMO on project policies, standards and processes to enhance BDA management and implementation capacities.
2	Regional Coordinator	1) Support the Regional Manager on project planning and management at the regional level; 2) Coordinate with LGU and other relevant stakeholders at the field level; 3) Review project management and implementation processes to improve project operation at the RMO level; 4) Coordinate with the CMO and other institutional partners; and 5) Conduct monitoring at pilot project sites.
3	Community Organizer Supervisor	1) Supervise Community Organizers for pilot project implementation; 2) Provide instructions to community organizers in organizing and strengthening groups of community people; and 3) Submit reports on the status of pilot projects to the RMO.
4	Regional Project Operation Officer (Road)	1) Provide support in planning of the infrastructure project; 2) Work with the Municipal Engineer and relevant MLGU officials, contractors, JICA experts and other relevant stakeholders on the infrastructure project; 3) Identify and analyze lessons, issues, and challenges on the infrastructure project; 4) Provide technical support to the infrastructure project; and 5) Conduct monitoring and supervision on the project.
5	Regional Project Operation Officer (Agriculture and Fisheries)	1) Help plan income-generation projects; 2) Work with relevant MLGU officials (such as Municipal Agriculture Officer), contractors, JICA experts and other relevant stakeholders on the infrastructure projects; 3) Identify and analyze lessons, issues, and challenges on the income-generation projects; 4) Provide technical support to the income-generation projects; and 5) Conduct monitoring and supervision on income-generation projects.
6	Community Organizer	1) Coordinate with the MLGU, and barangay LGUs for pilot project implementation; 2) Coordinate with community leaders and other stakeholders for the pilot projects; 3) Help mobilize the communities for pilot project implementation; and 4) Conduct regular monitoring of the pilot projects and reporting to RMO.

(2) Major findings

1) Central Management Office (CMO)

The CMO played an important role in planning for the CD-CAAM project. Initially, the CMO's

contributions were limited to the input of ideas, and the office required substantial supports from the JICA experts to draft any plans. CMO's planning capacities have been gradually strengthened, and for planning of daily activities—field trips, site surveys, and conferences—the CMO greatly contributed to preparing schedules, selecting content, and identifying participants. In addition, the CMO began holding regular pre-meetings among its staff members as well as with the RMOs before conducting activities. These meetings helped facilitate smooth implementation of project activities. Meanwhile, the CMO's data collection capacities improved because its personnel were able to identify where to obtain appropriate data. Further, the CMO established network with different resource persons/organizations in fishery, agriculture, and infrastructure sectors. These data resources and data itself are necessary to formulate plans.

For project implementation, coordination skills are necessary if the CMO is to function as a development manager. In this role, the CMO is expected to mobilize and synchronize activities and resources to achieve specific goals. The CMO had opportunities to improve coordination skills since it had to mobilize major stakeholders (e.g., municipal LGUs, barangays, villagers, and resource organizations). Moreover, the CMO regularly coordinated with RMOs to supervise their activities under the CD-CAAM. These experiences equipped CMO staff to coordinate smoothly. At the very beginning of the CD-CAAM, JICA experts often led in coordinating stakeholder consultations with the CMO. However, soon thereafter, the CMO took over the coordinator's role. Regarding monitoring skills, the CMO allocated monitoring staff members for three pilot project sectors: agriculture, fishery, and infrastructure. First, the respective staff accumulated technical expertise related to the applicable sector; for example, CMO staff members worked with RMO staff members at pilot project sites and attended technical workshops to learn new technologies associated with the various sectors. Accumulation of technical knowledge developed expertise to some extent and improved the capacity to monitor pilot projects with an understanding of needed technical validation.

Additionally, the CMO improved the reporting system used for further monitoring of RMOs. Even before the CD-CAAM began, RMOs were required to submit monthly reports to the CMO. The monthly reports provided primary monitoring information for the CMO. After RMO activities expanded, the CMO requested biweekly RMO reports for closer monitoring. This additional report helped the CMO obtain up-to-date information at pilot project sites. In addition, CMO staff increased the frequency of site visits and validated contents of reports. Staff members began crosschecking participation of RMO staff members and beneficiaries with logbooks at project sites. On the contrary, the CMO needs further capacity development for sufficiently drafting formal project reports. Since the beginning of this project, the CMO actively participated in drafting reports, such as pilot project plans and reports for social preparation 1 and 2. However, its participation was limited to sharing comments and authorizing dissemination of these reports, although the CMO was supposed to be one of the principal authors.

Capacity development for evaluation and assessment by the CMO was very limited. The brief exposure

to an internal assessment enabled CMO staff members to understand that reviews of past activities were necessary to identify succeeding and hindering factors. However, relevant training and practice to initiate and facilitate an internal assessment is necessary.

Although CMO staff members demonstrated a certain level of presentation skills even before the CD-CAAM was implemented, their skills improved during the project period. Especially, improvements in basic knowledge and skills for preparing presentation slides with application software (e.g., Microsoft PowerPoint) were noted. After the CD-CAAM began, JICA experts and local staff members in the CD-CAAM office provided technical advice regarding presentation materials, which were mainly used at landmark events including Steering Committee and Technical Working Group meetings. Furthermore, CMO staff members improved their capacity for making oral presentations in public, and the CD-CAAM created numerous occasions for the CMO to practice formal presentations in front of highly ranked domestic and foreign government officers and donor agencies.

2) Regional Management Office (RMO): Central Mindanao (CenMin) and Ranaw

Before the CD-CAAM, the RMO staff did not recognize the availability of relevant documents or know how to access important policies. However, the RMOs identified locations of necessary data sources for local development plans (e.g., Municipal Comprehensive Development Plan and Barangay Development Plan). The RMO staff improved its capacity to analyze data collected as input for decision making. Yet, the staff was not capable of conducting independent analyses of collected data. Through formulation of data collected in barangay data summaries and resource maps to select appropriate barangays as pilot project sites, the RMOs recognized that data analysis was an important tool for decision making.

The RMO staff also improved its technical knowledge related to pilot projects, and they began providing important input for pilot project planning after the second production cycles in the agriculture and fishery sectors. Therefore, the RMO staff can play a leading role in designing technical plans (such as the pilot project plans of the CD-CAAM) in the future, provided that advice from technical authorities is accessible when plans require adjustments for new situations.

The RMO developed its capacity to coordinate with LGU offices sufficiently. The RMO staff worked with the Municipal Agriculture Office (MAO) and ME and learned to communicate appropriately with LGU officers. Ease of communication was based on correct understanding of roles and responsibilities of LGU officers in pilot projects and the establishment of trust between parties. Throughout the project period, the RMO staff adjusted activity schedules jointly with representatives of the LGU office, and LGU officers participated in project activities. These outputs were evidences of improved coordination capacities by the LGU office. The RMO staff developed coordination skills that were useful for mobilizing villagers. The basic strategy for local mobilization was the assignment of a CO who knew target localities very well and who served as a bridge between the RMO and local villagers, beginning

with the very first contact at the barangay orientation. The CO was effective at sensitizing villagers so that a regional community operation officer could provide technical instruction to selected beneficiaries of the respective pilot project. The RMO also expanded networks with resource organizations, resulting in increased capacities to coordinate different technical training programs.

Additionally, the RMO staff members developed their capacity in risk monitoring to some extent, specifically through pilot projects. Risk monitoring has important components: prediction of risks, preparation of preventive measures and countermeasures, and execution of these measures if necessary. For example, the agricultural team experienced various foreseeable and unforeseeable risks with its demonstration farms. Regarding vegetable production, this team had discussed foreseeable risks, including outbreaks of pests and/or diseases. Thus, they also discussed countermeasures, such as the selection and application of pesticides. By repeating such practices, the RMO staff developed the capability to manage risks. Fishery and infrastructure teams also experienced outbreaks of anticipated risks. Through the experience of identifying and executing preventive and countermeasures, the staff developed its capacities for risk monitoring.

The RMO staff participated in and understood internal assessment processes. However, it is fair to mention that the staff did not sufficiently improve its capacities for leading an assessment independently.

RMO staff members improved their presentation skills during the project period; at the beginning of the CD-CAAM, they found it difficult to prepare individual presentations. Because they were required to prepare presentations regarding updates on CD-CAAM implementation in Sultan Mastura, they developed their capacities to use PowerPoint to prepare presentations. They presented at monthly meetings attended by all RMO staff members, including those working on other projects. Other opportunities for presentations included Technical Working Groups, Steering Committee meetings, and monthly updates with LGUs. RMO staff members achieved improvement in documentation skills for regular reports and articles for the BDA website. Staff members drafted individual required reports, such as monthly accomplishments, narrative reports, progress reports, personal journals, and news articles for the website. At the beginning, their reports were very lengthy because of their use of flowery words. However, repeated report writing ultimately resulted in reports that were brief, concise, and direct.

(3) Further capacity building needs

The CD-CAAM provided the basic skills for the BDA to enrich its planning capacity. However, to plan development projects independently, the BDA staff members should learn Project cycle management (PCM) methodology, which promotes a logical consideration of project frameworks with the participatory approach of stakeholders. This training is particularly suitable for CMO staff members and RMO management, who may be heading up project planning.

The CMO and RMOs became accustomed to monitoring projects during the CD-CAAM. They

established a cycle of regular monitoring by obtaining information from activity reports and site visits. In some pilot projects, RMO staff members learned how to use monitoring sheets, which enabled them to consolidate monitoring data systematically. However, the CMO and RMO are yet to apply useful monitoring tools at institutional levels. These tools are, for example, a work breakdown structure and operations. For further development of their capacity building, opportunities for learning these tools should be offered to both CMO and RMO staff members.

The BDA also experienced and understood the process for identifying succeeding and hindering factors and lessons learned. Although JICA experts facilitated the internal assessment, the BDA staff acquired new knowledge of the process. As the BDA did not have an opportunity to practice the assessment with its initiatives during the CD-CAAM project, a further training for evaluation may deepen their understanding and skills for project evaluation.

2.2. Strengthening and expansion of the CD-CAAM model

2.2.1. Major activities during the extension phase

The following are the major activities that were carried out during the extension phase from May 2014 to August 2016.

(1) Establishment of implementation structure and selection of the municipality

The implementation structure was modified to fit the scope of the activities of the extension phase. The allocation of the BDA counterpart staff was modified as described in Table 2.2.1.1, and in particular, the Provincial Management Office (PMO) was newly established in Tawi-Tawi.[12] The municipality of Panglima Sugala was selected in Tawi-Tawi through the municipality selection process/steps specified in the CDG.

Table 2.2.1.1: List of BDA counterpart personnel during the extension phase

Location/Position		Number of staff
Central Management Office (CMO)		
1	Executive Director	1
2	Program Management Officer	1
3	Planning, Monitoring, and Evaluation Officer	1
4	Information, Communication, and Learning Officer	1
5	Administration and Finance Officer	1
Regional Management Office (RMO) Cen-Min and Ranaw		
1	Regional Manager	1
2	Regional Coordinator	1
3	Community Organizer Supervisor	1
4	Regional Project Operation Officer (agriculture, fisheries, and livestock)	3

[12] The RMO Sulu and Tawi-Tawi supervised operation in Tawi-Tawi before the establishment of PMO Tawi-Tawi.

5	Community Organizer	2
Provincial Management Office (PMO) Tawi-Tawi		
1	Provincial Manager	1
2	Provincial Coordinator	1
3	Provincial Project Operation Officer (agriculture, fisheries, and livestock)	3
4	Community Organizer	1

(2) Social Preparation 1

Social Preparation 1 during the extension phase focused on the community profiling and the technical survey, which were carried out by the BDA, particularly by respective RMOs with support from the CMO and the JICA experts and the project staff. For Sultan Mastura and Matungao, where the community profiling and the technical survey were already carried out during the pilot phase, the general and sectoral profile such as agriculture, fisheries, and livestock were updated through Social Preparation 1. In Tawi-Tawi, a full process of community profiling and a technical survey was carried out by following the steps specified in the CDG. As a part of internal technology transfer within the BDA, the CMO and RMO staffs visited Tawi-Tawi to provide the orientation of activities of Social Preparation 1 as well as on-site guidance to the newly employed staff of the PMO. Major findings of Social Preparation 1 are summarized in the following sections.

1) Agriculture

In Sultan Mastura, most of the vegetable farmers remain using the traditional way of cultivation, and harvesting occurs at least twice a year and is mostly intercropped with other crops. In production, many farmers pointed out that infestation by pests and diseases and the recent hot and dry weather made it difficult to grow vegetables. Animals, such as goats, often damage farms too, so that some barangays issued an ordinance to fine the owner of a goat if it damages plants/crops (PHP 5 per plant). Additionally, although the CD-CAAM project has been promoting vegetable production and marketing in the municipality, many farmers still do not have opportunities to gain technical knowledge about vegetable production, and market linkage remains weak for most vegetable farmers. Low farm gate prices, high costs of farm inputs, and high costs for transportation of products to markets are major obstacles in promoting vegetable production in Sultan Mastura.

In Matungao, due to the success of the pilot project of the CD-CAAM, it is now widely known amongst the community that there is now a strong potential for generating income from vegetable production. The municipal LGU envisions Matungao as becoming a source for providing a large variety of vegetables, and the MAO, through the support of the LGU, has established a demonstration farm for vegetable production as a learning venue for the farmers who are interested in vegetable production in the municipality. The LGU has also started land preparation for the wider production area for different vegetable crops. Construction of the municipal public market has been completed in barangay Poblacion near the municipal hall, which opens every Wednesday. However, there are only a few farmers selling their products at this market and most vegetable products are transported to the markets in nearby

Linamon and Iligan City, because they can sell all of their products within a day and the price is relatively high. Many producers pointed out the high cost of farm inputs is one of the major challenges, and they want to learn how to make organic fertilizer to reduce the production cost.

The municipality of Panglima Sugala is approximately 18 kilometers from Bongao, the capital town of Tawi-Tawi province, and is located in the southern part of the island. The municipality is composed of seventeen barangays with Poblacion Bato-Bato as its capital barangay. Panglima Sugala is known for being Tawi-Tawi's agricultural center, and has rich agricultural lands suited for various crops. High value fruits, such as durian and mangoes, attract residents from nearby municipalities to barangay Bato-Bato where the public market is located. Buyers in the public market come from other municipalities, and bartering is still practiced in which people bring their seafood products to exchange for agricultural products, such as cassava and vegetables. With regards to vegetable production, although the MAO and five agriculture technicians visit farmers and provide them with advice and seeds on some occasions, the MAO pointed out that limited technical knowledge of production and marketing are one of the major challenges. The MAO also pointed out that lack of irrigation and improper land preparation often result in poor growth of vegetables, and a weak linkage with the market also hampers stable income generation from vegetable production. The Tawi-Tawi Regional Agricultural College (TRAC) was identified as a resource organization for the project. It is a public college in the province that is mandated to provide professional, technical, and special training to the farmers, and to promote research, extension services, and progressive leadership in the field of agriculture. Its main campus is located in Bongao. The Research Development, Extension Services and Production (RDESP) of TRAC provides extension services to different barangays and municipalities in Tawi-Tawi. They also have a radio program on agriculture, which airs on the Bongao radio station.

2) Fisheries

In Sultan Mastura, success of the CD-CAAM pilot project has drastically improved the production of tilapia, and the volume of production is expected to further increase when all production activities, including many technology adaptors in different barangays within the municipality, are combined. While there are some freshwater lakes and ponds that have a high potential for aquaculture, local people have not yet maximized the utilization of those areas. Meanwhile, local markets for cultured fishes are established in Parang, Midsayap, and Sultan Mastura. However, production volume remains limited because many people cannot venture into tilapia culture due to a lack of technical know-how and financial capacity to start production.

Freshwater fish culture was not very common in Matungao a few years ago, but the CD-CAAM project has significantly increased the number of fish farmers. Community-based tilapia hatchery production was also introduced and successfully adopted by the community, which sustains their fingerlings supply in the municipality. It also gave them the opportunity to sell fingerlings to tilapia growers or technology adaptors both within and outside of the municipality. Tilapia is one of the most popular fishes in Iligan

City, but most tilapia fish sold at the market there comes from other provinces such as Magiundanao. Another emerging market for locally produced tilapias is Marawi City and Balo-i where many Maranaw people reside. However, the volume of production of tilapia in Matungao remains limited, so market distribution is only within the municipality through direct selling.

Panglima Sugala is endowed with abundant marine resources of various fish species and one of the major producers of dried seaweed in Tawi-Tawi. According to the BFAR, seaweed farming is the main source of income of the marginal fishers in Tawi-Tawi. Not surprisingly, freshwater fishes, such as tilapia, do not have much market value in the municipality. Bongao, the capital municipality of Tawi-Tawi is the commercial center of the province where raw dried seaweed and other marine products are sold to traders. Cultured seaweed is mostly processed into raw dried products by farmers which are shipped by traders/consolidators to Zamboanga, Cebu, and Manila for processing into chips and semi-refined carrageenan, and then exported to countries such as the USA, Germany, Canada, and Japan. Seaweed farming is comparatively profitable for small-scale farmers, but farmers should master the craft to be successful. In particular, post-harvest improvement is one of the key factors to maintaining a quality seaweed harvest. Farmers also need to master the business aspect of seaweed farming, such as financial management and record keeping, to sustain the business. The MSU Tawi-Tawi was identified as a resource organization for seaweed production.

3) Livestock

Both in Sultan Mastura and Matungao, most of the goat farmers are practicing the traditional ways of goat production such as tethering and free ranging of goats under the coconut trees and alongside the roads for feeding. The level of knowledge on proper goat raising among the farmers remains low. They do not plant forage, and rely on the available grasses, and do not have any goat sheds, and do not practice any health management, such as vaccinations and de-worming. Most of the farmers are raising a small number of goats ranging from two to four, and they usually sell their stock when they are in need of money, for example for school enrolment for their children, for medical requirements, and for other personal necessities. In Sultan Mastura, some farmers received goats under development projects such as Payapa at Masaganang Pamayanan (PAMANA), but many farmers do not receive any formal training on goat raising and are willing to attend training to improve their capability. In Matungao, there is an existing association for goat raisers but it has been inactive due to lack of technical/financial supports. Goat is a traditionally important animal for the Muslim population for different occasions, such as Eid'l Adha (Festival of Sacrifice) and others. Male goats are more saleable than female goats, and live goats rather than chevon (goat meat) is more popular in the market. A shortage in the supply of goats often occurs during peak seasons, such as during Eid.

While the population in Tawi-Tawi are mostly Muslims, and goats are in high demand during Muslim festivities and occasions for ceremonial purposes, goat meat is not very popularly consumed on a daily basis. Most of the goats are raised on a backyard scale, and there are no commercial goat farms in

Panglima Sugala. There is no proper forage available in the municipality, and the selling of live goats in the public markets is very rare in the entire Tawi-Tawi province. In contrast, many households raise native chickens in their backyard, and there exist live, native chicken vendors both at Bongao and Panglima Sugala. The Provincial Agriculturist and the Municipal Agriculturist of Panglima Sugala suggested that goat raising can augment the income of the ordinary farmers in Tawi-Tawi, however, it may not become a main livelihood activity given the limited demand of live goats or goat meat in the province. The University of South Mindanao (USM) was identified as a resource organization for goat production for all locations.

(3) Formulation of the project implementation plan and Social Preparation 2

Based upon the results of Social Preparation 1, the project implementation plan for respective livelihood projects have been formulated, and the target barangays were also selected (Table 2.2.1.2). Based upon the results of Social Preparation 1, a project for seaweed culture, post-harvest improvement, and marketing was determined as the most appropriate project in Panglima Sugala, and its project implementation plan was formulated accordingly. The BDA then carried out Social Preparation 2 in respective municipalities, which included barangay wide orientation, selection of beneficiaries, baseline survey as well as Value Enhancement Training (VET).

Table 2.2.1.2: Target barangays of the extension phase

Sultan Mastura, Maguindanao	Matungao, Lanao del Norte	Panglima Sugala, Tawi-Tawi
Promotion of Vegetable Production and Marketing through the FTF approach		
Boliok: 30 beneficiaries	Matampay: 30 beneficiaries	Kulape: 10 beneficiaries
Tilapia Culture, Processing, and Marketing through the FTF approach		
Tapayan: 15 beneficiaries (pond culture), Balut: 15 beneficiaries (cage culture)	Purok 3, Sta. Cruz: 15 beneficiaries and Koriod, Sta. Cruz: 15 beneficiaries (pond culture)	
Technologies for Seaweed Production		
		Buan: 10 beneficiaries
Technologies for Goat Production		
Kirkir: 20 beneficiaries	Somiorang: 20 beneficiaries	Sumangday: 10 beneficiaries

(4) Technology transfer through the Farmer-to-Farmer approach (Agriculture and Fisheries)

FTF approach to technology transfer was already tested in the pilot project for fisheries, and it was also voluntarily carried out by the beneficiary group of the pilot project for agriculture in Sultan Mastura. The activities during the extension phase aim to establish and institutionalize the FTF within the CD-CAAM model as an approach for technology transfer to the wider population.

Activities of the FTF started with the training of trainers (TOT) wherein members of the beneficiary groups of the pilot phase were trained as the farmer trainers (FT). The TOT aims to equip FTs with

necessary planning, communication, and presentation skills to train other farmers effectively. It also provides the FTs with an opportunity to reflect on the specific technologies that they are expected to disseminate to others. Major activities for the FTF are summarized in Table 2.2.1.3 and 2.2.1.4. The results of FTF are examined in detail in Chapter 3.

Table 2.2.1.3: List of activities for the FTF approach (Agriculture)

(1) Sultan Mastura		
	Date	Activity/training
1	August 25–26, 2015	Training of Trainers
2	August 27, 2015	Examination and evaluation of FTs capacities
3	September 3, 2015	Building FT groups and planning for FTF
4	September 8, 2015	Dry run for FTF (practice of FTF)
5	October 5, 2015	FTF Topic 1: Soil sampling and land preparation
6	October 7, 2015	Market survey
7	October 12–13, 2015	FTF Topic 2: Nursery making, sowing/transplanting, and fertilizer management
8	October 20–22, 2015	FTF Topic 3: Vermicomposting and concoction
9	October 26, 2015	FTF Topic 4: Irrigation and water management
10	October 27, 2015	FTF Topic 5: Companion plants planting and trellising
11	Nov. 10–11, 2015	FTF Topic 6: Pest and weed control
12	Nov. 23–24, 2015	Farm management, transplanting and fencing of practice farm
13	December 8–9, 2015	Preparation of "bokashi" and green manure planting
14	December 22, 2015	FTF Topic 7: Pruning
15	December 23, 2015	FTF Topic 8: Harvesting and post-harvesting
16	December 24, 2015	FTF Topic 9: Selling and recording
17	January 14, 2016	Matchmaking
18	February 11, 2016	Farm management on land preparation
19	March 1, 2016	Orientation on cooperatives by the Cooperative Development Authority (CDA)
20	March 12–13, 2016	Training on cooperative development and management by CDA
21	March 21–22, 2016	Training on cooperative financial management by CDA
(2) Matungao		
	Date	Activity/training
1	August 20–21, 2015	Training of Trainers
2	August 22, 2015	Examination and evaluation of FTs capacities
3	August 31, 2015	Team building of FTs (group formation)
4	September 7, 2015	1st dry run by FTs (practice of FTF)
5	September 26, 2015	2nd dry run
6	September 21, 2015	Market Survey
7	September 22, 2015	FTF Topic 1: Establishment of practice farm
8	September 22, 2015	FTF Topic 2: Soil sampling and testing
9	September 28, 2015	FTF Topic 3: Land preparation
10	October 6, 2015	FTF Topic 4: Nursery establishment
11	October 6, 2015	FTF Topic 8: Sowing, planting/transplanting
12	October 13, 2015	FTF Topic 5: Fertilizer application
13	October 13, 2015	FTF Topic 9: Trellising and pruning
14	October 20, 2015	FTF Topic 6: Compost making, rapid composting, vermicomposting
15	Oct. 13, 20, 27, 2015	FTF Topic 7: Concoction preparation
16	November 11, 2015	FTF Topic 10: Irrigation and drainage
17	November 18, 2015	FTF Topic 11: Pests, diseases, and weed control
18	December 16, 2015	FTF Topic 13: Selling and record keeping
19	January 13, 2016	FTF Topic 12: Harvesting and post-harvesting
20	January 20, 2016	Business matchmaking

Table 2.2.1.4: List of activities for the FTF approach (Fisheries)

(1) Sultan Mastura		
	Date	Activity
1	September 5, 2015	Dry run for FTF
2	November 3–7, 2015	Extension of pond digging and dike strengthening
3	November 3–5, 2015	Fixing and installing floating fish cages
4	November 11, 2015	Training on manual sexing of tilapia
5	Nov. 12–13, 2015	Stocking of mono-sex tilapia
6	November 15, 2015	Procurement and stocking of tilapia breeders for cages and ponds
7	Nov. 16–18, 2015	Procurement and stocking of tilapia fingerlings for mono-sex culture
8	December 8, 2015	Stocking of additional fingerlings
9	Dec. 9–13, 2015	Construction of duck house, fencing and procurement of ducks
10	Dec. 10–14, 2015	Excavate pond 2 and pond 3 for mono-sex tilapia culture
11	December 15, 2015	Stocking of ducks
12	December 15–16	Sampling of stocks in Tapayan
13	January 27–30, 2016	Digging of hatchery/nursery pond, installing piping system
14	January 31, 2016	Stock sampling and on-site lecture on feeding management
15	February 9–18, 2016	Manual digging of breeding ponds
16	Feb. 10–24, 2016	Drilling and water pump installation
17	March 3–5, 2016	Hands-on training on tilapia processing
18	March 7, 2016	Stocking of ducks for integrated fish farming
20	March 17, 2016	Tilapia processing and stock sampling
(2) Matungao		
	Date	Activity/training
1	September 3–5, 2015	Training of Trainers
2	October 6, 2015	Dry run for farmer trainers
3	October 7, 2015	FTF training
4	October 13–30, 2015	Pond excavation for tilapia culture
5	Nov. 7–21, 2015	Pond digging and construction and repair of pond water source
6	Dec. 8–10, 2015	Procurement and stocking of ducks
7	Dec. 17–19, 2015	Transport and stocking of fingerlings from South Cotabato
8	January 11–25, 2016	Excavation of pond 2 and installing piping system for water source
9	January 13, 2016	Training on manual sexing of tilapia fingerlings
10	February 3–4, 2016	Training on duck raising for integrated fish farming system
11	Feb. 6–20, 2016	Manual digging of grow out pond 2 and breeding pond
12	Feb. 25–28, 2016	Construction of duck house and fence and stocking of ponds with fingerlings

(5) Implementation of a new livelihood project

To further promote the CD-CAAM model to the wider areas in Bangsamoro, a variety of community development interventions of the CD-CAAM model must be increased to address diverse development needs/potential of the areas. For this purpose, the project for goat production was implemented as a new livelihood project. Major activities are summarized in Table 2.2.1.5, and the results of goat production are examined in detail in Chapter 3. Based upon the results of Social Preparation 1 in Panglima Sugala of Tawi-Tawi, a new livelihood project (involving seaweed culture, post-harvest improvement, and marketing) was formulated and implemented as well. As such, during the extension phase, two new livelihood projects have been added to the community development project under the CD-CAAM model. Results of the new projects are examined in Chapter 3.

Table 2.2.1.5: List of activities for goat production

(1) Sultan Mastura			
	Date	Activity/training	Training contents
1	September 7–11, 2015	1st technical training	Introduction to goat production and study tour
2	October 20–22, 2015	2nd technical training	Goat housing and other essential facilities
3	February 16–18, 2016	3rd technical training	Breeding/reproduction, nutrition, general herd management, animal health management, farm record keeping
4	April 21–23, 2016	4th technical training	Basic business management, financial management, and hands-on drafting of business plan
5	April 2016	Cooperative development training	Establishment of a cooperative and managerial skills in running a cooperative
6	September 12, 2015–February 15, 2016	Establishment of demonstration farm	Actual construction of demonstration farm facilities
(2) Matungao			
	Date	Activity/training	Training contents
1	September 7–11, 2015	1st technical training	Same as above
2	October 6–8, 2015	2nd technical training	Same as above
3	February 2–4, 2016	3rd technical training	Same as above
4	April 11–14, 2016	4th technical training	Same as above
5	Sep. 12, 2015–Feb. 20, 2016	Establishment of demonstration farm	
(3) Panglima Sugala			
	Date	Activity/training	Training contents
1	January 23–25, 2016	1st technical training	Introduction to goat production, goat housing, breeding and reproduction, animal health mgt., and farm record keeping.
2	April 26–28	2nd technical training	Training on basic business management, financial management, and hands-on drafting of business plan
3	November 20, 2015–March 15, 2016	Establishment of demonstration farm	

(6) Internal technology transfer within the BDA through implementation of CD-CAAM in Tawi-Tawi province

To further promote the CD-CAAM model to the wider population, and to address geographically, socio-economically and culturally diverse realities within Bangsamoro, the BDA must make maximum use of its existing resources. In particular, its seven RMOs in the different regions of Mindanao should be fully equipped with sound understanding and skills to carry out the CD-CAAM model of community development in respective areas. During the pilot phase, the CMO and the RMO Cen-Min and Ranaw, which are responsible for project implementation in central Mindanao region and Lanao region (del Norte and del Sur) respectively, were capacitated to carry out the CD-CAAM model. One of the objectives of the extension phase is to establish an effective mechanism to transfer skills and knowledge that are deemed integral to the CD-CAAM model within the BDA, so that the BDA's capacities and functions as a leading agency for effective community development shall be further enhanced.

For the purpose of this project, Tawi-Tawi was selected as a project site given its remote location from the main island of Mindanao, and relatively stable security situation. As mentioned earlier, the PMO

was newly established in Tawi-Tawi, and six staff were appointed. An internal technology transfer was conducted both in Tawi-Tawi and on the mainland. Staff from the CMO and RMOs visited Tawi-Tawi to build staff capacity on site of the PMO. Meanwhile, staff from the PMO visited the mainland to participate in some of the technical training (for the livestock project), and also participated in a study visit to the pilot project sites in Sultan Mastura and Matungao. Results of the internal technology transfer are examined in the next session. Table 2.2.1.6 summarizes major roles and responsibilities of each entity for field operations in Tawi-Tawi.

Table 2.2.1.6: Roles and responsibilities for field implementation in Tawi-Tawi

Entity	Major roles and responsibilities
CMO	1) Manage and supervise overall activities of the CD-CAAM conducted in Tawi-Tawi. 2) Provide technical/managerial support to the PMO. 3) Coordinate with provincial and municipal government for overall CD-CAAM implementation.
RMOs (Cen-Min and Ranaw)	1) Provide technical support to its counterpart staff of the PMO including a) planning of the activities of respective livelihood projects, and b) monitoring the activities on the ground.
PMO (Tawi-Tawi)	1) Plan, implement, and monitor various activities of the CD-CAAM model including livelihood projects. 2) Coordinate with resource organizations, such as TRAC and MSU, to carry out various technical training. 3) Coordinate with municipal LGU, especially MAO and MPDC, as well as barangay LGUs for smooth implementation of the projects. 4) Coordinate with beneficiaries of the livelihood projects and provide technical support to them if necessary. 5) Report to the CMO on progress of the activities on a regular basis.
LGU	1) Coordinate with the PMO and facilitate smooth implementation of the projects in the municipality and the target barangays.
Resource organization	1) Provide hands-on training on livelihood projects. 2) Monitor the livelihood projects and provide necessary technical advice to the beneficiary groups.

Major activities in Panglima Sugala of Tawi-Tawi are summarized in Table 2.2.1.7.

Table 2.2.1.7: List of activities in Tawi-Tawi

(1) Agriculture		
	Date	Activity/training
1	November 17–19, 2015	Training on basic vegetable production and marketing
2	December 12, 2015	Transplanting and direct sowing
3	December 15–17, 2015	Training on compost making and botanical pesticide/insecticide preparation
4	December 27, 2015	Farm monitoring
5	January 10–11, 2016	Farm management
6	January 21 and 27, 2016	Follow through on farm management and monitoring
7	February 13, 2016	Follow through on farm management and monitoring
8	February 14, 2016	Matchmaking
9	March 6, 2016	Follow through on farm management and monitoring
(2) Fisheries		
	Date	Activity/training
1	November 23–26, 2015	Hands-on training on seaweed farming, post-harvest improvement, and marketing
2	December 15–30, 2015	Preparation of seaweed demonstration farm site, planting materials, seedlings, and installation of seaweed lines and stake

3	February 27–March 7, 2016	Construction of stilt-type seaweed solar dryer and procurement of farm transport boat
4	February 28–March 6, 2016	Installation of pen enclosure and stocking of sea cucumber, re-seedling, and re-planting of seaweed
(3) Livestock (see Table 2.2.1.5)		

2.2.2. Results of capacity building during the extension phase

(1) Framework and scope of assessment

As mentioned earlier, the primary objective of the extension phase is to strengthen the BDA's capacities to carry out and promote the CD-CAAM model's own initiatives. To assess to what degree the capacities within the BDA are upgraded before/after the expansion phase more objectively an assessment matrix was formulated. The matrix identifies nine key areas of capacity to promote the CD-CAAM model,[13] and specifies the related tasks/activities during the extension phase as well as several key competencies to carry out those tasks and activities. In particular, key competencies were carefully selected to fit with the specific roles and responsibilities of the CMO, RMOs, and PMO to promote the CD-CAAM model. For example, the CMO's capacities on the FTF are assessed by looking at its competencies in overall management of activities related to the FTF (such as provision of guidance on problem solving, reviewing the field reports, and so on), whereas RMOs' capacities are assessed by their competencies in management of FTF activities at the field level (such as field monitoring, report writing, logistics and procurement, and so on). Similarly, in the case of internal technology transfer within the BDA, the CMO should be capacitated to guide the PMO on overall management of the CD-CAAM model whereas the RMOs are expected to provide technical support to the PMO to carry out specific activities (such as technical surveys, and livelihood projects such as vegetable production and marketing). Please see Appendix 2.2.2.1 for the details of the assessment matrix. In the self-assessment by the BDA each competency is scored through consensus within the CD-CAAM counterpart staff of the four BDA offices during the baseline and end-line assessment sessions.[14]

(2) Major findings

1) Results of capacity building of the BDA

The baseline assessment of the BDA's capacity was conducted in the early stage of the extension phase in June and July 2015. Table 2.2.2.1 and Figure 2.2.2.1 are the results of the scoring of the baseline assessment.

[13] 1) logical decision making, 2) data gathering and analysis, 3) plan formulation, 4) community mobilization, 5) technology transfer through FTF approach, 6) technology transfer for new sector, 7) internal technology transfer, 8) assessment and 9) revision and modification

[14] Assessment scale (1-5) 1: do not understand the task, 2: understand the task but cannot carry out the task, 3: can carry out the task with substantial support from others, 4: can carry out the task with a little support from others, and 5: can carry out the task independently

Table 2.2.2.1: Results of the baseline assessment

Capabilities		Activities/Tasks	CMO		RMO CenMin		RMO Ranaw		PMO	
(1) Planning and Preparation (P)										
1. Logical Decision Making	1	Short-listing of the target municipalities	3.5	3.8	-	-	-	-	-	-
	2	Field validation survey	3.5		-		-		-	
	3	Selection of target municipalities	4.0		-		-		-	
	4	Formulation/exchange of agreement with the LGU	4.0		-		-		-	
2. Data gathering/ analysis	1	Community Profiling	3.8	3.7	3.3	3.1	3.3	3.0	1.5	1.5
	2	Technical Survey	3.7		2.9		2.8		1.5	
3. Plan formulation	1	Formulation of project plans for vegetable production/sales	4.0	3.7	2.0	1.6	2.0	2.1	1.3	1.3
	2	Formulation of project plans for Tilapia/seaweed culture/processing/sales	4.0		1.7		2.3		1.3	
	3	Formulation of project plans for goat production	3.0		1.0		2.0		1.3	
4. Community mobilization	1	Barangay-wide orientation	3.9	3.9	3.2	3.4	3.3	3.3	1.4	1.4
	2	Selection of beneficiaries	3.5		3.0		2.5		1.5	
	3	Values Transformation Training (VTT)	4.0		3.9		3.9		1.1	
	4	Baseline survey	4.0		3.4		3.5		1.6	
(2) Implementation (D)										
5. Technology transfer through FTF	1	Implementation of TOT Program	3.5	3.2	2.3	2.5	2.7	2.7	-	-
	2	Implementation of Leadership Program	3.0		2.4		2.4		-	-
	3	Activities on Site selection of demo farm to Selling to markets	3.2		2.9		2.9		-	-
6. Technology transfer for new sector	1	Activities on Site selection of demo farm to Selling to markets	3.0	3.0	2.3	2.3	2.3	2.3	-	-
7. Internal technology transfer	1	Implementation of Vegetable production/sales in an Island province	3.0	3.0	3.0	2.7	4.0	3.7	1.9	1.9
	2	Implementation of seaweed culture/processing/sales in an Island province	3.0		3.0		4.0		1.9	
	3	Implementation of Goat production in an Island Province	3.0		2.0		3.0		1.9	
(3) Evaluation and others (C&A)										
8. Assessment	1	Implementation of assessment on livelihood projects	3.0	3.0	2.0	2.0	3.0	3.0	2.0	2.0
9. Revision/ modification	1	Revision of the Community Development Guidelines	3.0	3.0	2.0	2.0	3.0	3.0	2.0	2.0
	2	Revision of basic manuals	3.0		2.0		3.0		2.0	
	3	Development of a basic manual for new project	3.0		2.0		3.0		2.0	

Being a newly established office, staff of the PMO Tawi-Tawi naturally had nominal knowledge of specifics of the CD-CAAM model while some staff have some professional experience as a social worker and technical knowledge in fisheries. Meanwhile, for the CMO and two RMOs, results of the

baseline assessment are in fact the end-line results of their capacity development during the previous pilot phase. In other words, the results of the baseline assessment can be the proxy to measure the confidence level of each office in the implementation of the CD-CAAM model as it is based on self-assessment. It can be also assumed that there is consistency with the findings described in the previous section (2.1.2. Results of capacity building during the pilot phase).

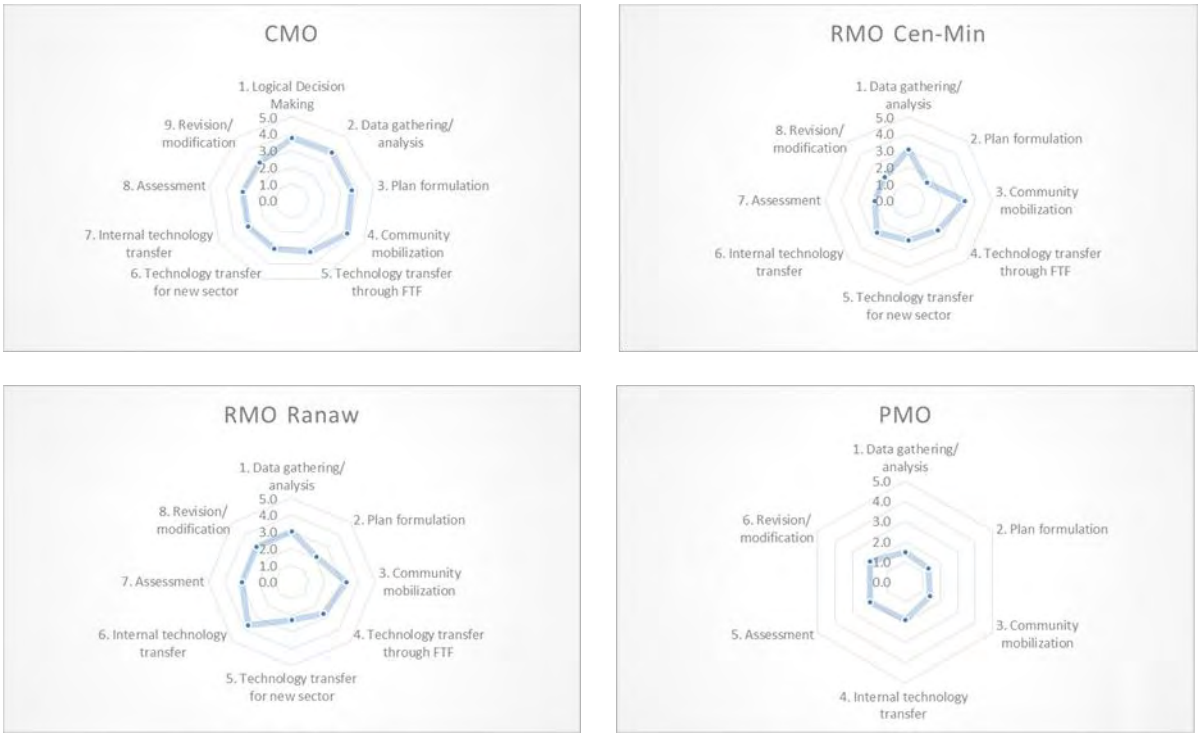


Figure 2.2.2.1: Results of the baseline assessment

As mentioned earlier, the assessment conducted at the end of the pilot phase pointed out the steady progression of capacities of the CMO particularly in the areas of planning, data collection, coordination, and resource mobilization. Figure 2.2.2.1 illustrates the consistency with such findings, and the counterpart staff of the CMO were already confident, to some degree, in some key capacity areas prior to the implementation of the extension phase. They were less confident in the area where specific technical knowledge is required such as FTF technology expansion and technology transfer for the new livelihood project, which is not surprising as those were the new activities for the extension phase. As the JICA experts led the assessment of pilot projects and development of the guidelines and technical manuals during the pilot phase, it seems reasonable that the CMO's confidence in those areas was relatively low.

Although the assessment of the pilot phase also indicated the positive results of capacity development within the two RMOs, Figure 2.2.2.1 illustrates relatively limited levels of their confidence except for capacity of community mobilization. In fact, the RMOs' enhanced capacity coordinating and mobilizing with different stakeholders on the ground, including community members, leaders, and the LGU, was

one of the most remarkable achievements during the pilot phase. While they also became familiar with specific technologies regarding vegetable production, tilapia culture, and LBT during the pilot phase, they did not seem confident in the application of such experiences and knowledge to the new activities planned for the extension phase such as FTF and the goat production project. It was found that the staff members of the RMO Ranaw were more confident than those of the RMO CenMin particularly in internal technology transfer mainly because they have had several opportunities to share their experiences with other colleagues in the RMO through dissemination meetings and seminars.

In sum, discussion during the baseline assessment sessions revealed that the CMO felt they were able to carry out most of their tasks (mostly overall project management) with regular guidance and quality backstopping from the JICA expert team. However, the RMOs may require further technical support to carry out their tasks from the JICA expert team as well as resource organizations, which involve more technical interventions at the field level. Additionally, confidence levels at both the CMO and RMOs was quite low for the capacity related to financial management and logistics and procurement, which they were not tasked to execute during the pilot phase (assessment of capacity development on these areas is discussed in the next section).

The end-line assessment was conducted in April 2016 by using the same assessment matrix. Table 2.2.2.2 shows the results from the end-line assessment.

Table 2.2.2.2: Results of the end-line assessment

Capabilities		Activities/Tasks	CMO		RMO CenMin		RMO Ranaw		PMO	
(1) Planning and Preparation (P)										
1.Logical Decision Making	1	Short-listing of the target municipalities	4.5	4.9						
	2	Field validation survey	5.0							
	3	Selection of the target municipalities	5.0							
	4	Formulation/exchange of agreement with the LGU	5.0							
2.Data gathering/ analysis	1	Community profiling	4.0	4.0	4.0	4.0	4.8	4.5	4.3	4.1
	2	Technical survey	4.0		4.0		4.2		4.0	
3.Plan formulation	1	Formulation of project plans for vegetable production/sales	5.0	4.3	4.0	3.7	5.0	4.9	4.0	4.0
	2	Formulation of project plans for tilapia/seaweed culture/processing/sales	5.0		4.0		5.0		4.7	
	3	Formulation of project plans for goat production	3.0		3.0		4.7		3.3	
4. Community mobilization	1	Barangay-wide Orientation	5.0	4.3	4.8	4.4	5.0	4.9	4.3	4.4
	2	Selection of beneficiaries	3.5		4.0		5.0		4.0	
	3	Value Transformation Training (VTT)	4.5		4.9		5.0		4.5	
	4	Baseline survey	4.3		4.0		4.7		4.7	

(2) Implementation (D)										
5. Technology transfer through FTF	1	Implementation of TOT program	4.4	4.6	4.1	4.4	4.8	4.8		
	2	Implementation of Leadership program	5.0		4.7		4.8			
	3	Activities on site selection of demo farm to selling to markets	4.5		4.4		4.8			
6. Technology transfer for new sector	1	Activities on site selection of demo farm to selling to markets	4.0	4.0	3.9	3.9	4.8	4.8		
7. Internal technology transfer	1	Implementation of Vegetable production/sales in an Island province	5.0	4.7	5.0	4.3	5.0	5.0	5.0	5.0
	2	Implementation of seaweed culture/processing/sales in an Island province	5.0		4.0		5.0		5.0	
	3	Implementation of Goat production in an Island Province	4.1		4.0		5.0		5.0	
(3) Evaluation and others (C&A)										
8. Assessment	1	Implementation of assessment on livelihood projects	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
9. Revision/ modification	1	Revision of the Community Development Guidelines	4.0	3.7	4.0	4.0	3.0	3.3	4.0	4.0
	2	Revision of basic manuals	4.0		4.0		4.0		4.0	
	3	Development of a basic manual for goat production	3.0		4.0		3.0		4.0	

Figure 2.2.2.2 illustrates a comparison between results of the baseline and end-line assessment of the key capacities at the CMO. The end-line self-assessment shows that most of the key capacities have been steadily enhanced after one year of implementation of the extension phase. The results essentially indicate strong confidence among the CMO staff of their capabilities to manage major aspects of the CD-CAAM model.

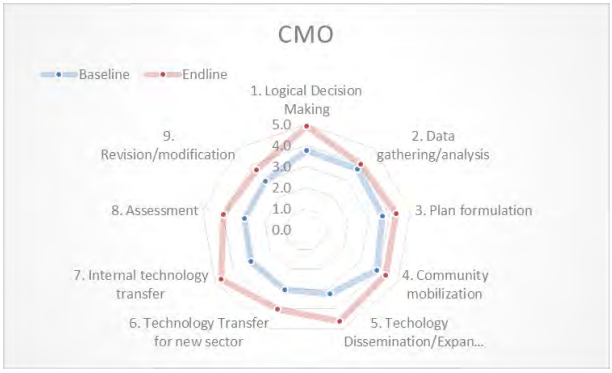


Figure 2.2.2.2 End-line results of CMO

In particular, their engagement with provincial and municipal LGUs in Tawi-Tawi apparently gave them valuable experiences despite the challenging environment in the remote island province where the staff of the CMO and the RMOs faced cultural and linguistic differences as well as physical hardships. While the JICA expert team took initiative in initial communication with the LGUs in Sultan Mastura and Matungao during the pilot phase, the BDA initiated the efforts in Tawi-Tawi. Although the presence of the BDA was not very strong prior to the CD-CAAM project, and has successfully obtained trust and mobilized strong support from the Panglima Sugala LGU. Additionally, through continuous advocacy of the six pillars of the CD-CAAM model, it also succeeded in encouraging women's active participation in the project. Initially, the women were somewhat reluctant to take on a role of responsibility in the beneficiary groups. Eventually, the BDA has become well known among many people not only in Panglima Sugala, but also in other

municipalities in Tawi-Tawi. Being responsible for overall management of the CD-CAAM project, the CMO also faced cultural differences among their regional/provincial offices (two RMOs and the PMO), and tried hard to address their different needs and perspectives while ensuring the accountability, transparency, and principles of the CD-CAAM project were maintained. Particularly, the CMO had to instill not only the six pillars of the CD-CAAM model, but also the visions and mandates of the BDA (which has a significant linkage with those pillars) to the newly recruited staff in the PMO during the limited project period and without stable communication means to the island. All of these experiences seemingly equipped the CMO with the necessary skills, knowledge, and flexibility to manage and promote the CD-CAAM model in different environments in the future. Meanwhile, the CMO staff perceive that the FTF technology transfer achieved great success, exceeding their expectations, which has a significant implication in order for the BDA to reach the larger population in the future. While all these successes have created a favorable environment for the promotion of the CD-CAAM model in Bangsamoro, the CMO staff maintained that they still have to manage high expectations within the communities carefully as there are several areas they would need to further improve to address diverse development needs and their potential in Bangsamoro. Marketability of the products from livelihood projects must be further increased, and choice of livelihood projects also needs to be expanded. The BDA is currently working on a plan to establish a close relationship between the CD-CAAM model and the PLEDGE project funded by the International Labor Organization (ILO), which focuses on value chain management in order to enhance marketability of livelihood projects. Meanwhile, the CMO emphasized the strong need for continuous expert support from development partners, such as the JICA, specifically in these areas.

Figure 2.2.2.3 also illustrates that the key capacities within the two RMOs have been greatly strengthened during the extension phase. Open discussions conducted during the end-line assessment session has also provided us with valuable insights on how much they have achieved over the past several years. As the staff of the RMO CenMin mentioned, it was somewhat difficult to fully understand the significance of balancing development needs and development potential during the pilot phase, as their previous experiences focused more on immediate needs of the war-torn communities. However, they said they have become strong advocates for the principle of the CD-CAAM model and were able to articulate it to the LGU and people within the community when they helped the guidance of selection of the target municipality in Tawi-Tawi. Their commitments to the communities were very impressive as well. The staff of the RMOs often stayed at the communities for a long time (and sometimes overnight) to build trust with the community leaders and members of the beneficiary groups, and discuss various issues. The RMO CenMin, on their own initiative, also organized a monthly study circle about the holy Qur'an to strengthen rapport with the beneficiary groups, which, they claimed, has further united and inspired the groups to commit to work together for the success of the project. They had some doubts on the FTF approach in the beginning as they thought that FTs might not be able to work for a nominal honorarium given their own difficult livelihood. In Matungao, they found that some members of the beneficiary group of the pilot phase were quite hesitant to teach the new beneficiary group, as

they did not have confidence in their technical knowledge and skills. However, such continuous community mobilization, they believe, greatly contributed to motivate the trainers to teach other farmers and fellow community people. The RMOs are currently planning to train farmer groups in other municipalities with the support from the FTs of Sultan Mastura and Matungao. Meanwhile, both RMOs felt there is a strong necessity for continuous external expert support to further establish sound technical quality of their technology transfer as well as to increase the variety of livelihood projects to match diverse development needs and potentials in Bangsamoro.

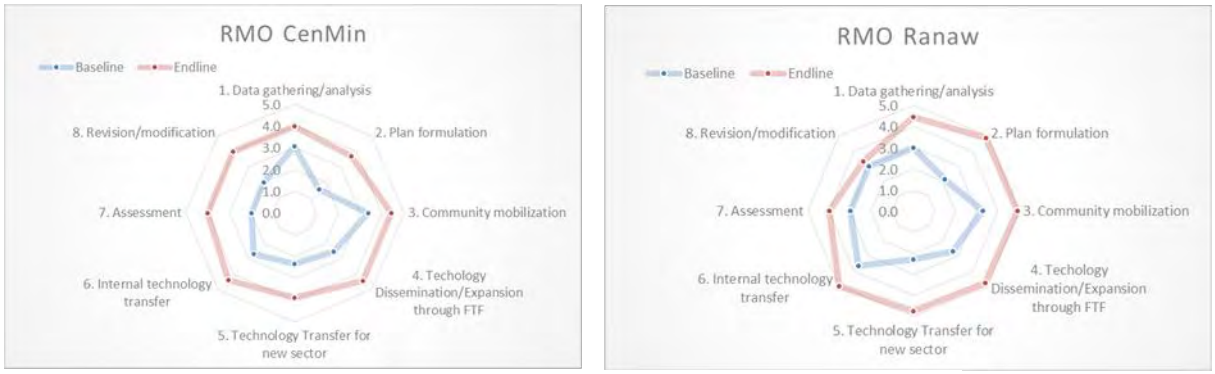


Figure 2.2.2.3: End-line results of RMOs

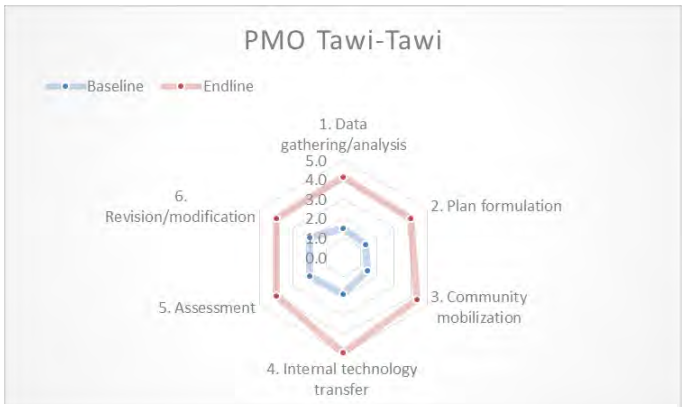


Figure 2.2.2.4: Endline result of PMO

Finally, Figure 2.2.2.4 shows the results of capacity development at the PMO Tawi-Tawi. As the newly established BDA provincial office is in a somewhat remote island province, the CD-CAAM counterpart staff there often faced different challenges during implementation of the CD-CAAM projects. Although most staff had some knowledge and experience in community development, they were not familiar even with the visions and mandates of the BDA as its presence in Tawi-Tawi has been limited, not to speak of the CD-CAAM model. The staff of the CMO and the two RMOs as well as the JICA expert team have provided the necessary guidance and technical supports to the PMO through a series of workshop (both in Tawi-Tawi and on the mainland), On-the-Job Training (OJT), and daily communication through telephone conversations and emails. However, it was found that a trip to and from Tawi-Tawi is both costly and time-consuming (it requires four travel days in total[15]), and the communication infrastructure in Tawi-Tawi remains underdeveloped, all of which have made effective internal technology transfer within the BDA even more difficult. With limited presence of the

[15] For example, from Cotabato, you have to go to either Davao or Manila, fly to Zamboanga to stay overnight there, and then fly to Tawi-Tawi

experienced BDA staffs as well as the JICA expert team members, PMO staffs sometimes found difficulties to have active engagement of some resource organizations in the training and monitoring activities. Nevertheless, it can be said that achievements of the BDA in Tawi-Tawi are remarkable given the very limited budget and time for the extension phase. In particular, although the MILF historically does not have very strong presence in Tawi-Tawi, BDA (particularly the CMO) gradually but successfully established trust among the LGU and local leadership through carefully observating the six pillars of the CD-CAAM model. As the mayor of Panglima Sugala is a sister of the congresswoman and the governor of Tawi-Tawi province, the BDA eventually obtained acceptance and recognition not only in Panglima Sugala but also in a whole province, which lays a good foundation for future promotion of the CD-CAAM model in the island provinces.

In addition to the assessments above, an assessment of capacity on financial management and procurement was carried. This survey also used a self-assessment approach. The assessment at the CMO level was done for the following five competencies which relate to the financial management, procurement, and logistics arrangements.

Table 2.2.2.3: Competencies on financial management and procurement (CMO)

A	Ability to examine an activity plan and schedule formulated by RMO and provide feedback/instructions to RMO if necessary
B	Ability to examine a financial plan formulated by RMO and provide feedback/instructions to RMO if necessary
C	Ability to monitor RMO's proper execution of planned activity
D	Ability to ensure RMO's liquidation in timely manner
E	Ability to keep receipts, working records, activity reports, and budgetary estimation sheets using proper filing

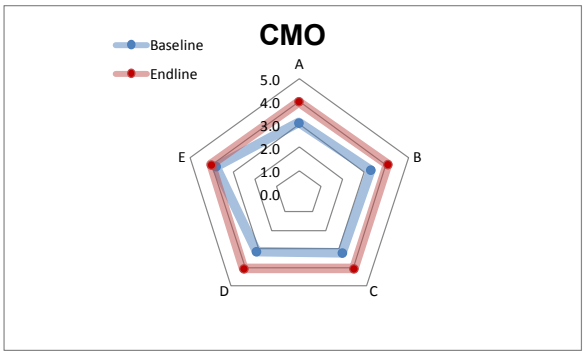


Figure 2.2.2.5: Baseline and end-line results of the CMO (financial management and procurement)

In the baseline survey, the CMO had the least confidence in A (ability to examine an activity plan and schedule formulated by RMO and provide feedback/instructions to RMO if necessary). Naturally, this deficiency was quite significant in new activities such as TOT and goat raising that began in the extension phase. On the other hand, the CMO had relatively greater confidence in E (ability to keep receipts, working records, activity reports, and budgetary estimation sheets using proper filing). This would appear to arise from their experience in dealing with liquidation documents, as well as other documents, in the pilot phase, although there was a lack of any systematic approach in these earlier cases.

In the end-line survey conducted on April 6, 2016, the CMO scored above 4 in all the competencies.

This indicates that the CMO acquired confidence in all the activities related to financial management, procurement, and other logistics arrangements that were dealt with in the training. While the CMO still had delays in the submission of liquidation documents and correcting mistakes in documents as described below, their understanding of financial management and logistics arrangements clearly improved.

It is apparent that the CMO gained the ability to examine and consolidate the monthly budget estimation sheets and follow appropriate approval and fund transfer processes, although reminders and substantial guidance from the project team are sometimes needed to get these items completed and submitted in a timely manner. In terms of liquidation, while reminders from the project team are sometimes needed, the CMO is able to identify issues in receipts and working records that need to be addressed. As for file keeping and organizing, the CMO often needs some support from the project team, and there is room for improvement. Liquidation documents submitted by the CMO often need to be re-arranged and re-organized despite several orientation sessions.

Assessment of capacity on financial management, procurement, and other logistics matters were also conducted for the RMO CenMin, RMO Ranaw, and PMO. The following competencies were included.

Table 2.2.2.4: Competencies on financial management and procurement (RMO)

A	Ability to make proper activity plan and schedule
B	Ability to make proper financial plan with an estimation sheet
C	Ability to make arrangements for vehicles and venues
D	Ability to conduct procurement with proper liquidation documents
E	Ability to prepare documents/items for equipment needed for activity according to plan
F	Ability to execute planned activity properl
G	Ability to present proper liquidation to CMO

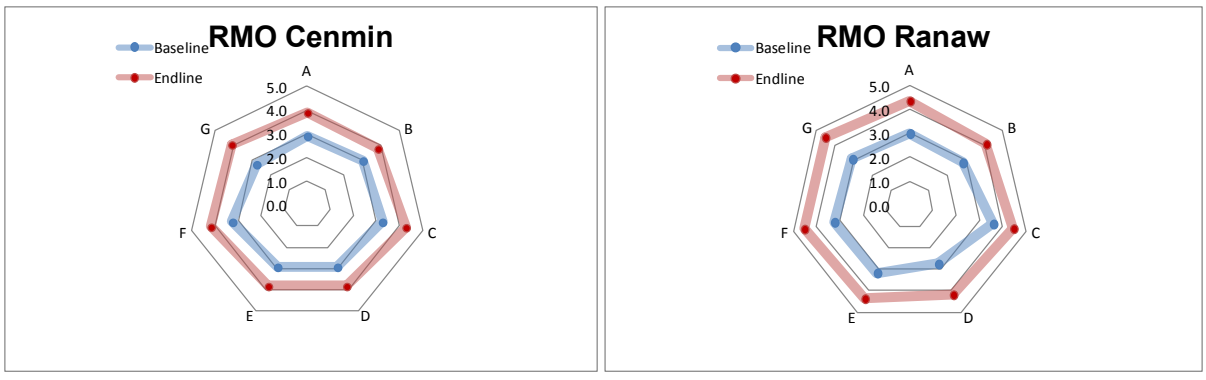


Figure 2.2.2.6: Baseline and end-line results of RMOs (financial management and procurement)

According to the baseline surveys, the two RMOs already had confidence in C (ability to make arrangements for vehicles and venues). This likely came from their previous experience in the pilot phase. In the end-line survey, both RMOs scored close to the maximum on this competency.

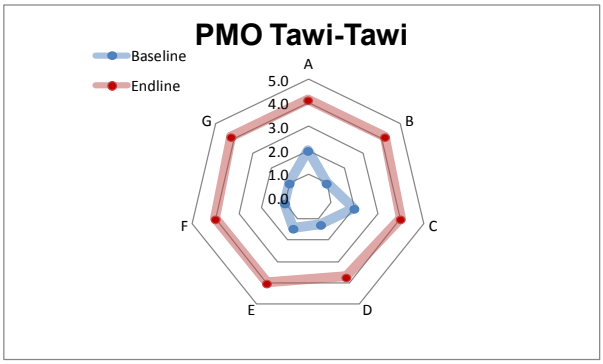


Figure 2.2.2.7: Baseline and end-line results of PMO Tawi-Tawi (financial management and procurement)

On the other hand, for items B, D, and G, which relate to financial management and liquidation, the RMOs scored lower in the baseline survey, as they didn't deal with these areas systematically in the pilot phase and didn't have prior confidence in them. However, in the end-line survey, both RMOs scored higher in these competencies, having gained confidence from the OJT. The RMO staff members had the ability to assess their capacity rather objectively since financial and logistical arrangements were dealt with by almost all RMO staff members through activities at the project sites. In addition, these tasks were not restricted to the Regional Coordinator (RC) who examines the documents submitted by other staff. Even in the OJT, the RMOs frequently asked the JICA project team to re-conduct orientation on financial management and liquidation.

Generally, the RMOs and PMO were all fast learners in terms of budget preparation, disbursement of funds, and liquidation. This is likely because they had more opportunities to deal with activity plans, budget plans, and liquidation through their activities at the project site. Consequently, they were able to submit liquidations as instructed, with only minor corrections. They also routinely submitted their monthly budget plan and liquidation documents ahead of the prescribed time. As for file keeping, the RMOs and PMO performed well and independently. On the other hand, their file organizing practices still need improvement. In fact, the RMOs and PMO took the file organizing issue seriously and asked the project team to conduct a re-orientation.

As mentioned above, it was observed that there were differences in the levels of achievement in financial management, procurement, and other logistics arrangements between the CMO on the one hand, and the RMOs and PMO on the other. The RMOs and PMO, which had more opportunities to deal with financial management and logistics arrangements, experienced greater benefit from the OJT; for them, the training produced an improved sense of the importance of proper management in both areas in an organization.

In the financial management OJT, items dealt with were focused only on the cost of office supplies, the cost of motorcycle fuel, cellular phone fees, and salaries taking into account risks such as a delay in the project's implementation. The expenses for these four items amounted to only PHP 658,186 (out of the total expenses which equaled PHP 4,530,875) as of September 2015, when field activities began in earnest. Given that procedures were frequently delayed even in this small segment of the budget, more training and experience are crucial if the agency is to manage all project funds and make all logistics arrangements without outside help. Reorganization and an increase in staff are also crucial if the BDA is to manage all funds and make all logistics arrangements for the CD-CAAM projects. The CMO had

only one administrative staff member on the project, while the RMOs and PMO didn't have anyone in charge of financial management or logistics arrangements. Only a single administrative staff member in the CMO was responsible for examining all documents related to finance and logistics.

Problems in managing a remote office were found with the establishment of the new office in Tawi-Tawi during the extension phase. At first, the less than desirable communication environment in this remote area caused frequent delays in the submission of documents and made communication difficult. In this situation, it was not easy for the CMO to give instructions to the PMO. This was a serious issue given the fact that when a new office is established, cordial instructions to the staff are generally necessary as the new staff typically have little experience. In the CD-CAAM project, staff from the CMO and RMOs often visited the PMO to give instructions as a way of compensating for the above-noted negative aspects of the new office. However, this requires a significant increase in funds to cover the added transportation and accommodation costs.

There is undoubtedly room for improvement in the BDA's capacity for financial management, liquidation, and file keeping. Generally, these issues have a strong relationship to organizational culture, and it will take time before the necessary principles and procedures really take root in the organization. While the specific system and processes for activity planning, budget planning, and liquidation will understandably differ according to which organization is providing the BDA with support, the basic principles and policies that were prescribed in this training—"with appropriate documentation, with appropriate process, in a timely manner"—are essential in any organization. Following these policies thoroughly and continually will be required before they become fully ingrained in the BDA culture.

2) Issues and challenges with capacities of the BDA

The extension phase essentially aimed to establish the BDA as a leading institute to implement and promote the CD-CAAM model community development initiatives in Bangsamoro. As discussed above, the results of self-assessment by the BDA staff revealed their strong confidence in carrying out such important tasks. Although self-assessment may not always reflect actual capabilities, enhanced confidence, sense of ownership, and commitment to the CD-CAAM model built within BDA offices during the past five years are valuable assets. Keeping such achievements in mind, this section discusses the issues and challenges the BDA may face for future implementation and promotion of the CD-CAAM model.

Figure 2.2.2.8 illustrates six distinct characteristics, or the six pillars, of the CD-CAAM model. Firstly, the CD-CAAM model addresses both development needs and development potential in order to ensure a greater impact of community development interventions. Development needs refer to communities' priorities, whereas development potential refers to whether interventions can have a wider economic and socio-economic impact in terms of area and population. The activities of social preparation, particularly the community profiling and technical survey, are some of the most important activities that

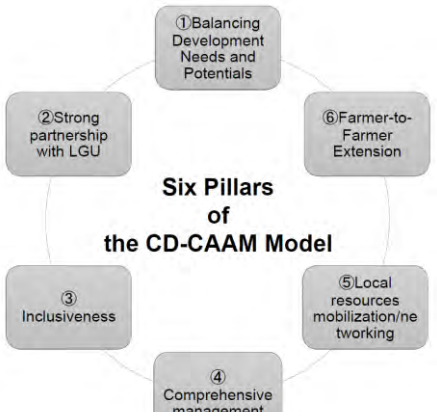


Figure 2.2.2.8:
Six pillars of the CD-CAAM model

provide the planners with necessary information to determine appropriate community development interventions, training content, project sites, participants, and so on while considering the balance between development needs and potential. During the pilot phase, it seemed that many staff of the BDA (both in the CMO and RMOs) found difficulties in reconciling immediate needs of the poor communities and the prospects of success in the long run. As successes of the pilot phase have apparently convinced them of the significance of such perspective, it was found that they were able to articulate it to the stakeholders and community people in Tawi-Tawi where the CD-CAAM model was newly introduced. The people tended to put greater emphasis on immediate needs and quantity rather than longer term potential and quality of the intervention. However, the challenge is that such efforts are inevitably time-consuming as they involve collection and analysis of a large number of data/information as well as continuous consultation with stakeholders. In fact, it took around three months before actual implementation of community development projects on the ground began. Further efforts must be made to expedite the process while maintaining the quality of the projects so as to respond more swiftly to development needs and potential in Bangsamoro.

Secondly, the CD-CAAM model emphasizes strong partnership with the LGUs where the community development interventions are implemented. The success of the pilot projects clearly shows that interest and commitment from the LGU increases the sustainability and impact of the interventions, and even attracts other development partners to the communities. In fact, one of the great achievements and a new strength of the BDA can be found within this pillar. The BDA's careful and continuous engagement and dialogue with the LGUs was one of the key factors of success of the CD-CAAM projects on the ground. Key LGU personnel, including the mayor, MAO, and Municipal Planning and Development Coordinator (MPDC), were regularly informed of the activities and progress by the BDA, and they visited the project sites regularly. Thanks to such efforts, for example, Matunaga LGU specifically assigned its staff to each livelihood project, and they participated in training and monitoring for the project. Matunaga LGU has eventually replicated its own demonstration farm based on the learning from the CD-CAAM project. While the leadership of the LGUs greatly affects the nature and modality of partnership with the LGU, the BDA has further proved its aptitude regarding this pillar in the remote Tawi-Tawi island province. Historically, Tawi-Tawi is not a stronghold of the MILF, thus presence of the BDA was limited there. While most people were not familiar with the BDA, they carefully coordinated with the provincial government and LGU of Panglima Sugala, and gradually established a partnership with them. Eventually the BDA, as well as the CD-CAAM, became one of the most popular development interventions in the locality.

Thirdly, inclusiveness is another underlining characteristic of the CD-CAAM model. As the prolonged armed conflict often fragments the socio-cultural fabric of communities, the model aims to strengthen social cohesion among diverse socio-cultural and political groups through community development intervention. While selection of beneficiaries of the community development projects is often one of the most difficult processes, given that limited numbers of people are able to participate in the projects, the BDA has also shown its sensitivity to the complex realities in the conflict-affected communities in Mindanao. In close consultation with the LGU and community leaders, the BDA carefully facilitated the selection of beneficiaries from different socio-cultural or political groups, and tried to relieve tensions such selection processes sometimes created among those who were not selected for the projects through dialogue. As several beneficiary groups are newly formed for the livelihood projects, the staff of the RMOs were continuously engaged with the groups to strengthen the team work among the members with diverse backgrounds through activities such as Value Transformation Training (VTT) and VET designed by the BDA, as well as more informal interaction (the RMO staff sometimes stayed overnight in the project sites voluntarily to nurture good relationship with the community). As many staff of BDA suggested, such continuous engagement and mobilization of communities are time-consuming (and sometimes require nominal funds) but have a significant implication for success of any community development intervention in the conflict-affected areas. However, the challenge for the BDA may be that such efforts are not very visible and its importance is not always recognized by the donors/funders of the projects who may sometimes tend to prefer quick implementation and cost saving.

Fourthly, livelihood projects under the CD-CAAM model address the entire income generation process, including planning, production, processing, marketing, distribution, sales, and internal financial management. While many community development projects in Mindanao tend to put more focus on production, the CD-CAAM model looks more carefully at marketing and selling aspects so as to ensure sustainable income generation. So-called match making sessions, introduced by the JICA expert during the extension phase, was one of the new initiatives to link producers with the markets and buyers (details of match making are explained in the Chapter 3). While the BDA offices have greatly enhanced their managerial and technical knowledge and skills on different community development projects through the CD-CAAM, they may need to further deepen their expertise particularly on marketing/selling aspects to increase sustainability and impacts of the community development interventions. Meanwhile, the BDA successfully managed several new livelihood projects such as goat production and seaweed production (as well as piloting of integrated tilapia farming with duck and sea cucumber production) during the extension phase. Although the BDA still needed substantial technical support from the JICA expert team and resource organizations, it was found that the BDA proved its flexibility and adaptability to carry out new initiatives, and succeeded in increasing the “menu” for community development projects of the CD-CAAM model during the extension phase.

Although Mindanao has experienced prolonged conflict, there are possibly abundant valuable resources locally. However, these valuable technical resources often remain untapped in CAAM. Thus another

pillar of the CD-CAAM model ensures maximum use of locally available resources, such as universities and governmental and non-governmental technical resources, which strengthens the relevance and sustainability of interventions in CAAM's specific contexts. The MSU Nawaan and Maguindanao, the Agricultural Training Institute (ATI), and the Upi Agricultural School (UAS) provided technical support to the pilot projects. The RMOs maintained communication with these resource organizations and received their technical advice during the extension phase. Additionally, the BDA expanded its networks with new resource organizations such as MSU Tawi-Tawi for seaweed production and the USM for goat production. Further efforts may be needed to identify more potential technical partners, and the BDA also needs to institutionalize such partnership in a more formal and sustainable manner as the current partnership with resource organizations are somewhat ad hoc for the CD-CAAM project.

The last pillar of the CD-CAAM model is the FTF technology extension approach. Given the current shortage of financial and technical resources, the extension of certain technologies within municipalities is a serious challenge faced by LGUs. During the pilot phase, the LGU in Sultan Mastura and the BDA encouraged beneficiaries of pilot projects to disseminate their knowledge to the neighboring communities on a voluntary basis. Built upon such initiatives, the extension phase aimed to establish and institutionalize the FTF extension approach as the sixth pillar of the CD-CAAM model. During the extension phase, the staff of the BDA became familiar with the concept and technologies of the FTF approach, and experiences of the pilot phase gave them enough skills and knowledge to provide necessary guidance to the FTs and beneficiaries on the site. Similar to the achievements of the third pillar, the BDA successfully encouraged the FTs to complete a whole cycle of FTF technology transfer although only a nominal honorarium was provided to them. The BDA attributed such commitment from the FTs to the change of their mind-set through group work under the pilot projects as well as the training such as VTT and VET. While acknowledging this is another remarkable achievement of the BDA, the BDA can play a more proactive role (such as approaching the LGU to secure financial and technical support/commitment) rather than depending on the goodwill of community members so as to enhance sustainability and replicability of the FTF approach.

All in all, it seems fair to conclude that the BDA is able and confident to carry out each component of the CD-CAAM model particularly at the field level. However, it should be mentioned that there are still several major areas of capacity the CD-CAAM project was not able to fully address during the five years of engagement with the BDA. In particular, overall project management and financial management of the CD-CAAM project were largely administered by the JICA expert team as its contractual agreement with the JICA dictates. As discussed earlier, some responsibilities for finance, procurement, and logistics were delegated to the BDA during the extension phase for capacity development purposes, and their capacity in these areas greatly improved. However, the volume of administrative work and amount of funds managed by the BDA staff consisted of only a small part of the total workload. As proper and efficient administrative and financial management should be one of the foundations of effective implementation of the CD-CAAM model, it remains to be seen whether their experiences during the

extension phase equip the BDA staff with enough skills to handle a far larger workload and significantly more funds in the future.

2.3. Peacebuilding perspectives

As the CD-CAAM primarily aims to contribute to peacebuilding in Bangsamoro, there are several issues that should be carefully addressed in order to ensure the important principles of "Do No Harm" and "Do Maximum Good". In particular, a recent discourse on so-called 'horizontal conflict' within the Bangsamoro may need to be carefully addressed. According to the report of the International Alert[16], the signing of the CAB between the GPH and the MILF in 2014 was a significant step in reducing vertical conflict[17], but horizontal conflict[18] are the 'new and important signifiers of violence'.

While causes of such horizontal conflicts are complex and deep rooted in the history of Mindanao, this section examines issues that are the most relevant to the specific contexts of the three target municipalities, and discusses the implications of those issues in the project planning and implementation on the ground.

Firstly, the population of Mindanao comprises of Muslim ethnic groups, or Moro, Christians migrant settlers, and Indigenous people (IP), or Lumads. It is said that there are thirteen Moro ethnic groups, and eighteen Lumads residing in Mindanao. Although such ethno-religious diversity itself may not necessarily be the driver of violent conflict, identity-based groupings can be mobilized into horizontal conflicts, therefore they may have an important implication for peacebuilding and conflict prevention in the area.

Secondly, the persistence of land-based conflict and the inability to undertake an effective land reform have a significant implication for horizontal conflict. In fact, land related issues/disputes are considered on major dimension of violent conflict (either horizontal or vertical conflict) in Bangsamoro. The roots of such land related issues/conflicts in Mindanao can be dated back to the 19th century, and subsequent influx of Christian migrants from Luzon and Visayas to the Mindanao during the Commonwealth period as well as after the Second World War have further accelerated dispossession of land from Moro and Lumads. It is said that prevailing clan feuding, or Rido, one of the most serious concerns for sustainable peace in the region, is often triggered by land disputes. Land disputes trigger not only inter/intra clan feuding, but also conflicts between different ethno-religious groups involving Moro, Christian, and Lumads. It is maintained that a serious challenge remains particularly on how to reconcile necessity

[16] International Alert (2014): Rebellion, political violence and shadow crimes in the Bangsamoro
[17] vertical conflict refers to insurgency-related, separatist or non-separatist armed struggles against the state, including terrorist actions
[18] horizontal conflict refers to violent struggles between clans, ethnic groups, rival insurgent factions, political parties and private armed groups or shadow authorities for control over land, natural resources, elective and non-elective positions, including government resources and rents

of formalization of individual property to protect the right of the owner, and respect of traditional communal concept of property ownership among Moros and Lumads in the region.

Thirdly, to look at horizontal relationship, gender dimension must be carefully addressed as well. The Gender Development Index (GDI)[19] indicates the female population in the Bansamoro persistently faces disadvantages. Compared with other region, the income gap between male and female is particularly wide, and labor participation rate is quite low among women. Further political and economic empowerment need to be ensured through gender mainstreaming, which would greatly contribute to peace and productivity in the region.

Lastly, while the Bangsamoro severely lags behind other regions in terms of socio-economic development, intra-regional disparities must be also addressed to mitigate horizontal conflict. In particular, while island provinces such as Basilan, Sulu and Tawi-Tawi may consist more than one-third of the future Bangsamoro population and are said to have high development potential given the abundant water resources, the socio-economic situation of people in those provinces lag behind those in the mainland area. Sulu and Tawi-Tawi consist a bottom cohort in life expectancy[19], and poverty and inequality also are also severe in the island provinces. In terms of security, while number of conflict incidents is higher in the mainland provinces, conflict intensity in the islands is severe when viewed in terms of density and conflict per person.[16] Population in the island provinces may feel marginalized if insufficient attention is paid to their particular needs and aspirations.

The above-mentioned perspectives are more or less relevant to the selected project sites for the CD-CAAM project, namely, Sultan Mastura of Maguindanao, Matungao of Lanao del Norte, and Panglima Sugala of Tawi-Tawi.

Muslim population is predominant in Sultan Mastura with some Christian residents (around 9%), and ethnic groups include Iranun (66%), Maguinanawon (25%) and Cebuano/Ilocano etc. (there is no record of IP residents in the municipality)[20]. The municipality is within the jurisdiction of the ARMM government, while there are some community residents who are affiliated with the Moro National Liberation Front (MNLF) and others with the MILF. While there were some land issues on the boundaries of family-owned lands and political boundary issues between barangays before, it is said that these issues were somewhat resolved by the LGU. Occurrence of serious violence related to land and political issues is limited in these days (except the incidents took place before the local election in 2016 as mentioned later).

Muslim population is also dominant in Matungao (89%) while Christians compose more than 10%.

[19] 2012/2013 Philippine Human Development Report
[20] Sultan Mastura CDP-ELA 2008-2014

Maranao is the dominant ethnic group, that is followed by Cebuano, Tagalog, Hiligaynon and so on (it is reported that a few IP reside in the municipality).[21] According to the LGU staffs, there had been frequent conflicts between Muslim and Christian residents in the past, but Matungao has overcome such conflicts, and today there are no apparent religious /political tensions in the barangays of the municipality. Rido is very rare within Matungao, but there are some incidents that involve the families from other municipalities such as Balo-i and Pantao Ragat. In the past, the settling of Rido has been the responsibility of the Sultans and the Council of Elders, but they no longer play such mediating roles in the conflicts.

Muslim population is also dominant in Panglima Sugala, and Sama and Tausug ethnic groups compose the majority with some Christian. According to the LGU, there is no tangible tensions between Muslims and Christians, and inter/intra-family/clan conflict is also rare. As there is an MNLF camp in the area, many communities seem more affiliated with the MNLF in the municipality.

Against these backdrops, the selection of project sites and beneficiaries was carried out carefully as it essentially relates to the pillars of the CD-CAAM model, particularly inclusiveness as well as the development potential and the development needs of the community. One should also be aware of the conflict sensitivity of project planning, as it can create antagonism among communities if the selection process is not conducted in a transparent manner. A distinct criteria and process for the selection of barangay and beneficiaries was specified to ensure utmost transparency and objectivity, whereas activity such as the Social Preparation made the best effort to sensitize the community leaders and stakeholders with the contents, visions, and values underlying the project. Selection of barangays and beneficiaries was also done through close consultation with the LGU. However, the selection may not be a very straightforward process and almost inevitably involves a multitude of socio-political and cultural dynamics.

Table 2.3.1 is the basic profile of the selected barangays for the project implementation, and Table 2.3.2 is the basic profile of the beneficiaries selected for the projects.

[21] Matungao CDP-ELA 2008-2010

Table 2.3.1: Basic profile of the barangays

Sultan Mastura	Macabiso	Namuken	Tambu	Tariken	Boliok	Solon	Balut	Tapayan	Kirkir
Religion	Islam (50%), Christian (50%)	Islam (95%). Christian (5%)	Islam (79%), Christianity (21%)	100% Islam	Islam (99%), Christian (1%)	Islam (95%), Christian (5%)	Islam (99%), Christian (1%)	Islam (87%), Christian (13%)	Islam (90%), Christian (10%)
Ethnic Affiliation/language	Iranon (40%), Maguindanaon (10%), Bisaya/Cebuano (50%)	Iranon (70%), Maguindanaon (25%), Bisaya/Cebuano (3%), Maranao (1%), Ilocano (1%)	Iranun (51%), Maguindanaon (15%), Bisaya (18%), Tagalog (11%), Ilocano (3%), Maranao (2%)	Iranun (68%), Maguindanaon (30%), Maranao (2%)	Iranun (88%), Maguindanaon (11%), Bisaya (1%)	Iranun (75%),Maguindanaon (20%), Cebuano/Ilonggo (3%), Maranao (2%)	Iranun (70%), Maguindanaon(28%), Bisaya (2%)	Iranun(79%), Maguindanaon (8%), Bisaya (3%), Tagalog (5%), Ilocano (5%)	Iranun (79%), Maguindanaon (8%), Ilocano (5%), Tagalaog (5%), Bisaya/Cebuano (3%)
Land ownership:*Tenant/farm worker/Land-owner/Leaseholder (%)*	20%/75%/5%	45% /35% /20%	55%/30% /15%	80%/20%/0%	38%/60%/2%	50%/30%/20%	33%/40%/27%	65% /35%/0%	60%/10%/30%
Matungao	Bangco	Batal	Cadayonan	Bubong radapan	Puntod	Matampay	Pasayanon	Sta cruz	Somiorang
Religion	Islam (100%)	Islam (100%)	Islam (100%)	Islam (100%)	Islam (100%)	Christian (100%)	Islam (100%)	Islam (100%)	Islam (100%)
Ethnic Affiliation/language/Appro x. No. of IP's	Maranao (100%)/15	Maranao (100%)/16	Maranao (100%)/15	Maranao (100%)/5	Maranao (100%)/15	Bisaya/Cebuano (100%)/7	Maranao (100%)/10	Maranao (100%)/7	Maranao (100%)/15
Land ownership:*Tenant/farm worker/Land-owner/Leaseholder (%)*	97%/2%/1%	90%/10%	85%/10%/5%	80%/10%/4%	N/A	35%/45%/20%	50%/45%/5%	25%/70%/5%	85%/10%/5%
Panglima Sugala	Kulape	Buan	Sumangday						
Religion	Islam (90%), Christian (10%)	Islam (95%), Christian (5%)	Islam (90%), Christian (10%)						
Ethnic Affiliation/language/Appro x. No. of IP's	Sama, Tausug/412	Tausug, Sama/2,914	Sama,,Tausug/419						

Table 2.3.2: Basic profile of the beneficiaries

Sultan Mastura	Agriculture		Fishery				Livestock
	Macabiso	Boliok	Solon	Tambu	Cage Culture	Pond Culture	Kirkir
Male/Female	19/1	26/4	5/1	16/4	12/3	12/3	15/5
Age	25-67	19-65	36-54	16-52	18-61	20-55	23-70
Islam/Catholic	20/0	30/0	6/0	19/1	30/0	30/0	30/0
Education							
Elementary	6	6	0	7	1	0	2
High School	13	19	3	8	4	11	12
College	1	3	3	4	10	3	6
No School	0	2	0	1	0	0	0
Matungao	Agriculture		Fishery				Livestock
	Puntod	Matampay	Pasayanon	Cadayonan	Sta. Cruz (Purok 3)	Sta.Cruz (Koriod)	Somiorang
Male/Female	12/8	6/24	6/0	18/2	15/0	15/0	11/9
Age	16-59	29-63	19-53	18-57	20-60	18-47	16-55
Islam/Catholic	2/18	6/24	6/0	18/2	1/14	15/0	30/0
Education							
Elementary	2	13	2	4	6	7	7
High School	15	13	3	11	2	1	10
College	3	4	1	5	0	0	3
No School	0	0	0	0	7	7	0
Panglima Sugala	Agriculture	Fishery	Livestock				
	Kulape	Buan	Sumangday				
Male/Female	6/4	7/3	8/1				
Age	23-51	23-48	35-54				
Islam/Catholic	10/0	10/0	10/0				
Education							
Elementary	0	0	0				
High School	5	1	11				
College	2	17	17				
No School	3	0	0				

As seen in these tables, given the necessary “technical” requirements for the project sites as well as the beneficiaries of each training, it is fair to say that the selection of barangays and beneficiaries was fairly done in general particularly in view of inclusiveness. It was apparent that LGU involvement both positively and negatively affected the selection process. On the positive side, LGU officials know their residents and can identify those who best meet the criteria. However, some barangay officials and community leaders pre-identifed participants even before knowing the criteria. To counter this tendency, it is necessary that the project team makes clear to the LGU officials and the leaders the process of selection and the criteria that have been set. It was also found that many communities wanted only men to be selected for the project, but gender sensitivity and equality should be given importance in any

project to be implemented in the community. Moreover, maintaining the project team's nonpartisan image or impression in the community is important. Although the BDA is a development arm of the MILF, the field staffs made their best efforts to maintain neutrality in project implementation process, which greatly contributed to the success of the projects, particularly in Matungao, non-ARMM municipality and Panglima Sugala where presence of the MNLF remains strong.

Generally, the CD-CAAM project has been safely completed without any serious conflicts and incidents that were directly related to, or seriously affected the project implementation in the selected communities. The project established close rapport with the LGU and communities. The project was also able to mobilize supports from land owners to establish demonstration/practice farms and ponds/cages for tilapia culture not only during the project period, but for a certain duration (3-5 years) after the completion of the CD-CAAM project. Additionally, while many beneficiaries were landless tenant particularly in Matungao, some land owners lend some parcel of lands for free to some of the landless beneficiaries, thereby enabling them to continue the learned livelihood activities.

The BDA's initiatives such as VTT, VET and a monthly study circle about the holy Qur'an has further ensured supports and commitment of the beneficiaries. While the contents of the VTT and VET are more or less based on Islamic teaching, BDA also shown its abilities to deliver the core messages of the training, i.e. importance of unity and cooperation, to non-Muslim beneficiaries as well. The close relationship between Muslims and Christians established thorough working together in the project in Matungao, has proved the project's potentials in peacebuilding. Women were also encouraged to play important roles in every aspect of activities. For example, while some female members of the 1st beneficiary group were initially not very confident in their knowledge and skills as the FT for the FTF, the project's continuous supports and encouragements greatly empowered them, and eventually they played an active role in disseminating technologies in the communities.

Additionally, one of the remarkable achievements of the project may be its increasing visibility in Tawi-Tawi province where presence of the MILF is historically not very strong. Through their careful coordination and consultation with the provincial government and the municipal LGU of Panglima Sugala, the project has established a partnership with them, and BDA and the CD-CAAM model eventually gain great popularity. Although it is one small step, the experience may show the CD-CAAM model potentially contribute to address issues on prevailing intra-regional disparities within the Bangsamoro.

In April 2016, indiscriminate firing and explosions took place in six barangays of Sultan Mastura, which included several project sites (Barangay Tapayan, Tariken, Macabiso and Tambu). Fortunately, there was no casualty among the residents in the communities, and it is assumed that the political rivalry related to the local election in May was behind the incidents.

Unfortunately, in February 2016, two of the beneficiaries of the goat production project in Matungao were fatally shot by a local whose clan was a rival of the victims' clan. The incident was an example of the type of feud that is not unusual in the region. While the incident itself was not directly related to the project, the BDA has coordinated fully with the LGU and the leaders of the communities, collected and validated information and then reported their findings to the rest of the project team. In addition, they raised funds for the bereaved family. The project in the location was suspended for a short period, which did not seriously affect the project implementation. Thus, in general, they handled the situation very well.

Chapter 3: MAJOR FINDINGS AND RESULTS

3.1. Establishment of CD-CAAM model (sector activities)

3.1.1. Agriculture Sector (Sultan Mastura and Matungao)

(1) Major findings

1) Results of the pilot project

Table 3.1.1.1 shows the results of vegetable production and marketing for the first production cycle on 1,000 m^2 of a demonstration farm in Barangay Macabiso, Sultan Mastura Municipality. The production cycle (cropping) was during the dry season, between November 2013 and December 2013, though harvesting occurred from February 2014 until before the wet season started.

Table 3.1.1.1: Results of the first cycle of vegetable production and marketing

Type of vegetable	Quantity supplied to markets (kg)	Total Sales (PHP)	Seeds (PHP)	Other inputs[22] (PHP)	Net profit (PHP)
Tomato	2,111.00	19,160.00	1,580.00	10,291.00	7,289.00
Eggplant	415.00	7,725.00	980.00	10,291.00	▲3,546.00
Bell pepper	344.00	8,719.00	970.00	10,291.00	▲2,542.00
Bulb onion	N/A	N/A	N/A	N/A	

Source: Sales record of the demonstration farm as of April 2014

Harvested crops were sorted and delivered to markets in Cotabato City, as a market survey revealed that retailers are potential buyers. Unit prices were between PHP 8 and 10 per kg of tomato, PHP 10 and 25 per kg of eggplant, and PHP 13 and 30 per kg of bell pepper. Tomato generated a net profit of PHP 7,289 and the profit margin on sales was 38%, which is relatively impressive in vegetable production. Eggplant and bell pepper failed to produce a positive net profit, as during harvesting, they were found to be damaged by pest and disease. About 50% of these harvested crops did not meet certain quality standards required to be sold at wet markets and were discarded. The disease that attacked the bell pepper was bacterial wilt, which was caused by a fungus, while stem borer damaged the eggplant. In addition, production of onion totally failed from the nursery to the main field because of factors such as poor quality of seed, improper variety, and improper soil texture.

The second cropping resulted in a negative net profit, as shown in Table 3.1.1.2. The table shows that this second production cycle resulted in failure. Because of low production volumes, the vegetables were sold directly to traders to minimize transportation costs to Cotabato City. The unit price of tomato was between PHP 12 and 15 per kg, PHP 25 per kg of bell pepper, and between PHP 6 and 12 per kg of pechay (bok choy). Lettuce was a trial crop; however, it was sold at PHP 50 per kg.

[22] Other inputs include synthetic fertilizer, organic fertilizer, worm cast, pesticide, insecticide, fungicide, and mulching materials. While a drip irrigation, power tiller, water pump, shredder, and product crates were provide to the demonstration farm, they are not included in the other inputs because they were provided as inputs to introduce additional technologies to the local farmers.

Table 3.1.1.2: Results of the second cycle of vegetable production and marketing

Type of vegetable	Quantity supplied to markets (kg)	Total Sales (PHP)	Seeds (PHP)	Other inputs (PHP)	Net profit (PHP)
Bulb Onion	N/A	0.00	850.00	1,327.67	▲2,178.00
Cauliflower	N/A	0.00	600.00	1,327.67	▲1,928.00
Tomato	149.00	2,235.00	2,160.00	2,996.00	▲2,921.00
Bell pepper	5.00	125.00	1,080.00	2,996.00	▲3,951.00
Lettuce	5.00	250.00	150.00	0.00	100.00
Pechay	52.00	520.00	75.00	1,328	▲883.00

Source: Sales record of the demonstration farm as of October 31, 2014

The failure in production was attributed to pest and disease, which was exacerbated by heavy rains. The second cycle started in May and June 2014, to avoid coinciding with Ramadhan in July 2014. Wet season starts in May in Maguindanao; therefore, the vegetables were cultivated right in wet season, which was a challenge for the beneficiaries who normally cultivate paddy in wet season. Moreover, rainfall was even higher than normal due to typhoons such as Glenda, Henry, Inday, Jose, and Ompong between July and October 2014.

Figure 3.1.1.1: Army worm in cauliflower

According to a resource representative at UAS and the MAO[23], the demonstration farm was submerged in flood water, causing an increase in soil moisture, making the crops prone to disease. In addition, the site of the farm was formerly a rain-fed paddy field, so it was difficult to achieve adequate drainage to reach a suitable soil moisture content level. The beneficiaries stated more detail about the failures of particular crops[24]; for example, cauliflower was attacked by army worm, which lives in the stem of the plant, as shown in Figure 3.1.1.1. While the beneficiaries applied insecticide to the crop, rain washed away the chemical. As a result, it was not effective in eradicating the insect. Insects gathered in the demonstration farm because the surrounding area was not planted with any vegetables or paddy at the beginning of the second cropping in August 2014.

The resource representative observed that the specific variety of bell pepper might not have been appropriate, though the recommended variety was not available in Cotabato City. In fact, this person also mentioned experiencing the same problems with bell pepper, especially during rainy season. Moreover, nematodes caused leaves to wilt, suggesting that the farm should have been sterilized before commencing farming activities. The farm had previously been used to cultivate tomato and bell pepper; therefore, a soil analysis could have been done, according to the resource person.[23]

[23] Interview with the resource person of UAS and MAO at CD-CAAM Cotabato office on November 3 and 5, 2014.
[24] A focus group discussion with the beneficiaries at the demonstration farm in Macabiso, Sultan Mastura, on November 4, 2014

To make wet season production possible, rain shelters were introduced; however, establishment was delayed due to Ramadhan as well as delays in the preparation of materials. Despite these delays, the facilities were used in October 2014 when the beneficiaries again started nursery activities. The third cropping started in November 2014, and included the use of high ridges and wide gaps between these ridges to avoid damage from rain and flood.

Table 3.1.1.3 shows vegetable production and sales from 1,000 m^2 of the demonstration farm at Barangay Puntod, Matungao Municipality during first cropping.

Table 3.1.1.3: Results of the first cycle of vegetable production and marketing

Type of vegetable	Quantity supplied to markets (kg)	Total Sales (PHP)	Seeds (PHP)	Other inputs (PHP)	Net profit (PHP)
Pechay	391.30	6,640.10	80.00	4765.33	1,794.77
Eggplant	354.03	7,495.90	282.00	3034.99	4,179.01
String beans	185.85	4,510.00	760.00	1594.55	2,155.45
Cucumber	320.60	5,597.50	282.00	2321.54	2,993.96
Pumpkin	130.25	1,400.00	282.00	462.49	655.51

Source: Selling record of demonstration farm as of June 25, 2014

The planting started in November 2013, with harvesting between January 2014 and March 2014. All crops resulted in a positive net profit. Prices of the vegetables varied, at between PHP 10 and 25 per kg of pechay, PHP 15 and 30 per kg of eggplant, PHP 20 to 25 per kg of string beans, PHP 10 to 25 per kg of cucumber, and PHP 10 to 15 per kg of pumpkin. Profit margin on the sale ranged from 27% to 56%, which is somewhat impressive in vegetable production. It is also remarkable that the beneficiaries of the Matungao pilot project were able to establish marketing linkages with the shopping mall “Gaisano” in Iligan City, a nearby local wet market, adjacent municipalities, and walk-in buyers in Matungao. The most serious issue during the first cropping was that heavy rain brought on by tropical depression Agaton in January 2014, severely damaging pechay (a leaf vegetable) in 6 of the 12 planting beds.

The Table 3.1.1.4 shows results of the second cropping.

Table 3.1.1.4: Results of the second cycle of vegetable production and marketing

Type of vegetable	Quantity supplied to markets (kg)	Total sales (PHP)	Seeds (PHP)	Other inputs (PHP)	Net profit (PHP)
Pechay	343.50	4,563.00	195.50	102.40	4,265.10
Upland Kangkong	27.50	470.00	0.00*	47.40	422.60
Lettuce	6.10	610.00	65.00	47.40	497.60
Tomato	136.99	2,889.70	112.00	47.40	2,730.30
Bell pepper	14.80	592.00	188.00	47.40	356.60
Lady finger	39.75	695.00	60.00	47.40	587.60
Green Cucumber	248.91	3,394.90	490.00	417.70	2,487.20
White Cucumber	10.00	135.00	112.00	94.70	▲71.70

Source: Sales record of the demonstration farm as of October 2014
Note *: Seeds for Kangkong was provided by MAO.

Beneficiaries planted the following crops in the second production cycle: pechay, kangkong, tomato, lady finger (okra), green and white cucumber, bell pepper, and lettuce as trial. Each crop produced a

positive net profit except white cucumber, due to oversized fruits that were rejected by the markets.

The price of pechay was between PHP 10 and 25 for a kg, PHP 10 and 20 per kg of kangkong, PHP 15 and 20 per kg of okra, PHP 20 and 30 per kg of tomato, PHP 10 and 15 per kg of white and green cucumber, PHP 40 per kg of bell pepper, and PHP 100 per kg of lettuce. Lettuce has been proven to grow well in Matungao; however, it is not sellable to local buyers and traders because of its high price.

As seen in the Table 3.1.1.4, costs of other inputs could be minimized; for example, it would cost PHP 47.40 to buy molasses as one of the ingredients in a concoction to spread on crops. As for the additional materials used as other inputs to prepare organic chemical treatments, these materials are collected from rejected or rotten vegetables on the farm. Spending on synthetic fertilizer in the second cropping could be reduced compared to the first cropping by continuing to use compost; consequently, expenses should be lower than the first cropping. The market destinations were maintained in the second cropping as well: Gaisano Mall of Iligan City, buyers from public markets of neighboring municipalities, local traders, and walk-in buyers. As for supplying to the Mall, the main target vegetable is pechay, which is now collectively delivered every three days.

2) Ouctomes and impacts of the pilot project

The questionnaire[25] inquired about the degree to which beneficiaries would acquire and apply the major technologies demonstrated and taught in Sultan Mastura through the demonstration farm.

According to the results of inquiry, technology transfer to the beneficiaries in Sultan Mastura was successful to a certain extent. Most of the basic technologies on vegetable cultivation were applied to beneficiaries' own farms. During the focus group discussion,[24] the beneficiaries mentioned the following additional technologies that they adopted: (1) use of burnt paddy husk for nursery bed, (2) mulching with bio-materials such as lemon grass and paddy straw, (3) pruning, (4) soaking seeds to break dormancy, and (5) consciousness of proper farm work sequence.

One of the successful dissemination technologies is vermicomposting. Materials for vermicomposting are easily collected on farms, although it takes sometimes before they are ready to be used as an organic fertilizer; thus, the technology was well-accepted by the farmers. Moreover, African Night Crawler (ANC) was naturally multiplicated at the demonstration farm so that the beneficiaries could obtain the worm on-site and practice producing compost from the worm to use on their own farms.[23]

[25] A questionnaire survey was conducted with the beneficiaries of Sultan Mastura by BDA RMO CenMin in the agriculture sector in October 2014.

However, a treatment concoction was not applied on their farms. According to the beneficiaries' conclusion during the focus group discussion, they have to buy particular ingredients from markets to prepare the concoction and it takes two weeks before they can use it.[24] Recordkeeping techniques were also difficult to adopt. Seventy percent (70%) of the respondents had not applied them in their respective farming businesses. Recordkeeping was revealed to be a significant challenge for the beneficiaries, who stated that, from back to their ancestors, they had not been in the habit of doing so. They primarily rely on memory, which makes it difficult to accurately see what they have spent in past. While they understand the importance of recordkeeping, the beneficiaries believe that if they start keeping monetary record, however, they feel that it discourages generosity because they will know how much they provide for charity.[24]

Figure 3.1.1.2: Vermicomposting bed of one of the beneficiaries in Sultan Mastura

Although construction of rain shelters for use during the wet season was delayed on the demonstration farm, their effectiveness on nursery making in the wet season was recognized by the beneficiaries.[23] The existing rain shelters on the demonstration farm can still be experimentally used by the beneficiaries during the wet season even after the CD-CAAM is terminated. These rain shelters will help farmers produce vegetables during wet season when demand is generally high.

Selling status was also improved to some extent because of marketing approaches used in the pilot project. Eleven (11) participants out of 20 have since acquired market destinations for individual farming.[25] MAO also recognized the effectiveness of the market linkage approach because, according to the MAO, as a result of obtaining market information, the beneficiaries could sell their products easily. In addition, a few buyers came to observe the demonstration farm to buy vegetable products and to find out when the products would be harvested and ready for the market.[23]

There is an indication of the pilot project's effectiveness on income generation for individual beneficiaries because they applied a few technologies that have enhanced their farming activities. As of the end of April 2014, the results of production and sale of vegetables during dry season by six farmers are described in Table 3.1.1.5.

Table 3.1.1.5: Production and sale of individual farming at the end of April 2014 (dry season)

Individual beneficiary	Farming scale	Crops	Production (kg)	Sale (PHP)
A	2,500 m^2	Cauliflower	47.0	2,475.00
B	2,500 m^2	Tomato	416.0	3,530.00
C	2,500 m^2	Bell pepper	N.A.	N.A.
D	2,500 m^2	Tomato	5,109	33,178
E	1.5 ha	Eggplant	2,559.0	25,590.00
F	1.5 ha	Bell pepper Cauliflower	45.0 16.0	990.00 605.00

Source: Interviews and farmer's record in 2014

Vegetable production during wet season in Sultan Mastura is a challenge. As such, only one member cultivated a vegetable (tomato) during this season while the others cultivated paddy. In general, agriculture in Sultan Mastura is comprised of rice-based farming; for example, paddy is a major crop in wet season while vegetables are cultivated only as a second crop on these same paddy fields. The beneficiaries used the rain shelters on the demonstration farm to produce vegetables during the rainy season (in addition to producing paddy) even after the CD-CAAM was finished with them in an effort to take advantage of producing vegetables in a group. The beneficiaries understand the advantages of the shelters and experienced good growth of vegetable under them. The frequency required of chemical sprays was reduced while using these shelters.[24]

Similraly, the questionnaire[26] inquired about the degree to which beneficiaries would acquire and apply the major technologies demonstrated and taught in Matungao through the demonstration farm. Technology transfer to the beneficiaries in Matungao was also successful to a certain extent. Most of the basic technologies on vegetable cultivation were applied to beneficiaries' own farms.

According to the observations of the resource person from ATI - Regional Training Center 10 (ATI-RTC-10), technology transfer was successful, as 90% of the beneficiaries understood and could elaborately explain what they had learned and 80% of the beneficiaries adopted technology that was taught to them on the demonstration farm.[27]

MAO's observation was also positive regarding technology transfer to the beneficiaries: (1) a few beneficiaries could increase income through vegetable production from their own farming, (2) some willingly applied the acquired technology on their own farms, and (3) community people could directly buy products not only from the demonstration farm but also from the beneficiaries' farms. The latter is beneficial because it is cheaper to buy from local farms than from other neighboring municipalities' farms (e.g., Linamon), because customers must incur additional transportation costs.[28]

[26] A questionnaire survey was conducted with the beneficiaries of Matungao by BDA RMO Ranaw in agriculture sector in October 2014.
[27] An interview with the resource person of ATI-RTC-10 at CD-CAAM Iligan office was held on November 9, 2014.
[28] An interview with MAO at Municipality office of Matungao was held on November 10, 2014.

Concoctions such as Oriental Herbal Nutrients (OHN), Fermented Plant Juice (FPJ), and Indigenous Microbial Organism (IMO) were accepted by the beneficiaries in Matungao because they have access to a local material called "kinugay," which is a solid form of one of the non-sugar by-products from sugar cane. The cost is PHP 35 per kg, and beneficiaries need between 2 and 3 kg (PHP 75-107), for the preparation of the concoction.

Recordkeeping was overwhelmingly adopted by beneficiaries, as more than 60% now practice recordkeeping, as shown in Figure 3.1.1.3. A few beneficiaries clearly mentioned the advantages and effectiveness of recordkeeping on their farming business. For example: (1) some mentioned that they can now clearly track income and expenditures; (2) one assessed that recordkeeping made him cognizant of which vegetables are sellable, in-demand, and during which month to sell, enabling the production cycle to be planned; (3) one feels confident when declaring her profit to others. Weekly meetings were a big help in motivating the beneficiaries to keep records, because they were asked by the facilitators (BDA RMO RPOO and CO) to explain activities and progress on the demonstration farm and their individual farms.[29]

Figure 3.1.1.3: Record of production and sales of individual beneficiaries

The pilot project linked the beneficiaries to market destinations such as shopping malls, retailers of wet markets, traders, and walk-in local customers.[26] Through the practice of selling vegetables from the demonstration farm to Gaisano Shopping Mall in Iligan City, eight beneficiaries from the pilot project and two other non-members signed an agreement with the Marketing Head of Gaisano Mall in September 2014 to collective supply 150-250 kg of pechay to the mall every three days. One of the 10 producers transports the products to the mall on his motor bike, and the other producers pay him PHP 2 per kg of vegetables in return. In addition, retailers within the Municipality of Linamon and Barangay Buruun of Iligan City also became a market destination for certain beneficiaries. While the farm gate price is higher than that of the Gaisano Mall, they still would like to sell their products to the mall because it accepts bulk volume delivery.[29]

Additionally, through the questionnaire survey conducted in October 2014, a focus group discussion with the beneficiaries, and interviews with MAOs and resource persons in November 2014, a remarkably positive impact from the implementation of the pilot project in agriculture was revealed.

In Sultan Mastura, technical improvement on vegetable production, a change in attitude toward farming,

[29] A focus group discussion with the beneficiaries at Puntod in Matungao was held on November 10, 2014.

confidence in teaching vegetable production technology to other farmers, and a change in the lives of their families were impacts recognized by all the beneficiaries as result of the pilot project in agriculture.[25] According to the beneficiaries,[24] "attitude toward farming changedwas due to the realization of improved farming practices, especially a reduction in chemical applications and economic inputs. Knowledge learned from the demonstration farm enhanced beneficiaries' farming work; for example, the pilot project enabled beneficiaries to work together and provided each member with a specific task during production activities. As a result, the beneficiaries' group became more consolidated. Communication and information exchange among the members became more active.

The beneficiaries also pointed out that they taught what they learned on the demonstration farm to their family members while chatting at home. Some family members, including wives and children, visited the farm and assisted with farm work, such as harvesting.[24] According to the beneficiaries, they became closer with their family members. Although some members of the beneficiaries of the pilot project in agriculture were selected from other sitio, the demonstration farm allowed the creation of a peaceful group/gathering, which is an example of "social cohesion."[24]

In Matungao, beneficiaries disclosed facts during the focus group discussion that supported their "attitude toward farming changed" as an impact created from the pilot project in agriculture. One female beneficiary disclosed that there was a big change on her farming practice. Before the pilot project, she only knew about chemical fertilizers, and used to consistently apply them on her farm. Now that she knows about the effectiveness of organic fertilizer like vermicompost, she stated that she will continuously use organic fertilizer going forward. Another female member explained that she recognized a big change in her attitude toward farming. She previously neglected the maintenance of her backyard garden; she just planted vegetables and left them untended. As a result, the garden was bushy and weedy. After participating in the pilot project, however, she has started to more carefully tend to her garden, practicing weeding, watering, fertilizing as if "nurturing a baby."[29]

Some of the beneficiaries changed their attitude not only toward farming but also changed their attitude toward life more positively. One male beneficiary did not have a farm at home before he joined the pilot project, spending his days idle. After participating in the pilot project, he now cultivates vegetables in small areas surrounding his home (i.e., a backyard garden). In addition to keeping himself busy with this backyard gardening, his older mother was also motivated to do gardening as well. Because of the extra money he earns from this small garden, his daughter is able to go back to school.[29]

In support of the impact "changed life of family members," the husband of one of the female beneficiaries explained that, as a coconut climber, when there is no work for climbing coconut trees, the family went without this cash income. Now that the couple has a backyard garden at their home, she and her husband engage in vegetable farming. Her husband helps her to sell the vegetables through the use of his motorbike. They earn constantly from their garden now.[29]

Another female beneficiary has a daughter working outside of Matungao municipality. The daughter stopped working and chose to come back home to help her mother tend to the vegetable production in their backyard garden. The mother taught the daughter vermicomposting and preparation for the planting of the nursery and said that she realized it is better for her daughter to know vegetable cultivation so that she will get income even without the help of her mother.[29]

In addition to the impacts explained above, the beneficiaries pointed out that another impact created from the pilot project in agriculture was the establishment of good relationships between Muslims and Christians.[26] The collective work on the demonstration farm (such as production and marketing), aimed at common objectives, production, and profit, created and fostered a family-like atmosphere among them. Eventually, positive outputs in production and profit attributed to unify the members beyond different religions.

Self-reliance was also observed as an impact.[26] After starting second cycle cropping, some beneficiaries began sustaining their backyard gardens by themselves, minimized expenditures, and stopped asking for inputs to continue vegetable cultivation on the demonstration farm. They use their own resources for inputs.

One of the innovative practices of the pilot project in agriculture is the extension activity that was carried out by some direct beneficiaries to other farmers in the municipality of Sultan Mastura under the supervision of MAO. Although extension activities were not planned as a part of the pilot project, according to MAO,[30] a lack of manpower is one of the serious challenges that the Department of Agriculture (DA) faces in terms of technology extension/dissemination. As such, MAO and BDA RMO CenMin staffers have mobilized the beneficiaries who were trained by the pilot project to disseminate technology as volunteer instructors. While such an extension approach looks similar to the FTF approach, that has been adopted in many developing countries, one of the most distinctive characteristics of the CD-CAAM interventions is firmly rooted in the values underlying the development envisioned by the BDA. It is believed that the VTT carried out before starting any major activities by the BDA, has ensured and enhanced inclusiveness and cooperation among beneficiary groups, which, in the case of Sultan Mastura, extends to the wider population and has greatly contributed to social cohesion within the municipality. Therefore, this approach can be considered a "value-based farmers' extension."

The beneficiaries group of Sultan Mastura, Macabiso Vegetable Farmers Group registered itself as a legal cooperative that was authorized by the CDA of ARMM on March 26, 2014. The group is now named Sultan Mastura Vegetable Producer Cooperative.[31] The beneficiaries group of Puntod of Matungao also applied to be an association with the Department of Labor and Employment (DOLE),

[30] An interview with MAO of Municipality of Sultan Mastura was held on 24 and 25 June, 2014.
[31] Registration number is ARMM 2014 – 000000305.

Regional Office X, Cagayan De Oro City. On May 6, 2014, the group was officially registered as Puntod Integrated Farmer's Association.[32] These two examples of legal registration as groups is a sign of beneficiary consolidation. The intention of eventually becoming a cooperative or association was gradually fostered during the pilot project, as the project's activities required members to perform collective work on the demonstration farm to produce vegetables, in addition to marketing and recordkeeping that required division of labor specialization. Most importantly, the beneficiaries realized economic gain through the pilot project and do not want to lose this positive momentum.

(3) Results of capacity building of BDA

In the planning stage of pilot project implementation, data and information on the current situation as well as problems affecting major agricultural products in the target municipality were gathered. In addition, the market situation was investigated during a technical survey[33] for the month of March 2013. It was carried out by a Japanese expert and BDA C/Ps (RMO). Survey tools included direct observation and an interview with corresponding simple questionnaire. The collected numerical data and qualitative information were then used in a SWOT (Strength, Weaknesses, Opportunities, and Threats) analysis within a workshop-style brain storming session, as reported. Through the workshop, a few conceptual strategies were produced. The JICA expert fine-tuned these suggested strategies and proposed a basic vegetable production and marketing strategy for income generation as the pilot project. Then, a plan of operation (POO) was developed and documented. The POO is composed of core activities that coincide with the general farm work sequence, especially for vegetable production.

However, the technical survey process and project formulation workshop in the above planning stage was not clearly understood by the BDA. Particular tools such as the semi-structured interview for the technical survey and SWOT analysis workshop would benefit from additional experience in agricultural development projects in general. During project implementation, the Regional Project Operation Officer (RPOO) of BDA RMO, MAO, and resource organizations (with support from the CD-CAAM office) plan the details of a particular activity, which are reportedd to the expert to technically assess and approve a budget. After the activity plan is approved by the expert, RPOO reports to CMO and then the activity is implemented. After the implementation of a particular activity, RPOO and MAO monitor beneficiaries' production and marketing activities to ensure that the beneficiaries follow the instructions given during training. They also observe if there are any technical problems on the demonstration farm. Consequently, RPOO reports progress and issues to the JICA expert via a written report or oral debrief, with support of the CD-CAAM office. As a reply, the expert provides technical instruction. Based on this information exchange and instruction, a few activities were discarded from the POO while others were added.

An evaluation workshop targeting BDA RMO CenMin to recall major activities and extract experiences

[32] Registration certificate number is IL-RW-14-05-06-214.
[33] Report on Technical Survey was submitted to JICA in June 2013; therefore, the report is not attached to this final report.

of problems and difficulty during the planning, implementation, and monitoring stages of project management in the agriculture sector was held at the CD-CAAM office in Cotabato on November 6 and 7, 2014.

In the planning stage of a respective activity, BDA RMO staff (particularly the RC, RPOO in Agriculture, and Community Organizer (CO)) plan activities in consultation with the CD-CAAM office. Once the plan is decided, it is relayed to the beneficiaries' leader either through the CO or RPOO. They also inform BDA CMO, particularly PMO, who was the focal person of agriculture. Communication could be by phone call or in person. RPOO communicates with resource persons and coordinates activities according to their availability and relays the planned activities to them. Meanwhile, RC or CO communicates with the Municipal Local Government Unit (MLGU), particularly MAO. However, during the early stages of the project, there were scheduling conflicts among the farmers; therefore, participation in farm activities did not reach 20 participants during on the training session on vegetable production. A few beneficiaries skipped part of training to take part in concoction (crop treatment) making. According to the RPOO, 80-90% participation was maintained during the early stages.

Financial literacy seemed to be difficult for the beneficiaries to understand during training sessions because the presentation materials prepared by the resource person were not fully scrutinized during the planning stage. While more discussion with the resource person was needed, the preparation period was short. Thus, during the evaluation stage of this particular topic, the JICA expert developed a simple record-keeping format for the beneficiaries to practice recording production and sales from the demonstration farm.

The period to prepare marketing materials, such as the survey and exercises to collect market information, was also short. Market information, including price, was then shared with other farmers during a market analysis workshop. A few crops' unit prices were lower than expected because of market saturation. In addition, the selection of crops did not really reflect the market survey results because production started on the farm before the survey was carried out.

Contents of home seed-raising were slightly different from planned contents. Training contents were thoroughly discussed and designed by RPOOs of CenMin and Ranaw as well as the JICA expert after observing facilities and engaging in discussions with the resource organization that accepted the planned training contents. Unfortunately, the target lecturer was suddenly replaced with another staff member who was not well-informed about the previous training. Internal information sharing within the resource organization was poor in this case.

Although problems and difficulties occurred during the implementation process, BDA RMO CenMin in the agriculture sector (as an implementer of community development in agriculture) is experienced in taking counter-actions to mitigate various challenges during a pilot project's implementation.

The RPOO of CenMin of RMO BDA has acquired vegetable production technology at a remarkable level; therefore, he went on teach vegetable cultivation in other municipalities and provinces. This was realized through a request from POLCOM to the raining division of the BDA RMO CenMin Office to implement vegetable training. Consequently, the RPOO was appointed to be the lecturer/instructor on the listed trainings shown in Table 3.1.1.6. Most of the participants were MILF combatants who wanted to learn vegetable production as a means of income generation. This extension work is also voluntary act. Through the pilot project, the RPOO became a skillful agricultural human resource that could be fully utilized in the future.

Table 3.1.1.6: List of training courses in agriculture in which RPOO became an instructor

Title of training	Number of participants	Date and place
Training on vegetable management and vermie-culture	40 Social Welfare Committee (SWC) women sector members	May 13, 2014, Poblacion, Parang Maguindanao
Training on mango propagation and vegetable management	64 municipal and barrio polcom members	July 26-27, 2014, Manaulanen, Pikit, North Cotabato
Training on vegetable management and rice production	60 MILF Guerilla team members	September 19-20, 2014, Lapok, Shariff Aguak, Maguindanao
Vermie culture and vermie composting Training	30 Rice farmers	September 26-27, 2014, Sitio Bagong, Timbangan, Shariff Aguak, Maguindanao
Vegetable management training	60 SWC members	March 14-15, 2014, SWC Office, Camp Drapanan, Sultan Kudarat, Maguindanao

Source: Interview with RPOO of CenMin on the demonstration farm in Sultan Mastura in October 2014

Similarly, an evaluation workshop targeting BDA RMO Ranaw was held at the CD-CAAM office of Iligan on November 11, 2014. During implementation of the technical survey in all of the barangays in Matungao municipality, a few stakeholders expressed a lack of understanding about the direction of the survey. In this case, the JICA expert took initiative and used interviews as a survey tool. The preparation and implementation periods for the surveys were short, which aimed to help stakeholders clearly understand how the survey contributes to the formulation of community development projects in agriculture.

A workshop for pilot project implementation planning (PPIP) was conducted and facilitated by the JICA expert; however, some participants seemed to face difficulty in understanding the strategy, because the method was new to most participants and explanation time was very short. Consequently, the pilot project strategy was fine-tuned and documented by the JICA expert after the workshop. Interaction with participants in a barangay assembly meeting was found difficult in fully delivering the message to beneficiaries. Those barangays that were not selected as the pilot project target seemed reluctant to accept the selection results, although the selection process was performed according to strict criteria and appropriate transparency.

There were differences in opinions about materials used to establish a few facilities on the demonstration

farm because a paradigm shift in the community development concept, from "granting things to people" to "fostering self-reliance of people," was not effectively delivered to the stakeholders at an early stage. As a consequence, it took times to achieve the consensus needed to avoid delays in implementing activities. Most of the lectures and practices on vegetable cultivation technology performed on the demonstration farm were taught to the beneficiaries in Visayan language[34]; however, Filipino language, the Philippines's national language, should have been used.

Although problems and difficulties occurred during the implementation process, BDA RMO Ranaw in agriculture sector (an implementer of community development in agriculture) is experienced in taking counter-actions to mitigate various challenges during pilot projects' implementation.

(4) Challenges and issues

The following challenges and issues were identified for the agriculture sector based on the results of pilot project.

Firstly, tools used during the planning stage in the agriculture sector in Social Preparation 1 have to be fully taught to BDA RMO staff in order for them to be able to formulate community development projects, especially in the agriculture sector. The tools are as follows: RRA (rapid rural appraisal), SSI (semi-structured interview), technical report writing, SWOT for strategy making, and POO.

Secondly, the schedule and training periods conducted on the demonstration farm should coordinate with the schedule of individual farmers' daily farm work in an effort to maximize the participation ratio, although the timing of some training has to be according to specific farm work sequences to maximize production. The farm work schedule of each beneficiary should be shared in advance during the planning stage.

Thridly, training content, especially financial literacy trainning, should be fine-tuned to beneficiaries' knowledge level during the planning stage. The content of financial literacy training requires a long review time, specialized materials, and a longer training session allocation in order for beneficiaries to fully understand the message of this training and to understand how to apply the tools on their individual farming businesses.

Fourthly, a marketing survey and marketing analysis workshop should be conducted before starting production activities at the demonstration farm to better strategize the farming plan to maximize profit.

[34] The Visayan languages of the Philippines are part of the Central Philippine languages. Most Visayan languages are spoken in the Visayas region, though they are also spoken in the Bicol Region, the islands south of Luzon such as those that make up Romblon, most of the areas of Mindanao, and the province of Sulu located southwest of Mindanao. The Visayan language with the most speakers is Cebuano, spoken by 20 million people as a native language in Central Visayas, parts of Eastern and Western Visayas, and most of Mindanao (Quoted from http://en.wikipedia.org/wiki/Visayan_languages, accessed on November 15, 2014).

A marketing survey should be conducted and finished before dry season cultivation starts in November. Based on the results of this survey, a production plan can be designed.

Fifthly, climate change and natural calamities such as heavy rain brought by typhoons should be considered as external assumptions for implementing community development in the agriculture sector. Moreover, community development in agriculture, especially vegetable production, should consider the timing of these typical events before entering production in dry season in November. Vegetable cultivation during wet season, from May to October, is still a challenge for farmers in Sultan Mastura; therefore, the rain shelters on the demonstration farm established during the CD-CAAM should continue to be utilized by the beneficiaries to practice vegetable cultivation during wet season.

Lastly, follow-up advocacy and information sharing should be regularly conducted during implementation of community development project to those barangays not selected as the pilot project target. The implementation of agencies such as the BDA, MLGU, and JICA could help to avoid further gossip, even though the implementers set transparent criteria for the selection process of the target barangay.

3.1.2. Fisheries Sector

The pilot project for the fisheries sector introduced two different types of fish culture: pond culture and cage culture. There are pilot sites for pond culture (at Tambu and Cadayonan) and another pilot site on cage culture (at Solon and Pasayanon) in each of the target municipalities, Sultan Mastura and Matungao. This section explains the major findings from the pilot projects as well as challenges and issues for further promotion of tilapia culture in CAAAM.

(1) Major findings

1) Results of the pilot project

In Sultan Mastura, the first stocking practice of tilapia pond-culture started in December 2013, after the completion of the pond construction and rehabilitation. Because the fish seeds transported from the BFAR hatcheries were too small to directly stock in the earthen ponds, they were at first stocked in hapa nets (fine-meshed nets) instead. About one month later, after nursing the fish seeds in the hapa nets, the fish grew to the proper stocking size for growth in earthen ponds (3–4 inches in body length). Once at the proper size, the fish were gradually transferred to earthen ponds for further growth, in January 2014 in Tambu, Sultan Mastura.

During the growth period, BDA counterparts regularly visited the pilot sites every 15 days (two weeks) for field monitoring of the fish culture activities. Sometimes technical partners, professors, or researchers from MSU Maguindanao accompanied the BDA counterparts in order to provide support and technical guidance. Basically, they used cast nets to sample several cultured fish in ponds and

estimated the growth rate of the fish, especially average body-weight (ABW). Estimates of ABW for the cultured fish are important for calculating and adjusting the feeding rate for the next cultured period, because the feeding rate has to be adjusted for the fishes' growth. In addition, they checked the water condition of the fish ponds, including turbidity, pH, and dissolved oxygen (DO), as well as the health conditions of the fish via direct observation.

About five months later, after stocking the fish seeds in earthen ponds, the cultured fish grew to the regular market size, 250g per fish (four fish per kg). The harvest of cultured fish started at the end of June, at the beginning of the 2014 Ramadan. Afterward, the beneficiary group harvested cultured fish, little by little, in accordance with the orders placed by the local population, until the end of July and the beginning of August 2014.

Construction and rehabilitation work of fish ponds

Stocking of fish seeds in hapa net for nursing

Sampling of cultured fish (Cadayonan, Mar. 2014)

Feeding of cultured fish (Tambu, Mar. 2014)

Figure 3.1.2.1: Fish Pond Culture

In the case of cage-culture practices, the beneficiary groups constructed one unit floating cages from bamboo at the respective pilot sites during the introductory field training, which was held in March and April 2014. In the introductory training, the project expert and local partners (MSU Maguindanao) explained the construction of the floating cages, as well as the basic techniques of fish cage-culture. Afterward, the project transported fish seeds from BFAR hatcheries to the pilot sites in April. During

the first two months, the fish seeds were nursed in hapa nets that were set in the bamboo cages. After the fish grew to the proper size (a body length of four inches), the fish were gradually transferred into the growth cages. The harvest of the cultured fish started in September or October 2014. The beneficiary groups harvested properly sized fish, little by little, according to the orders and requests of the local population.

Construction of bambo floating cage (Pasayanon, March 2014)

Stocking of fish seeds in hapa net for nursing (Solon, April 2014)

Sampling of cultured fish (Pasayanon, May 2014)

Harvest of cultured fish in cages (Solon, September 2014)

Figure 3.1.2.2: Fish Cage Culture

After harvesting the cultured fish, the beneficiary groups started preparing the second stocking practice. In the case of the pond culture, they cleaned the pond, spraying tea seeds on the bottom to kill predators like mudfish and frogs. In the case of the cage culture, the beneficiary group repaired the net cages and made additional net cages to expand the space for the fish culture. Table 3.1.2.1 shows the results of the first harvest in Sultan Mastura.

Table 3.1.2.1: Harvesting result in Sultan Mastura

(1) Pond culture				
Item	Indicators	Pond 1	Pond 2	All Ponds
Basic Information	Pond Size	560 m^2	174 m^2	834 m^2
	Culture Period	Jan. 12 – July 27, 2014	Feb. 25 – June 27, 2014	-
	Culture Days	191 days	123 days	-
Seed Stocking	No. of Fish Seeds	2,800 pcs.	790 pcs.	3,590 pcs.
	Seed Size	0.8 g	5.3 g	-
	Stocking Rate	5 fish/m^2	4.5 fish/m^2	-
Fish Harvest	Total Harvest	280 kg	99 kg	379 kg
	Estimated No. of Harvested Fish	1120 fish	396 fish	1,516 fish
	Survival Rate	40.0%	50.2%	42.2%
Consumed Feed	Amount of Consumed Feed	529 kg	161 kg	690 kg
	Feed Conversion Rate (FCR)	1.89	1.62	1.82

(2) Cage culture		
Item	Indicators	All Cages
Basic Information	Cage Size	77 m^3
	Culture Period	Apr. 15 – Sep. 1, 2014
	Culture Days	140 days
Seed Stocking	No. of Fish Seeds	924 pcs.
	Seed Size	0.4 g
	Stocking Rate	12 fish/m^3
Fish Harvest	Total Harvest	170 kg
	Estimated No. of Harvested Fish	680 fish
	Survival Rate	73.6%
Consumed Feed	Amount of Consumed Feed	272 kg
	Feed Conversion Rate (FCR)	1.60

In both practices, the feed conversion rate (FCR) was at a reasonable level, which means that the beneficiaries managed to sufficiently feed fish throughout that culture's period. However, compared to the growth rate and FCR, the survival rate is very low, at only 40% and 50% for pond culture. A survival rate of greater than 60–70% could be expected if proper feeding management is employed. The invasion of predatory fish, like catfish or mudfish, may be one of the possible reasons for the low survival rate. Another possible reason for the low rate is the theft of cultivated fish from the ponds.

The beneficiary groups sold most of harvested fish directly to local people in the municipality. In the case of a direct sale to a local person, they could sell fresh fish at reasonable prices: P 100–120/kg. The customers' opinion of their culture fish was very good. Most of the customers admitted that their tilapia had a better taste and was fresher. This indicates that the local population acknowledged that the cultured tilapia were of a higher quality. Table 3.1.2.2 presents the estimated financial balance of the first harvest of the pond and cage cultures in Sultan Mastura. In terms of the first harvest, the net profit of the pond culture at Tambu was estimated to be about P 5,000. Likewise, the net profit of the cage culture at Solon was about P 6,500. The profit rate for the pond culture was only 14%, which is much smaller than that of the cage culture (34%). The results of the first harvest suggest that the profitability of the cage culture is better than that of the pond culture. The largest portion of the production cost is the feed cost, which accounts for 80–90% of the total production cost. Therefore, reducing the feed costs is the most important issue in the financial management of fish culture.

Table 3.1.2.2: Economic condition of fish culture in Sultan Mastura

Item	Indicators	Pond Culture (Tambu)		Cage Culture (Solon)	
a. Fish Sale	Total Weight of Sold Fish	370 kg	Average Price: P 99.62/kg	170 kg	Average Price: P 110.29/kg
	Total Sale	P 36,860		P 18,750	
b. Production Cost	Feed Cost	P 24,150	Average Production Cost: P 85.47/kg	P 9,520	Average Production Cost: P 72.61/kg
	Seed Cost	P 1,256		P 924	
	Fertilizer Cost	P 918		-	
	Other Production Costs	P 2,800		P 500	
	Depreciation of Pond / Cage Construction	P 2,500		P 1,400	
	Total Cost	P 31,624		P 12,344	
c. Net Profit (= a – b)	Net Profit	P 5,236	Average Profit :P 14.15/kg	P 6,406	Average Profit: P 37.68/kg
	Profit Rate (c / a)		14.2%		34.2%

Note: Feed cost is estimated in unit price of P35/kg. The depreciation costs are estimated by the construction costs of fish ponds and cages. With regard to fish ponds, it is estimated as one tenth (1/10) of the construction cost, because fish ponds last five years. Regarding fish cages, it is estimated as one fifth (1/5) of the construction cost, because fish cages last 2.5 years. It is assumed that they can produce fish twice a year.

In the same manner as Sultan Mastura, the beneficiary group in Matungao managed to feed the fish at a rate that was periodically adjusted according to the sampling of cultured fish, and market-size fish were harvested from the first culture.

Table 3.1.2.3: Harvesting result in Matungao

(1) Pond culture					
Item	Indicators	Pond 1	Pond 2	Pond 3	All Ponds
Basic Information	Pond Size	243 m^2	174 m^2	45 m^2	462 m^2
	Culture Period	Feb. 28 – July 27, 2014	Feb. 28 – June 30, 2014	Feb. 28 – June 30, 2014	-
	Culture Days	120 days	123 days	123 days	-
Seed Stocking	No. of Fish Seeds	1,187 pcs.	1,420 pcs.	462 pcs.	3,069 pcs.
	Seed Size	12.0 g	5.8 g	33.0 g	-
	Stocking Rate	4.9 fish/m^2	8.1 fish/m^2	10.3 fish/m^2	-
Fish Harvest	Total Harvest	160 kg	170 kg	80 kg	410 kg
	Estimated No. of Harvested Fish	640 fish	680 fish	320 fish	1,640 fish
	Survival Rate	53.9%	47.9%	69.3%	53.4%
Consumed Feed	Amount of Consumed Feed	300 kg	300 kg	140 kg	740 kg
	Feed Conversion Rate (FCR)	1.88	1.76	1.75	1.80

(2) Cage culture		
Item	Indicators	All Cages
Basic Information	Cage Size	128 m^3
	Culture Period	June 13 – Oct. 4, 2014
	Culture Days	114 days
Seed Stocking	No. of Fish Seeds	2,560 pcs.
	Seed Size	14.1 – 18.5 g
	Stocking Rate	20 fish/m^3
Fish Harvest	Total Harvest	404 kg
	Estimated No. of Harvested Fish	1,616 fish
	Survival Rate	63.1%
Consumed Feed	Amount of Consumed Feed	646 kg
	Feed Conversion Rate (FCR)	1.60

The growth trend of cultured fish at all locations smoothly increased because of the proper feeding management of the beneficiary group. The FCR was also in reasonable range. However, the survival rate in pond culture was 53%, which is smaller than we expected. It is presumed that some predators,

such as frogs or aquatic insects, may have accidentally entered the ponds and preyed on the small fish. In addition, there are significant differences in the FCR and survival rate between the pond- and cage-culture practices. As a result of the first harvest, the cage culture demonstrated a higher productivity than the pond culture.

The beneficiary groups sold most of the harvested fish directly to the local people in the municipality. Some of the cultured fish were sold as live fish at the Matungao Municipality anniversary, which occurred at the beginning of September 2014. Because of their efforts to sell fish directly to local people, the farm-to-gate price was reasonable, ranging from P 100 to 120 per kg. This contributed to securing sufficient profits and operational costs for future production. Table 3.1.2.4 presents the estimated financial balance for the first harvest of the pond and cage cultures in Matungao. In the first harvest, the net profit was estimated to be about P 12,000 for both the pond and cage cultures. The profit rate for pond and cage cultures account for 26% and 31%, respectively. The profit rate of the cage culture is a little higher than that of the pond culture. Therefore, as was the case in Sultan Mastura, the profitability for the cage culture was better than that for the pond culture in the first harvest.

Table 3.1.2.4: Economic condition of fish culture in Matungao

Item	Indicators	Pond Culture (Cadayonan)		Cage Culture (Pasayanon)	
a. Fish Sale	Total Weight of Sold Fish	410 kg	Average Price: P 106.31 / kg	363 kg	Average Price: P 106.56 /kg
	Total Sale	P 43,590		P 38,680	
b. Production Cost	Feed Cost	P 25,900	Average Production Cost: P 75.64 / kg	P 22,610	Average Production Cost: P 72.56 / kg
	Seed Cost	P 1,074		P 1,280	
	Fertilizer Cost	P 740		-	
	Other Cost	P 1,500		P 500	
	Depreciation of Pond / Cage Construction	P 1,800		P 1,950	
	Total Cost	P 31,014		P 26,340	
c. Net Profit (= a – b)	Net Profit	P 12,576	Average Profit: P 30.67 / kg	P 12,340	Average Profit: P 33.99 / kg
	Profit Rate (c / a)		28.9 %		31.9 %

Note: Feed cost is estimated in unit price of P35/kg. The depreciation costs are estimated by the construction costs of fish ponds and cages. With regard to fish ponds, it is estimated as one tenth (1/10) of the construction cost, because fish ponds last five years. Regarding fish cages, it is estimated as one fifth (1/5) of the construction cost, because fish cages last 2.5 years. It is assumed that they can produce fish twice a year.

According to the financial results from the first harvest, discussed above, the range of the average production cost is P 72 to P 85 per kg. This indicates the break-even point between the sale price and production cost. Therefore, to make a profit in fish culture, the beneficiary groups have to sell their cultured fish at price higher than the average cost. Roughly speaking, a price of P 80/kg is the break-even price for the cultured fish from the first harvest. Regarding the profit rate of the fish culture in general, it is a little higher for cage culture than for pond culture. Based on the results of the first harvest, the cage culture tends to be a little more profitable than the pond culture.

2) Other activities

To add to the variety of fish culture practices, the pilot project introduced red tilapia seeds into the pilot sites. The project team accidentally encountered red tilapia at a private fish farm in Panabo, Davao del Norte. The red tilapia, from Thailand, was introduced into the program run by the BFAR Regional Fisheries Training Center in Panabo for trial purposes. Generally, in Southeast Asian countries, red tilapia is highly valued because of its bright appearance. This is the first time a red tilapia culture was stocked in the Bangsamoro region, because there are no past records of red tilapia culture. A total of 500 red tilapia seeds were already introduced into the pilot sites, and 250 fish were separately nursed in each target municipality. The first harvest of red tilapia was mainly carried out to produce breeders for future seed-production as Bangsamoro-oriented fish.

Additionally, after selling almost all of their marketable fish, the beneficiary groups tried to process dried tilapia (tilanggit) with the smaller fish, which remained in the ponds. In Tambu, Sultan Mastura, the beneficiary group for the pond culture produced about two kg of dried tilapia. Every 100g of dried fish was packed into a plastic bag using a vacuum sealer, and sold for 50 pesos per pack at the local market. In Matungao, the beneficiary group produced only one kg of dried tilapia through processing practice during the same period. Their dried tilapia was also sold at a local market.

Dried tilapia "Tilanggit" processed by the beneficiary group in Sultan Mastura.

Dried tilapia processing by beneficiary groups.

Figure 3.1.2.3: Practice of Dried Tilapia (Tilanggit) Processing

According to these processing practices, the net profit of dried tilapia fish reached P 40 per kg of the wet weight of the fish. This result indicates that smaller fish can be sold for a better price by processing them as dried fish. Sometimes it is hard to find customers who will buy smaller tilapia (i.e., with a body weight of less than 100g) fresh. This suggests that the processing of dried fish adds some value to smaller fish that are sold at local market.

Table 3.1.2.5: Economic condition of dried tilapia in Sultan Mastura

	Items	Unit x Quantity	Cost or Sale
Cost	Fresh fish (small-size)	10 kg (wet) x P 40	P 400
	Ingredient (spice, salt, vinegar, etc.)		P 100
	Package (plastic and label)		P 50
	Total Cost		**P 550**
Sale	**Total Sale**	2.1 kg (dry) x P 500 (Price: P50 for a 100-g pack)	**P 1,050**
Profit	**Net Profit**		**P 500**
	Profit per wet-weight		P 50/kg of wet-weight

Field–training events for community-based tilapia seed production were also held in both target municipalities. In the training program, the hapa-net method of tilapia seed production was introduced to the beneficiary groups. In the hapa-net method, mature male and female fish are mixed in a hapa net to promote mating and spawning. After the field training, the beneficiary group started their first trial of tilapia seed production at the same time that they began their second practice of fish growth. In November, the beneficiary groups successfully produced tilapia seeds at their own sites. Some of the fish seeds were nursed in hapa-nets in preparation of the next fish production cycle (the third harvest), while the other seeds were sold or given to other communities or farmers for their fish culture activities.

Hapa-net type method of tilapia seed production
(Cadayonan, Nov. 2014)

Tilapia fish seeds are collected in hapa net.
(Pasayanon, Nov. 2014)

Figure 3.1.2.4: Community-based tilapia seed production

According to the results of the self-evaluation surveys conducted upon completion of the pilot project, most of the beneficiary members considered the impacts of the pilot project to be very significant in three main subjects: community strengthening, technical improvement, and income generation.

More than 95% of the beneficiary members considered the pilot project to have significantly contributed to community strengthening. The evaluation results indicate that the beneficiaries gradually developed good relationships and cooperation with the community through the joint work of fish culture activities. Concerning the technical aspects, about 90% of the beneficiary members indicated that the pilot project provided good opportunities for improving and developing the participants' technical knowledge and skills in fish culture. However, there were some technical constraints, such as the difficulty of making

feed at home and calculating the feeding rate. After the project, follow-up programs covering these technical matters at a level in accordance with the participants' technical capacities will be necessary.

Regarding the project's economic aspect, about 90% of the beneficiaries indicated that the pilot project made significant contributions to improving the livelihood of the target communities. The pilot project provided ample opportunities for the beneficiary group to sell their cultured fish at higher prices, and introduced financial management for community businesses. In addition, the processing activities gave participants a chance to sell smaller fish at reasonable prices. However, there were serious constraints that negatively affected those impacts. In particular, the difficulty of preparing the initial capital for the fish-culture operation was the biggest constraint from an economic perspective. All of the beneficiary groups indicated that they planned to continue fish culture activities. In addition, all of them intend to expand the scale of fish culture in the near future.

During the implementation of the pilot project, many local people in the neighboring communities visited the pilot sites to directly observe the fish culture activities and listen to some advice from the beneficiary groups on preparing for fish culture. A few community groups and families who were stimulated by the pilot project started fish culture activities using their own capital. The beneficiary groups voluntarily supported these beginning fish farmers; for example, beneficiary members visited their fish culture sites to assist in the preparation of fish ponds and cages, as well as to give technical advices on fish culture.

Table 3.1.2.6: Extension cases of fish culture

Municipality	Barangay	Operation Body	Extension Situation
Sultan Mastura	Lake Terekan Barangay Tambu	Lake Tereken Aquaculture Cooperative	- 12 units of fish cages were installed in the lake. (10 m x 12 m: 6 units, 1.5 m x 5 m: 6 units) - 45,000 tilapia seeds in total were stocked in fish pens in Sep. and Nov. 2014.
	Barangay Tambu	Family-owned	- Fish pond (about 300 m^2) - 2,500 fish seeds were stocked. They were naturally produced at the pilot site.
Matungao	Barangay Santa Cruz	Family-owned	- 1 unit of fish pond (96 m^2) - 1,000 tilapia seeds were stocked in Nov. 2014
Poona Piagapo (Lanao del Norte)	Barangay Cormatan	Family-owned	- Fish pond (about 200 m^2) - 1,500 tilapia seeds were purchased at fish cage site of Pasayanon, Matungao

(2) Results of capacity building of the BDA

In terms of technical and management capacities in BDA counterparts, the observation and experience of the project experts verifies their achievements at respective evaluation criteria. The levels of the achievement at respective criteria are also evaluated by three levels of capacity development as follows.

Table 3.1.2.7: Capacity of BDA in the pilot project in fisheries sector

Categories	Observed Evidence / Change in the Pilot Project	Level
Technical Advices	- They understood the basic skills for tilapia fish culture and processing. - They often gave technical advices and proper suggestion to local communities.	A
Coordination with Local Beneficiaries and LGUs.	- They often contacted beneficiaries and LGU officials to monitor the field activities. - They could propose / arrange proper field activities with beneficiaries and LGU officials.	A
Coordination in BDA Organization	- They often exchanged / discussed their ideas in regional offices. - They discussed / shared the activity plan regularly at coordination meetings. - Sometime, the information was not shared well between central office and regional offices.	B
Presentation of Field Activities	- They can present the progress and results of field activities at public seminars and meetings. - They still need a help of a local coordinator for preparation of presentation materials.	B
Field Monitoring Skills	- They could manage field surveys / samplings of cultured fish with technical partners (MSUs). - They often delayed to submit the regular activity reports, especially, result of regular monitoring.	B
Level A: they can make basic arrangement, and manage necessary activities by themselves. Level B: They can make basic arrangement, however, sometime they miss important matters to manage necessary activities. Level C: They know basic arrangement; however, they cannot manage necessary activities. Level D: They do not know what activities are necessary and how to manage them.		

Generally speaking, the technical and management capacities of BDA counterparts drastically went up through a various experiences in the pilot project. In fact, at the beginning of the pilot project (baseline), the development level of BDA counterparts was the level C or D in all technical / management categories. Through the practical extension activities in the pilot project, regarding the two categories above, such as technical advices and coordination with local beneficiaries, the development levels of BDA counterparts have reached the level A, that they can manage necessary activities by themselves basically. However, according to our observation to their field works, there are still a few miscommunication cases to coordinate the arrangement in the organization, especially, a communication between the central office and regional offices. Therefore, the achievement level of coordination in the organization is evaluated as level B. They may need much efforts to improve the internal communication in the organization in the future. Additionally, their presentation skills and performance at seminars and meetings have been drastically improved by many presentation experiences in the project. In terms of field monitoring, the BDA counterparts have mastered a proper knowledge and skill for the regular monitoring activities on fish culture, collected the data of fish growth by sampling and adjusted the feed rate according to fish growth. However, the submission of field monitoring reports to the project were sometime delayed. As such, achievement levels of those areas are evaluated as level B at this time.

(3) Challenges and issues

Based on the performance of the pilot project in the fisheries sector, the following recommendations are proposed for future programs for tilapia production, processing, and marketing. The pilot project has developed the appropriate extension model for developing community-based fish culture, especially adapted to the Bangsamoro region. Based on the experience of the pilot project, the extension model should be extended to other communities.

The selection of proper sites is the most important factor for a successful fish culture project. To select target sites for extension programs according to the experience of technical surveys, the following criteria should be reviewed for proper site selection. In the case of fish culture development in particular, the quality and quantity of water sources is the most important aspect of proper site selection.

Table 3.1.2.8: Selection criteria for fish culture sites

Selection Criteria	Main Survey Points
Geographical Condition	- Water areas/sources available for fish culture activities - Ownership of water areas (e.g., pond, lake, reservoir), - Access to possible project sites (e.g., distance from a town, route condition)
Experience of Fish Culture	- Experience in fish culture activities - Production condition of fish culture (e.g., amount of production, culture method, harvest season)
Community Organization for Fish Culture Activities	- Existence of community organizations for fish culture activities (e.g., associations, cooperatives, groups) - Current condition of community organization

When a community group has sufficient technical and management capacities for their fish culture activities through the project activities, the community group should be registered as a community organization, such as cooperative or association, in order to request and receive government support in the future. All of the beneficiary groups in the pilot project already applied for registration as community organizations. At the moment, one beneficiary group at Solon, Sultan Mastura, has already become a registered association under the DOLE. The BDA officials are expected to support and facilitate the procedures for registering their organization after the pilot project. This is also one of the important factors for the continuation of fish culture activities as a community group.

To start the fish culture activities, a community group has to prepare the initial capital to cover the construction costs of the fish ponds or cages and the operational costs of fish culture. According to the results of first harvest trials, the necessary initial capital reached P 50,000–60,000 for the pond culture and P 20,000–40,000 for the cage culture. This varies according to the scale of fish culture and the stocking density of the cultured fish. It is not a small amount for the local people and their communities. In the case of fish culture development, the most serious issue is how they acquire the financial assistance needed for the initial capital. Therefore, we should consider not only extension programs for developing fish culture, but also programs for financial assistance for beginning fish farmers. This means that the extension program should be convened alongside a financial program, such as a subsidy, loan, or micro-credit program.

Table 3.1.2.9: Estimated initial capital of fish culture

Culture Style	Pilot Site	Scale of Fish Culture	Pond/Cage Construction Cost	Operational Cost of Fish Culture	Necessary Initial Capital
Pond Culture	Tambu	834 m^2	P 25,000	P 32,000	P 57,000
	Cadayonan	462 m^2	P 18,000	P 32,000	P 50,000
Cage Culture	Solon	77 m^3	P 7,000	P 12,000	P 19,000
	Pasayanon	128 m^3	P 8,000	P 26,000	P 34,000

Note: The figures have been rounded off to the nearest thousand. All construction cost was borned by the Project

According to the results of the first harvest trial, the feed costs accounted for about 90% of the total operational cost. The reduction of feed costs is an important key to the fish culture operation. Thus, the pilot project advised efficient feeding by regular sampling the population in order to minimize feed consumption. The production of organic feed using local ingredients is the advanced activity in fish culture. Especially for local farmers, it is not easy to constantly and stably procure a sufficient amount of local ingredients needed for fish feed, such as fish meal, rice bran, corn starch, etc. However, when considering the halal certificate, preparing for the production of organic feed is inevitable. Hence, in the near future, the BDA should consider a pilot-based feed production project that uses locally available ingredients. In that case, the BDA should work together with local technical partners, such as BFARs or MSUs, on this future project.

3.1.3. Road Rehabilitation and Maintenance (Sultan Mastura and Matungao)

The pilot project for LBT included two different types of road works: road rehabilitation and maintenance. There are two pilot roads in Sultan Mastura (at Tariken for road rehabilitation and Namuken for road maintenance) and another two pilot roads in Matungao (at Cadayonan for road rehabilitation and Banco for road maintenance). This section explains the major findings from the pilot projects as well as challenges and issues for further promotion of LBT in CAAM.

(1) Major findings

1) Results of the pilot project

The pilot roads in Sultan Mastura are composed of Sitio Padian-Kinugkungan Pilot Road Rehabilitation in Barangay Tariken, with a total length of 1.50 km, and Sitio Dungguan-Mareges Pilot Road Maintenance in Barangay Namuken, with a total length of 2.14 km.

Figure 3.1.3.1: Sitio Padian-Kinugkungan pilot road, Tariken

Figure 3.1.3.2: Sitio Dungguan-Mareges pilot road, Namuken

The pilot road rehabilitation in Tariken was an abandoned road for several years prior to the project, as it was impassable due to the absence of a connecting structure across Tariken Creek. The road is covered with thick vegetation growth, has no well-defined road section or drainage canals/structures, and

traverses across a creek whose pipe culvert was washed away by flooding in the area. Full-bearing fruit trees have been planted along the road's center line and along both sides, which encroach on the main road area. A topographic and profile survey was done by the contractor to prepare the technical documents, and a hydrographic analysis was conducted to determine the appropriate connecting structure to construct across the creek.

The pilot road maintenance in Namuken is an existing road with an irregular shape and alignment that is characterized by large, deep potholes and ruts that have rendered it impassable except by motorcycles, even during the dry season. There are also no drainage canals along the road and a major pipe culvert crossing was seriously damaged and washed away by flooding in the area, cutting off the road at its mid-section. A "walk through" was done by the joint team of BDA, the LGU and the JICA expert team, along the entire stretch of the road to determine the number and dimensions of potholes, ruts, and other depressions and deteriorations in an effort to prepare technical documents.

The final output of the pilot implementation is the improvement of the two roads into all-weather gravel roads, upgrading them to a maintainable level from their currently dilapidated, impassable earth road condition. The completed roads comply with standard Philippine local road specifications of a 4.00 m carriageway with 1.00 m shoulders on each side and the existence of complete drainage canals and structures. The finished road surfaces are made of compacted aggregate base course (Item 201[35]). A two-barrel box culvert was implemented in the rehabilitation of Tariken to accommodate the large volume of flood water flow due to the insufficient capacity of existing pipe culverts. In addition, the single line of pipe culvert in the pilot road maintenance in Namuken was replaced with two lines of pipe culverts to accommodate the large volume of water during rainy season. This will also mitigate the constant flooding in the area during this time of the year. The pilot roads in Barangays Tariken and Namuken generated employment for 186 and 116 skilled and unskilled laborers from the local community, respectively, for an equivalent of 8,038 man-days within a period of about six months.

Figure 3.1.3.3: Before and after application of "do-nou" method

[35] Item 201 is the technical item code used for Aggregate Base Course in road construction works.

The pilot roads in Matungao are composed of Cadayonan-Bubong Radapan Pilot Road Rehabilitation in Cadayonan, with a total length of 1.12 km, and Banco-Batal Pilot Road Maintenance in Banco, with a total length of 1.52 km.

Figure 3.1.3.4: Cadayonan-Bubong Radapan pilot road

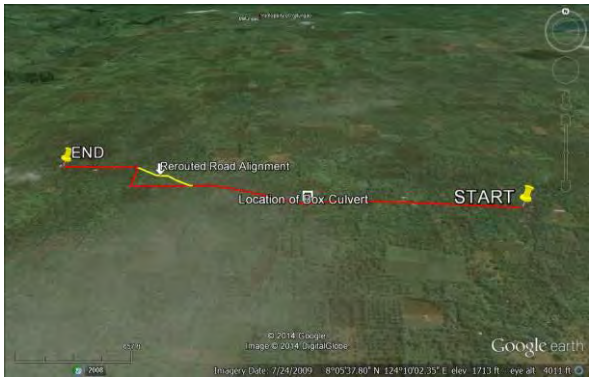


Figure 3.1.3.5: Banco-Batal pilot road

The pilot road rehabilitation in Cadayonan has been impassable for several years due to significant dilapidated and the presence of large boulders. The entire stretch of road has deep ruts and gullies along the center line due to its steep gradients, which were likely caused by rainfall run-off following the road alignment. It is also covered with thick vegetation growth, has no well-defined road section or drainage canals, and the lower section is perennially flooded due to the absence of a cross-drainage structure. A topographic and profile survey was done by the contractors to prepare technical documents.

The pilot road maintenance in Banco is an existing road that is part of the municipality's circumferential road. It is an earth road with large potholes and deep ruts that have rendered it impassable except by motorcycles even during the dry season. There are also no drainage canals along the road and the low lying section floods waist-deep during heavy rains due to surface run-off. A "walk through" was done by the joint team of BDA, the LGUs and the JICA expert team along the entire stretch of the road to determine the number and dimensions of potholes, ruts, and other depressions and deteriorations in an effort to prepare technical documents.

As in Sultan Mastura, the final output of the pilot implementation is the improvement of the two roads into all-weather gravel roads, upgrading them to a maintainable level from their currently dilapidated, impassable earth road condition. The completed roads comply with standard Philippine local road specifications of a 4.00 m carriageway with 1.00 m shoulders on each side and the existence of complete drainage canals and structures. The finished road surface is made of compacted aggregate base course (Item 201). To mitigate flooding on the low-lying sections of the pilot road maintenance in Barangay Banco, a two-barrel reinforced box culvert was installed to accommodate the large volume of surface run-off during heavy rains. The piloting generated employment for 81 and 102 unskilled laborers from the community for road rehabilitation and road maintenance, respectively, for an equivalent of 3,185 man-days within a period of about four months.

Figure 3.1.3.6: Before and after clearing

The piloting of road rehabilitation and maintenance for the two target municipalities followed only one implementation process broken into three major stages: *(*1) planning, (2) procurement, (3) implementation, monitoring and supervision. These stages were comprised of interdependent sequential activities that were designed to capacitate BDAs' future roles in the development of the CAAM, specifically the implementation of community-based infrastructure projects. Pursuant to the project's capacity-building concept through OJT, the pilot project established a Project Management Unit (PMU) for the infrastructure sector, comprised of individuals from BDA CMO, BDA RMOs, and the MLGUs that engaged in all of the activities under the three major stages of the implementation process.

The preparation of detailed engineering plans for the pilot road rehabilitation was outsourced to a private survey company due to the absence of survey instruments in the MLGU. During the actual survey works, however, the BDA joined the private surveyors in an effort to learn the basic operations of conducting profiles and topographic surveys in the field. The preparation of the pilot road maintenance technical documents was done through a hands-on "walk through" survey by the PMU in full coordination with the barangay officials and coaching and guidance by the JICA expert. During this process, the BDA and MLGU learned the processes and procedures on how to undertake a "walk through" survey, such as establishing road stations using chainage pegs; identifying the defects, distresses, and deterioration of the roads; taking actual measurements of these defects; and recording other road features in an effort to prepare quantity cost estimates needed for approval.

Figure 3.1.3.7: BDA hands-on learning on survey works and walk through

The procurement stage highlights one of the many core competencies which the sector aimed to

strengthen: the BDA and MLGU. The BDA as an institution had never been engaged in the procurement of civil works; hence, the agency was not familiar with the processes and procedures of the Government Procurement Reform Act (R.A. 9184). To mitigate this, under the supervision and technical guidance of the JICA experts, the project fully engaged a Bidding Committee, composed of key personnel from BDA CMO, BDA RMOs, and target MLGUs. The committee focused on the proper management and conduct of procurement of contracts, with emphasis on transparency and accountability among the committee members.

The project adopted the LBT and do-nou method using the "Pakyaw" contract system.[36] Under this, community members were grouped into work teams and assigned to finish a specific task within a fixed contract amount and specific period of time. A series of technical training on LBT and Do-Nou method was also carried out by the JICA experts.

Figure 3.1.3.8: BDA hands-on training on LBT and "do-nou" method

Figure 3.1.3.9: Hands-on application of LBT by "Pakyaw" groups

[36] "Pakyaw" is a system of hiring a labor group for the performance of a specific work and/or service task toward the implementation of an infrastructure project, whereby tools and materials are furnished by the implementing agency. For the specific work/service output, a lump-sum payment is made either through the group leader or divided among the "Pakyaw" workers and disbursed using a payroll system.

2) Results of capacity building of the BDA

The overall outcome of the capacity building interventions within the infrastructure sector succeeded in addressing the limited knowledge and skills of the BDA, MLGU, and communities regarding LBT and "do-nou" method. During the pilot implementation stage, one of the impacts was a change in perception of the BDA, MLGU, and community members on the effectiveness of the LBT and do-nou method in road rehabilitation and maintenance. They gradually began appreciating and accepting the concepts as an alternative means to improve and maintain the rural road networks in lieu of the commonly used equipment-based methods. The extensive trainings on LBT and "do-nou" method, coupled with hands-on application through the pilot project implementation, provided the participants with the necessary knowledge and skills to directly apply the technology for the improvement of their dilapidated rural roads. The BDA, MLGUs, and communities in the pilot areas are now well-equipped to identify rural road distresses and deficiencies, their causes, as well as appropriate solutions and work procedures to improve road infrastructure and sustain its usefulness through proper maintenance processes and procedures.

This is against a background of most MLGUs experiencing fiscal difficulties given the limited resources (e.g., budget, technical manpower, equipment) under the government's Internal Revenue Allotment (IRA). The application of labor-based road rehabilitation and maintenance has proven to participants that it is an effective method that can be replicated to improve long-dilapidated and even abandoned rural roads in lower-class municipalities, especially in conflict-affected areas. The pilot roads, which either impassable or abandoned due to serious deterioration, are now usable in all weather conditions. These roads were elevated to a maintainable level as a result of feature upgrades to acceptable engineering standards and specifications, complete with necessary drainage facilities to address flooding during the rainy season.

As recipients of the technology transfer, the community LBT facilitators shared their knowledge to other community members who were engaged during the pilot project implementation. In fact, the selected fisheries sector beneficiaries who were included in the training immediately initiated improvements to inaccessible and neglected trails to the Cadayonan fishpond site by using LBT that they had just learned. These facilitators are likely to become the focal persons in the replication of the technology to other barangays within their respective municipalities. Should the MLGUs decide to apply the technology in the maintenance of their local roads, these LBT facilitators can be engaged to train and supervise road maintenance works by community members from other barangays.

Due to the recent peace agreement between the GPH and MILF, the BDA (as the development arm of the latter) is expected to intensify its development efforts in the CAAM, which will provide significant opportunity for the LBT and do-nou method to be advocated and further replicated in such areas. Whether through direct initiatives from the BDA or from foreign funding donors, the project's LBT trainers could be engaged to train MLGUs in other CAAM areas to adopt the technology (and its

sustainability mechanism) to immediately improve rural road conditions through community work.

(2) Issues and challenges

The completed pilot roads are expected to deteriorate significantly faster than concrete roads, especially during the rainy season; however, with the projects' strict implementation of the proper LBT work methods and application of "do-nou" methods, the economic life of the completed pilot roads are expected to last longer than the original dirt road before it was rehabilitated or maintained. This is assuming that the pilot MLGUs and Brangay Local Government Units (BLGUs) will allocate enough budget to the endeavor annually and continue to conduct routine maintenance using LBT.

The institutional sustainability of the interventions, therefore, rests upon the pilot MLGUs and BLGUs' recognition and acceptance of the merits of the technology. Unless the BDA continues to advocate the pilot municipalities' technology for replication in other CAAM areas, all of the interventions will not be sustained if the LBT recipients themselves are not convinced of the technology's efficacy.

With the current limited resources and technical personnel available in the pilot MLGUs and BLGUs to monitor and evaluate their road network, the management of community-based road development as a whole is difficult for them to sustain. In addition, the pilot MLGUs' linkage with technical institutions such as Department of Public Works and Highways (DPWH) to provide technical and financial support is not yet clearly established under the Bangsamoro entity. Should the local community have its own initiatives to intermittently monitor and maintain their local roads, the guidance of the local LBT facilitators is crucial to ensure that proper work methods and specifications are observed to achieve optimal effectiveness. Thus, the lack of technically capable personnel or the unavailability of trained LBT facilitators might also hamper the sustainability of the interventions.

The roles and responsibilities of the BDA, as the catalyst of the technology, are crucial to the institutional, managerial, and technical sustainability of the pilot projects. With the increasing rate of development interventions funneled thru the BDA, the opportunities for the technology to be adopted in other projects are numerous. The BDA is expected to continue to advocate the application and replication of the technology to other target MLGUs in the CAAM.

3.2. Strengthening and expansion of the CD-CAAM model (sector activities)

3.2.1. Farmer-to-Farmer Extension

(1) Agriculture

In the extension phase of the CD-CAAM, the technology of vegetable production and marketing was expanded to other barangays within Sultan Mastura and Matungao using the FTF approach. Prior to conducting FTF, TOT targeting the 1st beneficiaries in the municipalities was implemented.

In this section, the process and content of TOT and FTF managed by the BDA is first explained. Secondly, the outputs from practice farms used during FTF are described, and thirdly, the capacity of BDA during the planning and implementation of TOT and FTF is discussed.

1) Results of FTF extension

a) Training of Trainers

The following are the objectives of TOT: a) training the 1st beneficiaries of CD-CAAM to be FTs who teach vegetable production technologies to 2nd beneficiaries in a different barangay in Sultan Mastura and Matungao in order to achieve technology dissemination of vegetable production and marketing; and b) building up teams of FTs. FTF provides an opportunity to the 1st beneficiaries to teach and transfer their learned knowledge and experiences to 2nd beneficiaries, while equipping 2nd beneficiaries with vegetable production technology. A maximum of 30 new beneficiaries (2nd beneficiaries) is selected and capacitated within their respective municipalities. Figure 3.2.1.1 shows the overall implementation mechanism of TOT and FTF.

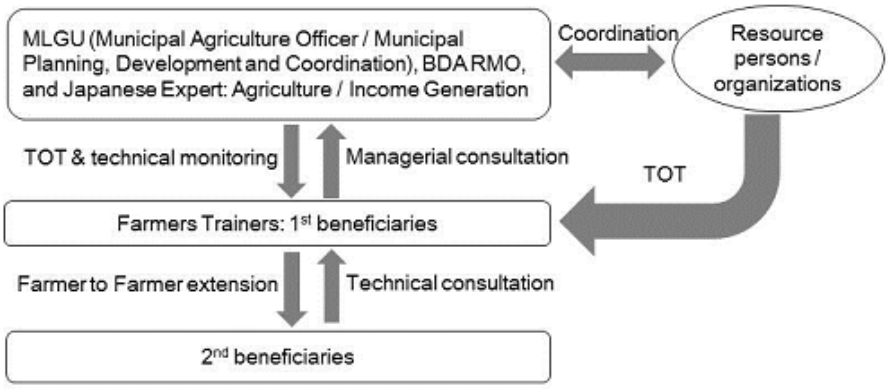


Figure 3.2.1.1: Implementation mechanism of TOT and FTF

As shown in Figure 3.2.1.1, the overall implementation body, excluding the final target, namely the 2nd beneficiaries, is divided in two levels to ensure smooth and effective implementation of the projects. The top body, composed of MAO/MPDC of MLGU, BDA RMO, and a JICA expert in agriculture manages technical activities. They coordinate with resource persons/organizations (hereafter RPs) as well, particularly for implementing TOT. The RPs provide lectures during TOT. FTs are then tasked with teaching 2nd beneficiaries primary farm works related to vegetable production during FTF with the support of BDA to ensure that the knowledge and experiences acquired by the 1st beneficiaries are imparted to the 2nd beneficiaries. The FTs consult the BDA and JICA experts when they face managerial or operational problems during FTF. Detailed roles of the stakeholders are described in Table 3.2.1.1.

Table 3.2.1.1: Role of stakeholders

Stakeholder	Role
BDA RMO	1) Plan activities in the extension phase and submit it to CMO for approval and review. 2) Monitor the activities. 3) Share and provide technical expertise to beneficiaries if necessary. 4) Facilitate activities and all the issues and concerns to be resolved at the RMO level (If necessary, RMO raises issues with the CMO.)
MLGU	1) Provide the necessary data available from the Municipality as partner. 2) Monitor the activities and outcome of the project and feedback/report to the executives of MLGU.
1st Beneficiaries	1) Plan and conduct training activities during FTF with BDA support. 2) Prepare visual aids for in teaching during FTF. 3) Relay the acquired technical knowledge and experiences on vegetable production to the 2nd beneficiaries during FTF.
Resource persons	1) Provide technical expertise on planning of FTF activities. 2) Provide technical skills on visual aid preparation and presentation, facilitation skills, and understanding adult learners during TOT. 3) Provide technical information on vegetable cultivation upon request by BDA.

Stakeholder meetings are held inbetween major activities to confirm the progress of an on-going activity and discuss preparations for the next activity. The meeting requires the attendance of the BDA CMO, particular staff members of RMO, MAO/MPDC of MLGU, RPs, and the JICA expert in agriculture[37].

FTF aims to supplement the agricultural extension activities of the government. For extending the technologies introduced during the vegetable production and marketing project conducted in CD-CAAM as community development model, the FTF approach is adopted to enlarge the areas for technology transfer and the number of beneficiaries in an efficient manner.

In FTF, 1st beneficiaries of the CD-CAAM project become FTs as explained in order to conduct technology transfer as shown in Figure 3.2.1.2 after being provided TOT to the 1st beneficiaries.

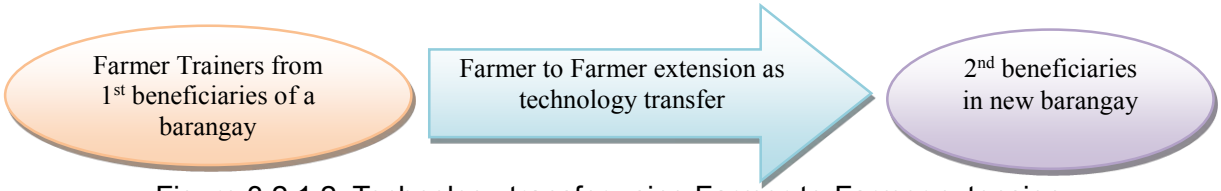


Figure 3.2.1.2: Technology transfer using Farmer-to-Farmer extension

To launch FTF, FTs need to be fostered using TOT. TOT is composed of three steps: a) discussing TOT content and schedule, b) conducting TOT and selecting FTs, and c) building a training team and planning FTF as indicated in Figure 3.2.1.3. TOT is primarily managed by BDA RMO with technical support from RPs. After completing TOT, the training team interacts with the target beneficiaries with support of BDA and MLGU, and both parties agree to start FTF and discuss arrangements in detail. The team then commences FTF activities.

[37] Although no JICA expert is sometimes assigned, stakeholder meetings are to be managed by BDA CMO and RMO.

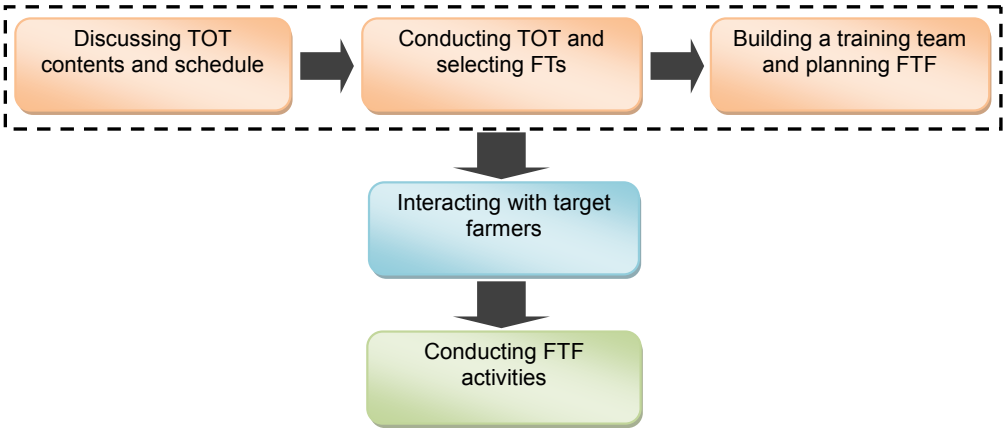


Figure 3.2.1.3: Flow from TOT to FTF

Table 3.2.1.2 explains the topic and contents of TOT.

Table 3.2.1.2: Topics and contents of TOT

Topic	Period	Contents	Materials	Lecturer
Role of FTs	1 day	Explain about the role of FTs	Guideline[38]	BDA RPOOs
Teaching method		➢ Presentation skills ➢ Preparation of visual aids ➢ Facilitation skills	Power point	RP
Reviewing vegetable production technology	1 day	Explain objectives, methods, and important technical aspects for each farm task in vegetable production by reviewing the Manual	Basic Manual for Vegetable Production and Marketing	RP and BDA
Record keeping		Explain the objective and tools of record keeping by using the actual record of 1st beneficiaries	Copy of the record made by 1st beneficiaries	1st beneficiaries if possible
Evaluation	1 day	Ballot Box (on farm) Micro teaching		RP and BDA
Building trainer team and planning of FTF extension	0.5 day	Build training teams and plan FTF extension	Team building text	RP and BDA
Preparation	2 days	Preparation for visual aid by farmers at their home	Pictures, manila paper, etc.	
Dry Run	2 days	Practice teaching of farmer trainers on vegetable production technology, marketing and record keeping		

TOT spends approximately 8 days on 8 major topics: a) rule of farmer trainers, b) teaching method, c) reviewing vegetable production technology, d) record keeping, e) evaluation, f) building trainer team and planning FTF extension, g) preparation, and h) dry run.

Under the topic "Rules of farmer trainers," the rules of FTs are simply explained to 1st beneficiaries as indicated in Table 3.2.1.3 by BDA when commencing TOT.

[38] JICA expert prepared the material and BDA translated it into Filipino.

Table 3.2.1.3: Rules of Farmer trainers

- **Farmer trainers** plan extension activities together with BDA, MAO, and RPs.
- **Farmer trainers** teach primary farm works to other farmers with BDA support.
- **Farmer trainers** have to refer to the Basic Manual for Vegetable Production and Marketing when teaching.
- **Farmer trainers** create simple visual aid materials for teaching with the support of BDA and RPs.
- **Farmer trainers** prepare some simple questions to ask other farmers during teaching.
- **Farmer trainers** and BDA review teaching activity on the farm and discuss the next activity right after the activity.
- **Farmer trainers** consult BDA when they face managerial or technical problems during FTF.
- **Farmer trainers** teach vegetable cultivation technology on the request of the beneficiaries even though it is not a part of the planned extension activities.

The teaching method includes three subjects by RPs: presentation skills, how to prepare visual aids, and facilitation skills. This lecture teaches the 1st beneficiaries to use visual aid materials that FTs use during FTF in an efficient and effective manner.

Reviewing vegetable production technology is an opportunity for the 1st beneficiaries to review what they have learned by using the Basic Manual of Vegetable Production and Marketing, instructed by RPs as shown in Figure 3.2.1.4. Although record keeping is included in the Manual, one of the 1st beneficiaries explains the subject by illustrating the recordkeeping format using production and sales data that he/she obtained through actual business in order for the other participants of the 1st beneficiaries to understand the subject thoroughly.

Figure 3.2.1.4: Reviewing vegetable production technology lecture by RP in Matungao

The topic of "Evaluation" involves evaluating and measuring the extent to which the 1st beneficiaries have understood the topics described in the Manual. The so-called Ballot box is used to conduct the evaluation on the demonstration farm. This practical test questions the knowledge of farm works that the beneficiaries have acquired; a question paper is hung on a chair in the demonstration farm and the beneficiaries have to answer the questions through their actions or filling answers in answering format. For example, if the question were "Prepare soil media for seedbed nursery," the correct answer would be putting bed soil in the holes of the seedling tray, making small holes in the soil using their fingers, dropping seeds in it, covering again with soil, and

Figure 3.2.1.5: Ballot box for practical test on demonstration farm

watering on it as illustrated in Figure 3.2.1.5. Question papers and the tools required to perform the actions for answer should be prepared before the Ballot box starts. The number of questions is 10.

Figure 3.2.1.6 Micro teaching as teaching skill evaluation

In addition, the micro teaching session is facilitated as shown in Figure 3.2.1.6. It evaluates teaching skill by observing the trial teaching of the given topic. The skill is evaluated using five aspects: a) mastery of topic; b) quality and effectiveness of the visual aid; c) ability to communicate; d) delivery skills and self-confidence; and e) quality of voice, eye to eye contact, and projection. The skill is evaluated on a five-point scale: 5: Excellent, 4: Good, 3: Fair, 2: Poor, and 1: Very Poor.

In terms of building a trainer team and planning FTF, the 1st beneficiaries are divided into some teaching teams based on the topics for the farm works. Twenty of the 1st beneficiaries in each municipality are grouped according to the respective farm works relating to vegetable production according to the topic explained in the Basic Manual for Vegetable Production and Marketing compiled by CD-CAAM. Thus, the FT teams are provided the corresponding topic assignment to teach the 2nd beneficiaries as indicated in Figure 3.2.1.7. An FT team consists of 2 or 3 members, of which 1 can be a lecturer and the other 2 can primarily be responsible for hands-on practice. After grouping, the training schedule for specific topics is planned.

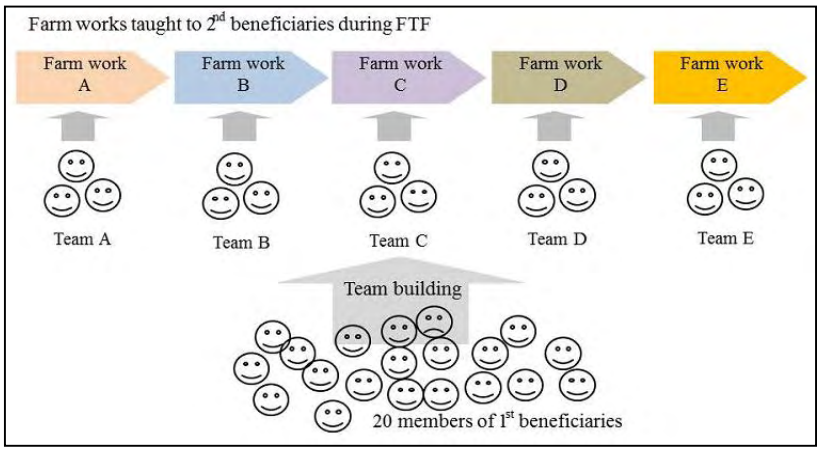


Figure 3.2.1.7: Arrangement of Farmer Trainers to teach farm works during FTF

FTs of the 1st beneficiaries thus transfer technology to 2nd beneficiaries based on the topics described in the Basic Manual: a) soil sampling and neutralization, b) land preparation, c) fertilizer application, d) nursery establishment, e) vermi-composting/compost making, f) sowing/transplanting/direct seeding, g) companion plants, h) trellising, i) irrigation and drainage, j) pests and disease control, k) harvesting and post-harvesting, l) selling and record keeping. After the FTs prepare the visual aid material for teaching,

they rehearse teaching on important topics as illustrated in Figure 3.2.1.8 as a dry run.

Figure 3.2.1.8: Dry run to practice teaching on responsible topics

As a result of the TOT process explained above, FT teams were built for respective municipalities as indicated in Table 3.2.1.4.

Table 3.2.1.4: Farmer teachers as a result of TOT

Municipality	Number of participants out of 20 for TOT	Number of trainer teams	Number of members per team
Sultan Mastura	15[39]	9	3[40]
Matungao	17[41]	4	5[42]

Source: Activity report for planning FTF in September 2015 , CD-CAAM

b) Implementation of Farmer to Farmer extension

As part of planning of FTF during TOT, extension schedule was also planned as indicated in Table 3.2.1.5. As explained, topics coincide with the subjects described in the Basic Manual for Vegetable Production and Marketing.

Table 3.2.1.5: Sample FTF plans of Matungao

Topics	Timing
Establishment of Practice Farm	Sept. 2015
Soil Sampling and Neutralization	Sept. 2015
Land Preparation	Sept. 2015
Nursery Establishment	Oct. 2015
Fertilizer Application	Oct. 2015
Compost Making and Vermi-Composting	Oct. 2015
Concoction Preparation	Oct. 2015
Sowing/Transplanting	Oct. 2015
Trellising	Nov. 2015
Irrigation and Drainage	Nov. 2015
Pest and Disease Control, and Weeds Control	Nov. 2015
Match making	Jan. 2016
Harvesting and Post Harvesting	Jan. 2016
Selling and Record Keeping	Jan. 2016

Source: Activity report for planning FTF in September 2015, CD-CAAM

[39] Five members could not participate due to the following reasons: One (1) beneficiary (A) was not able to join because he was sick during TOT. Two (2) others (B and C) participated on the first day of TOT but B was not able to complete it due to illness, and C had to take care of an important family matter. Two beneficiaries (D and E) were no longer participating in the activities because of other responsibilities. A, B, and C then joined the FTF extension as members of the trainer teams and provided support for hands-on activities.

[40] Some specific members become members of other trainer teams.

[41] One (1) beneficiary (A) could not leave her house for a long time because she was breastfeeding her newborn. Another (1) beneficiary (B) was away from the Municipalities during TOT because of specific personal business. Beneficiary (C) was extremely busy for his social obligations. A, B, and C joined the FTF as members of trainer teams. They assisted with hands-on training during FTF.

[42] All the 1st beneficiaries are in trainer teams.

Meanwhile, based on the result of the technical survey conducted as part of social preparation, an interview with Barangay Chairmen, Barangay validation, a series of consultations/discussions with BDA and MLGU and sectoral feasibility checks were conducted. The target extension sites of Barangay Matampay, Matungao Municipality, Lanao del Norte Province and Barangay Buliok, Sultan Mastura Municipality, Maguindanao Province, were selected prior to FTF. Thirty of the 2nd beneficiaries, indicated in Table 3.2.1.6, were selected in the target barangay of the two municipalities through the social preparation. The 30 members are caputured in Figure 3.2.1.9. The number of males and females is 6 and 24 in Matampay, and 24 and 6 in Buliok, respectively.

Table 3.2.1.6: Summary of the respective municipality framework

Municipality	Barangay	Beneficiaries	FTs
Sultan Mastura	Buliok	30 2nd beneficiaries	1st beneficiaries of Macabiso
Matungao	Matampay	30 2nd beneficiaries	1st beneficiaries of Puntod

Farms established for the extension purpose are called “practice farms” to differentiate them from the demonstration farms that were established for learning sites for the 1st beneficiaries in the previous phase of CD-CAAM.

Figure 3.2.1.9: The 2nd beneficiaries of Buliok (left) and Matampay (right)

Regarding the communication flow illustrated in Figure 3.2.1.10, RPOO of BDM RMO plans the schedule and topic based on the POO drafted in then stakeholder meeting. He then submits the activity plan with the budget estimation to JICA expert for approval. The RPOO submits these documents to the RC of RMO after the documents have been approved by the expert for submission to the CMO for endorsement. After the endorsement, RPOO informs the CO and FTs. CO finally conveys information about particular topic’s training to the 2nd beneficiaries for their comments. If an agreement is reached about the planned schedule for specific

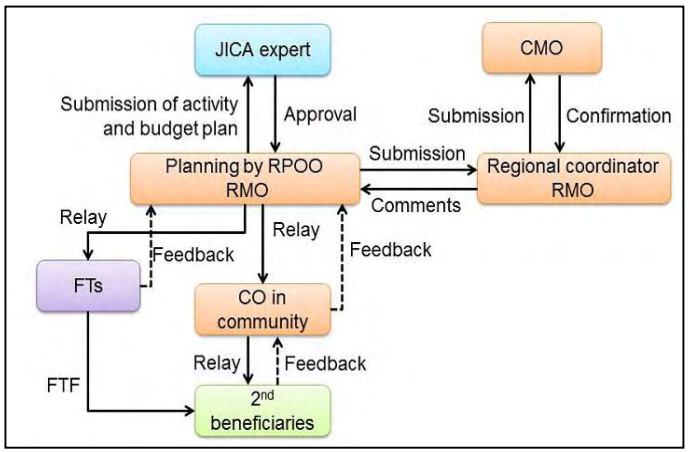


Figure 3.2.1.10: Communication flow for FTF implementation

topics, FTs conduct training on the practice farm.

2) Evaluation of quantitative outputs in terms of production and sales

a) Sultan Mastura

Quantitative outputs

The 2nd beneficiaries from Barangay Buliok started cultivating vegetables for the first production cycle in October and November 2015 as part of FTF activities. They selected seven crops: string beans, bitter gourd, tomato, bell pepper, squash, green chili, and cabbage. These crops were selected based on the results of the market survey conducted at Landasan Market of Parang Municipality and Cotabato City Mega Market of Cotabato City on October 7, 2015 by the FTs and 2nd beneficiaries. The crops were then cultivated on about 1,600 m^2 of the practice farm. Each crop was cultivated in some rows for a specific area: string beans for 360 m^2; bitter gourd, bell pepper, and squash for 240 m^2 respectively, tomato for 120 m^2; green chili for 150 m^2; and cabbage for 250 m^2. The 2nd beneficiaries harvested the products from December 2015 to February 2016.

Figure 3.2.1.11: Harvesting tomato

Figure 3.2.1.12: Buyers visiting the practice farm

The results of the production of the first cropping on the practice farm are tabulated in Table 3.2.1.7. The production was poor because of fungus and virus attack[43] after the flowering stage of the crops when the atmosphere became extremely wet. In addition, contrary to the wet conditions, a dry spell/draught condition affected the plants before and during the harvesting season; thus, only tomatoes produced a positive profit as indicated in Table 3.2.1.7.

[43] According to the Upi Agricultural School (UAS), the diseases could have been southern blight, stem blight, and white mold caused by the sclerotium rolfsii as pathogen. Moreover, an insect or virus may have been developed by weeds in the farm.

Table 3.2.1.7 Result of production and sale from the practice farm of the 1st cropping at Boliok

Crop	Sowing / transplanting date	Harvest start date	Scale (m^2)	Harvest (kg or bundle)	Sale (PHP)	Expenditure for production (PHP)			Selling price (PHP)	Profit (PHP)
						seed	fertilizer	chemical		
String beans	2015/10/13	2015/12/2	360	348	3,480	415	1,829	1,199	300	▲ 264
Bitter Gourd	2015/10/13	2015/12/17	240	73	2,082	1,100	1,220	800	110	▲ 1,147
Tomato	2015/11/11	2016/1/9	120	571	11,834	1,250	610	400	580	8,995
Bell pepper	2015/11/17	2016/1/14	240	76	1,896	1,250	1,220	800	60	▲ 1,433
Squash	2015/10/12	2016/1/16	240	138	1,768	965	1,220	800	0	▲ 1,217
Green Chili	2015/11/16	2016/1/9	150	46	640	480	762	500	0	▲ 1,102
Cabbage	2015/10/18	2016/2/3	250	141.5	2,727	710	1,270	833	140	▲ 226

Source: Record of production and sales of the practice farm at Boliok, Sultan Mastura, at the end of March 2016

In fact, provinces in Mindanao were officially declared being affected by the natural calamity caused by El Niño. Maguindanao province was among them[44]. Drought / Dry spell Assessment of Philippines Atmospheric, Geographical and Astronomical Services Administration (PAGASA) reports draught in Maguindanao from January 2016[45] onwards. Moreover, according to the official report of the Provincial Agriculture Office (PAO) of Maguindanao in April 2016, in terms of vegetables, about 20 ha farm land with 152 farmers were affected, and 50 tons of vegetable, equivalent to PHP 400,000, were damaged in the Sultan Mastura Municipality.

As for the prices of products, the prices of each type of vegetable sold in the markets vary: PHP 10 per bundle for string beans; PHP 15-20 per kg for green chili; PHP 4-10 per kg for squash; PHP 27-30 per kg for bitter gourd; PHP 15-30 per kg for tomato; PHP 20-30 per kg for bell pepper; and PHP 18-25 per kg for cabbage. The profit rate of tomato, which exhibited a positive result, was 76%.

Marketing was unique component of this livelihood project compared to other projects, according to the beneficiaries. They understood that marketing is very important to complete the overall farming activity successfully. In this context, matchmaking activity in January 14, 2016 provided an opportunity not only to the producers but also to the buyers to learn more about the production capacity of the producers. The buyers from Cotabato City and Parang municipality and local traders within the Sultan Mastura observed the practice farm. Through this activity, the relationship between farmers and buyers was strengthened, and the 2nd beneficiaries were able to sell their products constantly.

[44] http://www.mb.com.ph/maguindanao-also-put-under-state-of-calamity-due-to-drought/
[45] Drought / Dry Spell outlook, Climate advisory, PAGASA (http://www.pagasa.dost.gov.ph/#climate-advisories)

Results of technology transfer

The 2nd beneficiaries deemed the following specific technologies important and useful for their farming[46]: a) seed bed making for nursery making, b) fertilizer application, c) trellising, and d) harvesting. The farmers confirmed that the mortality rate of plants transplanted using the nursery is low compared to direct sowing. As for fertilizer application, the farmer knew about and had used 21-0-0 (NPK) and urea; however, they confirmed theoretical use of fertilizer with 14-14-0, urea, and potassium after knowing soil fertility through soil sampling. The farmer also recognized that A-shaped trellising helps the growth of tomato, string beans, and bell pepper instead of the only method they knew and practiced before. During harvesting, the beneficiaries understood the appropriate timing for harvesting by checking maturity, such as by observing the bottom part of the bitter gourd, counting the number of growth days after transplanting, and observing the color of fruits vegetables such as tomatoes. Although the technologies introduced during FTF were basic technologies for vegetable production, the farmers appear to not have been previously exposed to the technologies.

Figure 3.2.1.13: One of the 2nd beneficiaries who applied A-shaped trellis to his farm

As the effects of technology transfer became tangibly recognizable, some 2nd beneficiaries began to apply the technologies that they had learned through FTF on their own farms[46] as shown in Figure 3.2.1.13 Examples include a) seed bed making for transplanting nursery, maintain transplanting density, pruning, A-shaped trellising, appropriate fertilizer application, and pest management for tomato, b) appropriate fertilizer application, chemical application, and vermicast application for cauliflower and cabbage cultivation, c) trellising, soaking seeds for 24 hours, nursery making using plastic pots, pruning, appropriate fertilizer application, chemical application, and observation of crop status for bitter gourd, d) growing squash by direct sowing, side dressing by counting number of days after 1st fertilizer application, pruning, and appropriate timing for chemical application. The technologies that were applied on individual farms were found to coincide with some technologies that most 2nd beneficiaries consider useful.

Record keeping for production and sale, which is a key to successful farming for individual farmers, was introduced during FTF. Eleven out of 30 beneficiaries began to keep records[47]. Six examples of record keeping out of the 11 beneficiaries were observed, and the summary of the examples is tabulated in Table 3.2.1.8.

[46] Group interview in the practice farm of Buliok in Sultan Mastura on April 6, 2016
[47] Eleven out of 30 started vegetable production since FTF started as well.

Table 3.2.1.8: Record of individual production and sale of 6 beneficiaries of Buliok during FTF

Beneficiaries	Crop	Date planted	Harvest period	Production (kg)	Average price per kg (PHP)	Sale (PHP)
A	Bitter Gourd	Oct 17, 2015	Dec. 10, 2015–Jan. 29, 2016	443	22.75	11,457
	Squash	Dec. 19, 2015	March 20–29, 2016	1,495	3	4,485
B	Bitter gourd	Dec. 28, 2015	Feb. 19–Mar. 12, 2016	72	26	1,910
C	Bitter gourd	Dec. 29, 2015	Feb. 27–Mar. 15, 2016	31	25	775
D	Squash	Dec. 28, 2015	Mar. 30–Apr. 1, 2016	255	3.25	813
	Tomato	Oct. 15, 2015	Jan. 10–18, 2016	20	20	400
E	Bell pepper	Oct. 15, 2015	Jan. 14–17, 2016	15	32.5	475
	Tomato	Oct. 15, 2015	Jan. 13–16, 2016	35	25	850
F	Tomato	Oct. 17, 2015	Jan. 9–18, 2016	188	24	4,450

Source: Record of production and sale of individual beneficiaries as of March 2106

The fact, that the 2nd beneficiaries adopted some technologies, can be seen positively. Technology transfer using FTF is more understandable and an acceptable extension method by farmers. The 2nd beneficiaries and FTs realized the following advantages of FTF.

- FTs have more experience and knowledge about vegetable production; however, the extension method of the DA provides farmers with only theoretical information.
- FTs use the same language as the beneficiaries. This ease in communication makes technology transfer more efficient and effective.
- Both FTs and 2nd beneficiaries are farmers, which eliminates any hesitation to interact with each other. They feel free to seek clarifications from each other. Open communication in terms of farmer terminology can be maintained which increases comprehensibility for both sides. Both sides learn from the experience, meaning that both teaching and learning can be realized.
- FTs teach technology by illustrating how they work practically following a theoretical explanation in the lecture. The DA's extension activity only involves talking without any practical demonstration.
- Through FTF, the 2nd and 1st beneficiaries create and maintain networks, which will result in boosting agricultural production in Sultan Mastura.

Meanwhile, the following improvement points were also extracted from the group interview with the 2nd beneficiaries and FTs based on their experiences during FTF:

- Although male FTs can teach female beneficiaries during training, some hesitation is experienced due to the Islamic cultural background and male FTs tend to avoid physical contact such as touching female beneficiaries during the demonstration of farm works. Hence, female FTs should be encouraged to teach the practical parts thoroughly to support female participants.
- 2nd beneficiaries should include representatives from all the Sitios of a Barangay. There are four sitios in Buliok; however, the current beneficiaries were selected from two sitios.
- It is better to increase the number of FTs per team from 3 to at least 5 for every topic because 3 is not enough to teach 30 beneficiaries the practical aspects; 1 lecturer and 4 trainers would be

preferable for practical work.

- FTs should be provided certificates ascertaining their credibility by authorities such as the UAS.
- Additional TOT is required to improve teaching skills, or more time is required for a dry run during the TOT.
- Review sessions with technical guidance need to be provided before certain topics.

Other impacts

The 2nd beneficiaries of the Buliok of Sultan Mastura will officially establish a cooperative namely Amadio Vegetable Producers Cooperative after training was provided by the CDA of ARMMin March 2016.

b) Matungao

Quantitative outputs

The 2nd second beneficiaries from Barangay Matampay started cultivating vegetables for the first cycle of production in October and November 2015 as well. They selected five crops: bitter gourd, pechay, string beans, bell pepper, and sweet pepper. The selection of these crops was based on the results of the market survey conducted by the FTs and 2nd beneficiaries on September 21, 2015 prior to conducting FTF activities. The crops were then cultivated for approximately 1,500 m^2 of the practice farm. Each crop was cultivated in a specific plot area: bitter gourd for 502 m^2 and pechay, string beans, bell pepper and sweet pepper for 252 m^2 each. The 2nd beneficiaries started harvesting the products in the months from December 2015 to February 2016.

Figure 3.2.1.14: Planting seedlings

Figure 3.2.1.15: Harvesting pechay

During the growth period of the vegetables, the comparatively cool dry climatic conditions of Matungao, particularly from December 2015 to January 2016, were favorable, and the irrigation water was adequate because of the regular watering activities of the beneficiaries.

However, the 2nd beneficiaries encountered technical difficulty in terms of pest and disease control. Leaf worm, bacterial wilt, and mosaic were some of the observed pests and diseases. Asynchronous spraying of organic insecticides/pesticides in respective plots resulted in transferring the pests and insects to

adjacent plot area. Thus, preventive methods were adopted: simultaneous spraying of OHN as organic insecticides/pesticide to all the crops in the practice farm, frequent application of OHN with increasing hot chili ingredients in it, regular irrigation, planting companion plants such as white scallion and lemon grass, and frequent weeding within the farm. As a result, positive profits were obtained as indicated in Table 3.2.1.9.

Table 3.2.1.9: Production and sales from practice farm of 1st cropping at Matampay

Crop	Sowing/transplanting date	Harvesting period	Scale (m^2)	Harvest (kg or bundle)	Sale (PHP)	Expenditure for production (PHP)				Cost for selling (PHP)	Profit (PHP)
						seed	fertilizer	chemical	others		
Bitter gourd	Oct. 13, 2015	Dec. 22, 2015–Jan. 26, 2016	504	215	7,525	1,755	628	181	400.00	0	4,560
Pechay	Oct. 14, 2015	Nov.19–Dec. 3, 2015	252	285 (b)	8,200	50	514	155	200.00	900	6,380
String beans	Nov. 26, 2015	Jan.18–Feb. 29, 2016	252	296	4,440	90	514	155	200.00	0	3,480
Bell pepper	Oct. 14, 2015	Jan.14–Feb. 17, 2016	252	122	7,910	224	293	113	200.00	0	7,079
Sweet pepper	Oct. 14, 2015	Jan.14–Feb. 17, 2016	252	115	8,850	224	293	113	200.00	0	8,019

Source: Record of production and sales of practice farm at Matampay, Matungao, at the end of March 2016

Marketing was an important component of the program. Some of the 2nd beneficiaries had already contacted the buyers of the vegetables before the commencement of the FTF. In addition, the matchmaking activity involving the farmers and buyers conducted on January 26, 2016 provided a significant and remarkable opportunity to both stakeholders to strengthen their relationship. The buyers observed how the beneficiaries produce the vegetables with much attention to reducing the use of synthetic chemicals. By knowing buyer names and contacts, the farmers were able to create and expand market channels to the Municipalities of Pantao-Ragat, Poona Piagapo, Balo-I, Kauswagan, and Marawi City. The numbers of walk-in buyers / traders increased as well.

The prices of the vegetables varied: PHP 35.00 per kg for bitter gourd, PHP 20 to 30 per bundle for pechay, PHP 15.00 per kg for string beans, PHP 20-80 per kg of bell pepper, and PHP 60 to 90 per kg for sweet pepper. Bell pepper and sweet pepper from the early harvest were sold at a higher price than the late one; the latter was of low quality as it was harvested in its over-maturing stage. The profit rates of the crops were as follows: 61% for bitter gourd, 78% for pechay, 78% for string beans, 89% for bell pepper, and 90% for sweet pepper, as indicated in Table 3.2.1.9.

Results of technology transfer

Some beneficiaries applied crops and technologies that they learned during FTF in their farming, as shown in Figure 3.2.1.16 and Figure 3.2.1.17. As examples, in the former case, a farmer rented land from a land load, while in the latter case, a farmer cultivates in crops in his backyard garden. Although the scale of production scale differs in each case, both duplicated the raised soil bed, enabling them transplant pechay with companion plants, such as lemon grass.

Figure 3.2.1.16: A beneficiary started cultivating pechay on rent-in farmland after FTF

Figure 3.2.1.17: A beneficiary duplicated pechay cultivation in backyard garden

The six beneficiaries kept records, from which the effects of FTF can be observed. Their markets are within the municipalities, neighboring municipalities, or cities: Iligan city, and Balo-I, Linamon, Kauswagan, and Buruun municipalities. Buyers/traders approach the Matungao municipality, and so do not incur transportation costs. Matungao has become well known for its vegetable production, especially pechay, among traders.

Table 3.2.1.10: Record of individual production and sales of six beneficiaries of Matampay during FTF

Beneficiaries	Crop	Date planted	Harvesting period	Production (kg or bundles)	Average price per kg or bundles (PHP)	Sale (PHP)
A	Kangkong	Nov. 20, 2015	Dec. 15, 2015–Jan. 5, 2016	70 (b)	27.50	2,000
B	Tomato	Sep. 25, 2015	Dec. 15, 2015–Jan. 11, 2016	125	27.67	3,371
C	Pechay	Nov. 15, 2015	Dec. 29, 2015–Jan. 5, 2016	370 (b)	18.33	6,650
D	Cucumber	Sep. 29, 2015	Nov. 5– Dec. 17, 2015	2,377	6.00	14,262
	String beans	Oct. 5, 2015	Nov. 9–Dec. 29,2015	463	15.00	6,945
E	Pechay	Oct. 3, 2015	Nov. 29–Dec. 5, 2015	370 (b)	18.33	6,650
F	Pechay	Feb. 8, 2016	Mar. 10–Apr. 20,2016	313 (b)	30.00	9,390

Source: Record of production and sales of individual beneficiaries as of April 2016
Note: (b) denotes bundles.

The 2nd beneficiaries of Matampay understood the importance of most technologies that were introduced during FTF, and some beneficiaries tended to apply them. The extent of application of the technologies appears to be dependent on the land tenure situation among the 30 beneficiaries.

Four of the 14 tenants out of the 23 beneficiaries[48] applied technologies; land preparation, appropriate application of fertilizer, concoction making and application, sowing/transplanting, record keeping, and pechay production, as of April 2016. The others are waiting for the rainy season to finish corn production to start applying technologies. The remaining ten are planning to use the following technologies: land preparation, vermi-composting, concoction making and application, nursery making, and record keeping. Moreover, they prefer producing pechay and string beans that were introduced to them during FTF[49].

Among the beneficiaries, two are landowners. They applied technologies for and engaged in land preparation, sowing/transplanting, appropriate fertilizer application, trellising, concoction making and application, pruning, and record keeping. There are 5 backyard gardeners among the beneficiaries. They are growing pechay, eggplant, and tomatoes using concoction making and application, pruning, and record keeping. Four participants do not have land; therefore, that they cannot yet cultivate the vegetables[49].

The 2nd beneficiaries of Matampay also recognized and confirmed the advantages of the FTF approach for learning farming technology. The advantages of FTF are analyzed and described below based on the feedback from the beneficiaries[49].

- 2nd beneficiaries believe that learning from the FTs of the 1st beneficiaries is useful because the 2nd beneficiaries could actually observe actual vegetable production on the demonstration farm in Puntod.
- The shared language (Visayas) helps them understand each other during practical training.
- FTF practices a two-way learning process because FTs also learn from the good practices of the 2nd beneficiaries during vegetable cultivation by observing the practice farm.
- The combination of lectures and hands-on practice helps the 2nd beneficiaries easily grasp technologies. During the practice session, FTs provide direct instructions about farm works so that some technologies that were not completely understood during the lecture can be thoroughly understood through the practice.
- Tenants among the 2nd beneficiaries, who only relied on income from copra, realized that the vegetable produced under coconuts tress (intercropping with coconuts trees) is an additional income source. Thus, they will have extra income by introducing vegetable under coconut trees.
- 2nd beneficiaries are consolidated through FTF during which they hold meetings on Wednesday to discuss issues and countermeasures. And then, future activities are decided. Such gathering led them to organize and establish a farmers' association.
- The FTF approach provides not only knowledge and skills but also links farmers to markets.
- Uniformity and standardization of vegetable cultivation, particularly organic–conscious farming,

[48] There were 23 participants in the group interview in the practice farm of Matampay of Matungao on April 13, 2016.
[49] Group interview in the practice farm of Matampay of Matungao on April 13, 2016

can be practiced in Matungao so that the Municipality becomes a well-known site to produce vegetables with fewer chemicals because FTs teach the 2nd beneficiaries such organic-conscious technologies.

- FTF establishes a good network among the 2nd beneficiaries and FTs. For example, the FTs can share markets, and the 2nd beneficiaries can ask the FTs if they can sell to the FTs' buyers or vice versa. Moreover, FTs can refer buyers to the 2nd beneficiaries when FTs do not have sufficient supply in order to maintain a stable supply of vegetable for the buyers.
- FTs gained such extensive self-confidence through FTF that they become more active vegetable producers in the farming business.

The following improvement points for FTF were specifically extracted from the FTs[49]:

- More time should be allotted to the FTs during TOT to prepare fully for teaching.
- The same opportunities should be provided to all the FTs to master different topics, and not only specific assigned topics.
- FTs should follow up and monitor on the days following the lecture and hands-on practice to check the performance of the farmers and growth of vegetables.

Other impacts

The 2nd beneficiaries have been engaged in fulfilling the requirements for registering their group as a farmers' association with the DOLE Region X since March 2016. The documents were approved on April 1, 2016. The Matampay Vegetable Growers Association (MVGA) was officially established as indicated in Figure 3.2.1.18. The objective of registering their group is to become a legitimate organization, which is part of their sustainability plan to continue their vegetable production and marketing even after the CD-CAAM Project terminates. The beneficiaries will serve as the voice of the vegetable farmers of Barangay Matampay and unify their efforts in strengthening themselves, upgrading and developing vegetable production in the barangay. It will increase the renown of Matungao Municipality as an organic-conscious vegetable site along with the 1st beneficiaries of barangay Puntod.


REGISTRATION CERTIFICATE NO.IL-RW-16-04-078
KNOW ALL MEN BY THESE PRESENTS:
BY VIRTUE of the provisions of the Labor Code as amended and its implementing rules,
MATAMPAY VEGETABLES GROWERS ASSOCIATION (MVGA)
BENIGNO B. CABARDO

Figure 3.2.1.18: Certificate of the Association

The demonstration farm in Barangay Puntod of the 1st beneficiaries, the practice farms in Barangay Matampay for the 2nd beneficiaries, and the newly established demonstration farm by the MLGU under the management of MAO will be accredited as learning sites of Good Agricultural Practices (GAP) by the ATI of Region X. The official process is ongoing as of March 2016. The 2nd beneficiaries initiated the construction of a comfort room to meet the requirement for a sanitary facility stipulated by the ATI to apply for the GAP certification. The MAO office has committed to provide the toilet facilities.

Figure 3.2.1.19: The practice farm will be the official learning site of GAP accredited by ATI

3) Capacity building of BDA

The staff of BDA RMO CenMin and Ranaw carried out TOT and FTF in the Municipalities of Sultan Mastura and Matungao under the supervision of the CMO in the CD-CAAM extension phase with the support of JICA experts. The RPOO in the agriculture sector and the CO particularly committed to the management of activities related to TOT and FTF. In this section, the increase in the capacity of BDA RMO as a result of the capacity-building process is stated qualitatively with regard to its evaluation at different stages of the planning and implementation of TOT and FTF.

Evaluation workshops were held for RMO CenMin and Ranaw respectively that were attended by the CMO and officials of MLGU[50]. The workshop reviewed the details of the major activities at the planning and implementation stages of TOT and FTF, and recalled issues and countermeasures taken by the BDA or with MLGU to solve managerial problems.

The results of the workshops for planning and implementation of TOT and FTF in Sultan Mastura and Matungao respectively have been tabulated, and the capacity status is described as well hereafter.

a) RMO CenMin

<u>Planning and implementation process</u>

Table 3.2.1.11 indicates the results of the workshop on activities, problems, and actions taken during the planning of TOT.

At the planning stage of TOT, it was realized that there were differences in the degree of understanding on the content and process of TOT among stakeholders; therefore, it was proposed that RPs from the

[50] An evaluation workshop for BDA RMO CenMin was held at CD-CAAM Cotabato Office on April 7, 2016 that was attended by officials of BDA CMO, RPOO and CO of RMO CenMin, MPDC of Sultan Mastura, IC Net Staff, and the JICA expert in agriculture. Another evaluation workshop for BDA RMO Ranaw was held at the CD-CAAM Iligan Office on April 14, 2016 with participation of officials of BDA CMO, RPOO and CO of RMO Ranaw, MAO of Matungao, IC Net Staff, and JICA expert in agriculture.

UAS[51] and the RPOO of CenMin participate in TOT under the instruction of ATI in Matungao to maintain an equal quality level across TOT. Thus, a flexible model of learning from each other was created and accepted for the successful implementation of TOT.

The issue of honorarium for the FTs to mobilize them was raised during the planning of TOT. Without it, FTs would not actively take part in the program; thus, the JICA expert proposed that the FTs be paid an honorarium to the CD-CAAM. Finally, the CD-CAAM approved this proposal. However, the issue will not be completely solved unless funding agencies agree for the further expansion of vegetable production as community development in future. Otherwise, FTF should be institutionalized in the agricultural extension of MLGU for sustainable implementation.

During the planning of TOT, the availability of RPs clashed with the FTF schedule. Through mutual consent, BDA and RPs restructured the schedule agreeably in order to be able to conduct the activities of FTF. Thus, BDA appears to possess already the skills required to create schedules by consulting related stakeholders.

Table 3.2.1.11: Activities, issues, and actions taken during the planning of TOT

Major Activities	Details	Issues	Actions
1st stakeholders Meeting	• LGU, BDA, UAS, ATI, and the beneficiaries participated. • Scheduling for Plan of Operation • Discussion TOT and FTF and indirect support to Tawi-Tawi	Climate change not addressed and included in the planning.	
Explanation on FTF extension internal and external (office)	• JICA Expert explained the purpose of TOT and the FTF approach. • Discussed contents of TOT.	Differences in the capacity of TOT (RPs) Methods	Allow RPOO and RPs to participate in TOT at Matungao
Meeting/Workshop on TOT	• UAS, ATI, LGU, BDA, and JICA expert participated. • Discussion on contents of TOT, presentation materials, and evaluation method using ballot box making	• Difference in the experience of TOT by RPs • Honorarium for FTs	• Allow RPOO and RPs to participate in TOT practice at Matungao • Make proposals to funding agencies
2nd stakeholders meeting and planning on TOT	• All stakeholders for both municipalities participated. • Planning and presentation of schedule for TOT	Availability of RPs	Consultation and discussion with RPs to reach an agreement about the schedule
Observation of TOT in Matungao	RPOO CenMin and RP (UAS) learned about TOT at Matungao and understood TOT's activities		

Source: Evaluation workshop held at CD-CAAM Cotabato Office on April 7, 2016

Table 3.2.1.12 indicates the results of the workshop on activities, issues, and actions taken during

[51] UAS had no experiences on TOT while ATI had rich experiences on it.

implementation of TOT.

Flexible countermeasures involving the mutual effort of BDA and RP were observed during the implementation of TOT to foster FTs effectively, although it was a very new trial for them because of the differences among 1st beneficiaries who FT candidates in terms of literacy levels, understanding and mastery over topics of vegetable production technologies, and teaching skills. Examples of how these limitations were overcome are available.

BDA and RP translated verbally the contents of the Manual into Maguindanao dialect during a review of the Manual and evaluation activity using the ballot box method. The teaching team was structured to include a lecturer who knew a topic thoroughly and two demonstrators in order to make the training effective. In addition, all the 1st beneficiaries are allotted teaching teams as FTs in order to provide them opportunities to teach by one topic by one team arrangement. Thus, BDA RMO was equipped with field-oriented (site-oriented) solution ability.

Table 3.2.1.12: Activities, issues, and actions taken during the implementation of TOT

Major Activities	Details	Issues	Actions
Information Dissemination to 1st beneficiaries	Conducted meeting on the process of TOT and FTF	One beneficiary withdraw from the group due to transfer of residency	Replaced by a female beneficiary
VET for 1st beneficiaries by BDA	VET and leadership training by BDA for 3 days		
Reviewing the Manual	Reading the Manual and additional explanation provided by RP	Different literacy levels of the beneficiaries	Translation to local dialect
Lectures on presentation and facilitation skills	RP provided lectures on presentation and facilitation skills, and visual aid making	Presentation materials are provided in English	RPs translated into local dialect
Micro teaching and ballot box for evaluation	Determined the level of knowledge	• Difficulty in preparing visual aids • Difficulty in reading comprehension during the ballot box exercise	• Sharing of observation and critiquing for improvement • RP and RPOO translated questions into local dialect
Organized training team	Pairing strategies	Different capacity level	• Strategizing a team by combining a lecturer and 2 demonstrators • Provided teaching opportunities to all the 1st beneficiaries
Dry run	Determined the level of teaching capacity	Mastery of topics	• Assigned one topic one team

Source: Evaluation workshop held at CD-CAAM Cotabato Office on April 7, 2016

Table 3.2.1.13 and Table 3.2.1.14 show the results of the workshop on activities, issues, and actions taken during planning and implementation of FTF respectively.

During the planning of FTF, the number of issues was less. The 2nd beneficiaries identified several vegetable crops to cultivate on the practice farm after the market survey; thus, the purpose of the survey may not have been effectively conveyed to the beneficiaries. The number of crops to produce was narrowed down according to the advice of the JICA expert who also indicated that other crops could be planted in a small plot for experimental purposes. The training hours were different from the actual farming hours as was observed even during the pilot phase. This was left to the discretion of the farmers, as this is a common issue when training farmers.

During the implementation of FTF, some 2nd beneficiaries could not participate in the training for certain topics because of farm works on individual farms such as paddy harvesting. BDA advised the members of the 2nd beneficiaries to communicate what they learned to those who were absent.

Matchmaking was the first trial in the extension phase to strengthen the linkage between the farmers and buyers. Ten buyers were tapped during planning; however, six buyers visited and interacted with the 2nd beneficiaries because four buyers were afraid of visiting the sites. This issue remains unsolved. Therefore, BDA as the development organization of Bangsamoro needs to strategize advocacy to mitigate the negative image of such areas when implementing market linkage activities.

Table 3.2.1.13: Activities, issues, and actions taken during the planning of FTF

Major Activities	Details	Issues	Actions
1st and 2nd beneficiaries interact	Team building		
Market survey of 1st and 2nd beneficiaries	Selection of crops to plant	Beneficiaries identified several crops that they wanted to plant	Narrowed down number of crops for production with experimental purposes as advised by the JICA expert
Farmer Trainers' Planning	Planning for next steps, practice farm design and activities that need improvement	How to manage time given the time required for their own farm activities	Time management
Planning and Scheduling of VTT	Preparation for training materials, facilitators, participants, and venue		
Planning and scheduling of each topic	Meeting for scheduling and preparation		
Planning and scheduling of matchmaking	• Preparatory meeting • Communication with possible buyers		

Source: Evaluation workshop held at CD-CAAM Cotabato Office on April 7, 2016

Table 3.2.1.14: Activities, issues, and actions taken during the implementation of FTF

Major Activities	Details	Issues	Actions
Information dissemination to 2nd beneficiaries	Conduct meeting with 2nd beneficiaries		
VTT for the 2nd beneficiaries	Mind-setting and attitudinal change		
Series of training sessions on practice farm based on the Manual	• Knowledge and technology transfer from FTs to 2nd beneficiaries • Technical monitoring by FTs	Some did not participate because of conflict with the schedule of rice harvesting	Some members re-echoed the lectures to those who were absent during the lecture
Matchmaking	• Exposures to demonstration and practice farms • Exchange of information	• 6 buyers out of 10 who were tapped attended • Invited buyers were afraid to go to the area	Exchange of contact information
Cooperative training	• Orientation to the Cooperative • Trainings on cooperative development and financial management	• Some members did not join the cooperative • 20 out of 30 registered as members while those who did not join will observe the progress of cooperative • Barangay captain wished to join the cooperative but was not accepted because CDA official explained that barangay officials are not allowed to join the cooperative	

Source: Evaluation workshop held at CD-CAAM Cotabato Office on April 7, 2016

Other impacts of capacity building

Figure 3.2.1.20: BDA Initiatives in sharing technologies from CD-CAAM through radio broadcasting

The BDA Radio program is aired every Monday from 11:00 am to 12:00 noon and is hosted by the RPOO of CenMin in charge of Agriculture as indicated in Figure 3.2.1.20. The program can be heard on Voice FM 99.00. The program includes topics on vegetable production and a question-and-answer segment with SMS senders and callers. Through the radio broadcasting, the RPOO has shared the technology based on the Basic Manual for Vegetable Production and Marketing produced by the CD-CAAM. This program reaches listeners from Central Mindanao, North Cotabato, and other areas that fall within the frequency range. The program started in February 2016. The RPOO discussed soil sampling, land preparation, fertilizer application, nursery making, transplanting/direct sowing, trellising, and so on. On April 11, 2016, the RPOO finished the discussion on vermi-composting. Because of the insistent demand from listeners and the unanswered questions, the RPOO was called by the station again on April 14, 2016 to answer the listeners' inquiries. The RPOO then promoted the demonstration and practice farms in Sultan Mastura through the radio program and encouraged listeners to visit the farms

to learn more from the beneficiaries of CD-CAAM.

b) RMO Ranaw

Planning and implementation process

Table 3.2.1.15 indicates the results of the workshop on activities, issues, and actions taken during the planning of TOT.

During the planning of TOT, particularly in stakeholder meetings, incentive mobilization for FTs was raised from the farmers' side. The issue of the honorarium was taken to CD-CAAM. This issue will always emerge whenever the FTF approach is adopted; therefore, the approach should be institutionalized in the agricultural extension of MLGU in future.

MLGU and BDA agreed to communicate through documents for the implementation of FTF activities although verbal or text message communication will often be used for communication on the fields. Effective communication was established between the officials of the Municipality of Matungao and BDA RMO Ranaw. This is because the officials keep community development in their mind and the BDA understands MLGU as a development partner.

As stated previously, there were differences in the extent of understanding about the contents and process of TOT among stakeholders when discussing TOT. As the RP of ATI has experience in it, it was proposed that the RPs of UAS and BDA CenMin participate in the TOT activities conducted in Matungao. The stakeholders agreed with it because they seemed unified in their determination to ensure the successful implementation of TOT.

VET targeting the FT candidates[52] conducted by BDA was criticized by the participants who felt it was not in alignment with their religious beliefs. Lecturers from Matungao using Visaya dialect explained to the candidates in a comprehensive manner. It is advised that BDA be equipped with an advocative approach or method to explain the training effectively to non-Muslim beneficiaries before conducting it.

During the scheduling of TOT, BDA is responsible for accounting for RPs' participation in the schedule because RPs are the most important stakeholders for successful conducting TOT. Thus, BDA engaged in a continuous discussion and modification of the schedule to achieve consensus.

[52] The 1st beneficiaries were also provided value transformation training (VTT) by the BDA in the previous phase of CD-CAAM.

Table 3.2.1.15: Activities, issues, and actions taken during planning of TOT

Major Activities	Details	Issues	Actions
1st Stakeholders' Meeting	• BDA, MLGU, RPs, beneficiaries, and JICA expert participated • Orientation on TOT and FTF • Discussed and identified stakeholders' roles and function • Discussed issues during pilot phase and countermeasures to avoid same problems in extension phase	• 1st beneficiaries asked about incentives/mobilization during FTF • Selecting few 1st beneficiaries to be FTs. • MLGU requested that advance written communication be provided	• Japanese expert communicated the management of CD-CAAM • Stakeholders agreed to provide equal opportunity for all the 1st beneficiaries to teach • BDA and MLGU agreed to send written communication to MLGU a week before the commencement of the activity
Discussion with stakeholders and Japanese expert	• The Japanese expert explained the concept and process of TOT and FTF • Discussed and finalized the content of TOT and topics • Discussed presentation materials	Different capacities among RPs (ATI and UAS) for TOT	BDA RMO CenMin and RPs of UAS participated in TOT at Matungao to maintain the same quality of TOT
Values Enhancement Training for 1st beneficiaries	• Invited Islamic scholars to explain Islamic values and discussed their knowledge of faith and Islamic doctrines • Explained practices and common values of Islam and Christianity using the framework of the 5 pillars and roles of development	Arguments about some religious beliefs	Lecturers explained the comprehensive, fundamental law of Islam and its doctrines
2nd Joint Stakeholders meeting	• Updating the results of previous activities • Discussed and drafted a plan of operation • Finalized the design of TOT • Preparation for upcoming TOT for Matungao	Availability of RP to participate in TOT	Discussed and modified timing/schedule to conduct TOT

Source: Evaluation workshop held at CD-CAAM Iligan Office on April 14, 2016

Table 3.2.1.16 indicates the results of the workshop on activities, issues, and actions taken during implementation of TOT.

RP and BDA faced some difficulties during TOT although they managed to achieve the purpose of implementation. As a result, teaching teams were finally formed.

The Filipino version of the Manual was not used. Instead, the RP provided lectures by reviewing the English version of the Manual by using the Visayan dialect. Some participants did not attend the practical examination and evaluation because they had never taken an "examination" in their lives. The quality of visual aid presentation materials was poor with small-sized fonts, crowded words, and few figures. The beneficiaries were advised to modify them.

During team building, the beneficiaries wanted to choose members according to their preference. At the time, the RP and BDA had already analyzed the results of the examination to identify the strengths and

weaknesses of particular participants on specific topics. Based on this understanding of the strengths and weaknesses of the beneficiaries, the RP and BDA explained and proposed better combinations of team member for the topics for a more effective implementation of FTF; the beneficiaries followed the instructions.

Table 3.2.1.16: Activities, issues, and actions taken during implementation of TOT

Major Activities	Details	Issues	Actions
Teaching method	• BDA explained the importance of 1st beneficiaries in TOT for the sustainability of the project • Discussion on TOT methodology • RP trained beneficiaries for FT responsibilities • RP presented teaching methods; presentation skills, facilitation, and visual aid making	• Shortage of time to explain the teaching method • 1st beneficiaries wanted to learn the best possible strategies/method for the lecture	• RP suggested imparting the best method applicable for the field coupled with hands-on practice • Proposed to organize extra activities, workshop, or dry run for presentation skills.
Reviewing the Manual	RP discussed and reviewed the content of the Manual and explained some important points	• RP did not use the Filipino version of the Vegetable Production Manual • The Filipino version of the Manual was confusing	RP used the English version of the Manual and explained in the Visayan dialect
Examination and evaluation	Ballot box and micro teaching (knowledge, skills, confidence and competitivenes) were conducted	Some did not attend the "practical examination" and evaluation because they were afraid of them; they were experiencing examinations for the first time e in their lives	
Team building	• FTs were grouped into 4 teams based on the result of evaluation • Grouping was based on the strengths and weaknesses of members found from the results • Scheduling of FTF • Assigning topics to teaching groups • Preparation of Farmers Field Guide	Beneficiaries wanted to choose members based on their preferences to build teams	RP emphasized the importance and purpose of grouping based on the result of the evaluation
Preparation of visual aid	• CD-CAAM provided FTs materials for creating visual aids • FTs prepared visual aids for the assigned topics		
1st Dry run	• Discussion topics were assigned for creating visual aids • Critiqued the prepared visual aid	• Poor quality of visual aid • Font sizes were too small to read • Heavy wording	FTs were advised to modify visual aid with the support of CD-CAAM
2nd Dry run	RP emphasized that a good FT should master all topics	Clarification and confirmation of questions and practices were raised by FTs	Discussion and explanation by RP

Source: Evaluation workshop held at the CD-CAAM Iligan Office on April 14, 2016

Table 3.2.1.17 indicates the results of the workshop on activities, issues, and actions taken during FTF planning.

Regarding the planning of FTF, BDA RMO Ranaw faced issues and solved them; these solutions can be considered as lessons for the future.

The 2nd beneficiaries used to receive allowances when they participated in other development programs. BDA RMO Ranaw explained tenaciously to them that FTF under CD-CAAM is a thorough capacity building process for the beneficiaries that provides opportunities for income generation from vegetable farming.

Regarding VTT targeting the 2nd beneficiaries as preparation to participate in community development implemented by BDA, the same situation occurred as the VET targeting FTs during planning of TOT. Most of the 2nd beneficiaries expressed panic and anxiety that they were being forced to abandon their religious beliefs. BDA and lecturer then explained and emphasized that the training incorporated Muslim practices for development and was not attempting to convert the religion of the participants.

The 2nd beneficiaries experienced difficulties when they questioned retailers during the market survey for discussing and deciding on vegetable crops to cultivate on the practice farm during FTF. They faced negative attitudes from some retailers who did not like to be interviewed or declined to answer questions on price information. They felt that the surveyors were negatively affecting their vending business. The BDA is clear on its approach to the market before farming; therefore, it could explain purpose of the survey to the vendors. In addition, some vegetables were bought to placate the vendors.

Table 3.2.1.17: Activities, issues, and actions taken during FTF planning

Major Activities	Details	Issues	Actions
Barangay-wide orientation and selection of beneficiaries	• Introduce CD-CAAM extension Phase to the community • Initial identification of potential beneficiaries and selection	2nd Beneficiaries expected rice allowance for participation	Explained project's purpose thoroughly for capacity building.
Confirmation of 2nd beneficiaries	• 30 beneficiaries were selected • Selected beneficiaries pledge to undertake activities • Emphasized the roles and responsibilities of beneficiaries		
Values Transformation Training for1st beneficiaries	Presented the role of faith development emphasizing on BDA's core values	Most participants panicked thinking that they will be forced to convert their religion	Lecturer and BDA explained that VTT incorporated Islamic practices in development
3rd Joint Stakeholders Meeting (Cotabato)	Reported results of TOT and planning of FTF.	Absence of RP due to hectic schedule.	
Market Survey of 1st and 2nd beneficiaries	• 5 1st beneficiaries and 5 2nd beneficiaries participated • Data and information from markets within and nearby municipality were gathered • Learned the prices of vegetables	• Some vendors did not provide accurate information about the prices • Some vendors declined to be interviewed as it was time consuming	BDA explained the purpose of the market survey to the vendors

Major Activities	Details	Issues	Actions
Interaction and planning session of 1st and 2nd beneficiaries	• Sharing market survey results with other 2nd beneficiaries • Identified crops to plant • Discussed the size of the practice farm • Grouping the beneficiaries into 3 categories	• 2nd beneficiaries could not finalize the size of the practice farm • Some members wanted to grow other crops apart from the selected one	• 1st beneficiaries suggested that the 2nd beneficiaries use 1500 m^2 from MLGU • The group members decided to grow 2 crops
Baseline survey of 2nd beneficiaries	• Baseline survey questions were presented and explained. • Distributed baseline forms while other 2nd beneficiaries answered the forms. • Facilitated by BDA. • Interviewed the beneficiaries to understand their present situation • Questions were simplified using Visayan translation		

Source: Evaluation workshop held at CD-CAAM Iligan Office on April 14, 2016

During FTF implementation, three major problems occurred: FTs could not answer some questions asked by the 2nd beneficiaries, the time for hands-on practice was inadequate for certain topics, and the submission of the document of the activity plan was delayed at times.

The RPOO, who has a background of agriculture with farming experience[53], and MAO office staff followed up on the technical aspects and supplemented the FTF's activities in order for the 2nd beneficiaries to completely understand and acquire the vegetable cultivation technology.

More time began to be gradually allocated for a scheduled hands-on session for a specific training to fulfill the time required to transfer technology effectively from FTs to the 2nd beneficiaries. This countermeasure was also recommended by the BDA based on a field-oriented decision after observing the situation on the site.

Apart from technology transfer activities, documentation and submission of the activity plan with budget estimation was delayed at times, although the formulation and submission of the plan to the JICA Expert a week before the implementation of an activity was required. As the experiences of the BDA began to increase through guidance and support from the JICA expert of CD-CAAM, it gradually managed to meet the deadlines for the documents.

Matchmaking revealed to the BDA, MLGU, and the 2nd beneficiaries the reality of the outside buyers' negative attitude and image of the area because some buyers who were tapped to participate in the

[53] From 1981 to 1985, the RPOO worked as an Agricultural Technician (AT) of the Municipal Agriculture Office (MAO) in Marawi City of Lanao del Sur Province.

matchmaking at the practice farm in Matungao refused to do so. In fact, the marketing personnel of the Gaisano mall of Iligan city refused to participate because the headquarters of Gaisano instructed its staff members not to take part in the activity despite an official letter from CD-CAAM. Peace and order are the most important factors to implement effective and efficient community development; therefore, in the future, such matchmaking activities involving should be conducted after addressing the security of the area.

Table 3.2.1.18: Activities, issues, and actions taken during implementation of FTF

Major Activities	Details	Issues	Actions
Training on vegetable production on 13 topics based on the Manual	• Consultation with FTs on the materials needed for the topics during training • Formulation of an activity plan a week before the activity • Activity and budget plan reviewed by RC • Submission of activity and budget plan to JICA expert for confirmation • RC endorses plans to CMO who will submit plans to CD-CAAM for funding • RPOO informs CO that the activity has been approved, and CO informs MAO, FTs, and 2nd beneficiaries through verbal or cellular phone communication • FTs prepare for the training program and conduct training every Wednesdays • The 2nd beneficiaries evaluate the FTs after every FTF • Evaluation questions are provided to 2nd beneficiaries by BDA • Monitoring technologies on practice farm • Monthly updates and progress sharing with MLGU	• FTs were unable to answer questions by 2nd beneficiaries at times • Time shortage for hands-on practice with FTs • Late submission of the activity plan	• RPOO and MAO Office representative observe FTF training and provide technical assistance when necessary • Managing time during training to maximize time for hands-on practice • Ensure advance preparation and submission of the activity and budget plan for approval
Matchmaking	• Introduction of 2nd beneficiaries to the buyers to establish market linkage • Farmers and buyers exchanged contact numbers • Mutual understanding between farmers and buyers about prices	Some buyers such as Gaisano mall declined to visit Matungao to attend matchmaking due to security risks	E-Commerce is proposed by MAO through support of ATI
Establishment of farmers association	• Assistance provided by the FTs to 2nd beneficiaries to form legitimate farmers' association		

Source: Evaluation workshop held at CD-CAAM Iligan Office on April 14, 2016

Other impacts of capacity building

Through the initiative of BDA RMO Ranaw led by the RPOO in charge of the agriculture sector, the technology transfer of vegetable production was extended to other beneficiaries apart from the activities

of CD-CAAM. In October 2015, the RPOO was invited to provide a lecture on vegetable production technologies on a daily program of a Local ICOM Radio, Frequency 363 within the Province of Lanao del Sur. The RPOO was invited every Saturday on the program called "Kakhawiyagan" (meaning livelihood) wherein listeners could interrupt and seek clarifications or ask questions, and the RPOO would answer these. He provided the explanation of the technologies based on the Manual of CD-CAAM.

4) Challenges and recommendations on further promotion/expansion

Through the review workshops[54], group interview with FTs and the 2nd beneficiaries[55], and reviewing of activity reports submitted by BDA during the extension phase of CD-CAAM that started in May 2015, challenges and recommendations on future promotion/expansion, particularly vegetable production and marketing activities, as community development model of CD-CAAM are extracted. They are hereafter reported for the Municipalities of Sultan Mastura and Matungao, respectively.

a) Sultan Mastura

<u>Institutionalization of Farmer-to-Farmer (FTF) approach extension in MLGU</u>

FTF was effectively implemented and both 2nd beneficiaries and FTs recognized the advantages of the approach as an agriculture extension method. Therefore, the extension method can be institutionalized using the budget plan of MLGU's Comprehensive Development Plan – Executive Legislative Agenda (CDP-ELA) to mobilize FTs who are already present in the Municipality. Meanwhile, TOT and FTF need to be standardized by drafting an operation handbook between BDA and MLGU. The handbook and the Basic Manual for Vegetable Production and Marketing can be used as tools for FTF extension. Refresher training will be provided to existing FTs. Moreover, the fostered 2nd beneficiaries can be trained to become 2nd additional FTs so that wide areas can be covered by them within the Municipality. In this case, female FTs should be effectively fostered by considering the gender balance. This FTF can be smoothly implemented under the strong partnership between MLGU and BDA to mobilize farmers.

<u>Stabilizing and securing market linkage activity</u>

Matchmaking should be conducted to further strengthen or establish linkage to new market destinations for community development related to agriculture. Such marketing should be conducted in places that all the stakeholders can access without feeling a security risk. Hence, matchmaking will become a municipal-wide activity.

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[54] The review workshop for BDA RMO CenMin was held at the CD-CAAM Cotabato Office on April 7, 2016 with the following participants: officials of BDA CMO, RPOO; CO of RMO CenMin; MPDC of Sultan Mastura; IC Net personnel; and a JICA expert in agriculture. Another review workshop for BDA RMO Ranaw was held at the CD-CAAM Iligan Office on April 14, 2016 with the following participants: officials of BDA CMO, RPOO; CO of RMO Ranaw; MAO of Matungao; IC Net personnel; and the JICA expert in agriculture.

[55] The group interviews in the practice farms of Buliok in Sultan Mastura and of Matampay in Matungao were held on April 6 and 13, 2016, respectively.

Inclusion of beneficiaries of all sitios in a Barangay during FTF

Through the selection of beneficiaries, an opportunity to participate in the FTF was unknowingly provided to certain farmers in some sitios. Representatives of all sitios in a Barangay should be included as beneficiaries to avoid the natural human feeling of jealousy in terms of a barangay-to-barangay extension within a Municipality.

Addressing natural calamities at the planning stage

Some vegetables were damaged by natural calamities such as a dry spell/draught caused by the El Niño in 2015/16. Although it is very difficult for farmers to take countermeasure actions, the calamity should have been addressed at the planning stage in order to provide education on environmental/climate change to farmers apart from technical training. Advocacy is required for awareness about climate change.

Sensitization of CD-CAAM model to other development partners

BDA RMO extends vegetable production technology implemented in the CD-CAAM through its own tools such as training and radio broadcasting programs. BDA provides regular programs for capability building and maintains close communication with the Provincial Development Catalysts (PDC) who link with the development catalysts on the ground level and can inform the needs of community development to BDA. It should utilize this mechanism for expanding community development. To increase the effectiveness of this activity for wider areas, it needs to organize a conference to disseminate the CD-CAAM model by inviting development partners.

Inclusion of high value cash crops with vegetables and food processing

Vegetable production technology and its dissemination skills for community development were well established through CD-CAAM activities and acquired by the BDA, MLGU, and resource organizations. The technology and dissemination skills certainly contribute to capacitate subsistence farmers for their income generation in the CAAM areas. Besides, since the technology dissemination mechanism of BDA is set up in collaboration with MLGU and resource organizations, the technology level to be disseminated can be upgraded by adding a value to target vegetables or diversifying income resources by adding cash crops to intercrop the vegetables. To achieve this, research and development activities related to vegetable processing and intercropping of vegetable with cash crops by experts are recommended.

b) Matungao

Institutionalization of TOT and FTF in the agricultural extension of MLGU

As stated above, TOT and FTF need to be institutionalized in the agricultural extension activities of MLGU. Once the demonstration farms of Puntod and MLGU and the practice farm of Matampay are accredited as learning sties by ATI, the farms can be utilized more efficiently and effectively through FTF. The FTF's extension plan can be also included in the Barangay development plan or Municipality

development plan such as CDP-ELA to suit budget. In this case, existing FTs should be made more efficient by imparting teaching skills and visual-aid creation training and by exposing them to other good examples of vegetable farming. The 2nd beneficiaries should be fostered as new FTs through TOT by cooperation among MLGU, BDA, and ATI. A handbook of TOT and FTF should be drafted for them to maintain this approach. It can be used along with the Basic Manual for Vegetable Production and Marketing.

Securing market linkage by addressing security concerns

Market linkage activities such as market surveys and matchmaking are the key for successful community development in the model of CD-CAAM. While matchmaking, some buyers refused to visit the production sites of the Municipality. Therefore, MLGU and BDA need to address security concerns to ensure that buyers are linked with producers. Matchmaking can also be conducted in cities such as Iligan to secure buyers and widen market linkage for all vegetable growers in the Municipality.

Activating advocacy of CD-CAAM Model

BDA RMO Ranaw is already equipped with the ability to implement vegetable production and marketing activities as part of community development by collaborating with MLGU and resource organization (ATI). Therefore, to expand further the development within the municipality or outside the Municipality, capacity and tools for the advocacy of the CD-CAAM model are required. Pamphlets that can be used on different occasions to explain the CD-CAAM approach to development partners, and media programs such as radio broadcasting will help in disseminating the approach.

Planning farming schedule by accounting for natural calamities to mitigate damage

The current climate change and El Niño effect are intensely affecting farming in the Philippines. Although extremely difficult to predict, rainfall and temperature condition patterns should be researched for implementers to refer to the information when planning the schedule for farming training to mitigate damage from dry spells and heavy rains. Farmers can also be engaged with educational activities for increasing awareness about climate change.

(2) Fisheries

1) Results of FTF extension

The FTF extension provided the opportunity for the 1st beneficiaries to teach and transfer their learned knowledge and experiences to the 2nd beneficiaries. 30 new beneficiaries (2nd beneficiaries) were selected and capacitated through the FTF extension within their respective municipalities. Tilapia culture has been operated by 2nd beneficiaries both in cage and pond in this extension phase as 1st beneficiaries practiced fish farming in the pilot project phase. However, cage culture was not able to be practiced in Matungao because fish farming is not allowed in man-made lake. Matungao is a hilly place where there is no reliable water source such as river and spring. Therefore, 2nd beneficiaries in Matungao conducted only pond culture in 2 sites/barangays located in a deep valley where there is a reliable water source for

fish farming. Figure 3.2.1.21 shows the overall implementation mechanism of TOT and FTF.

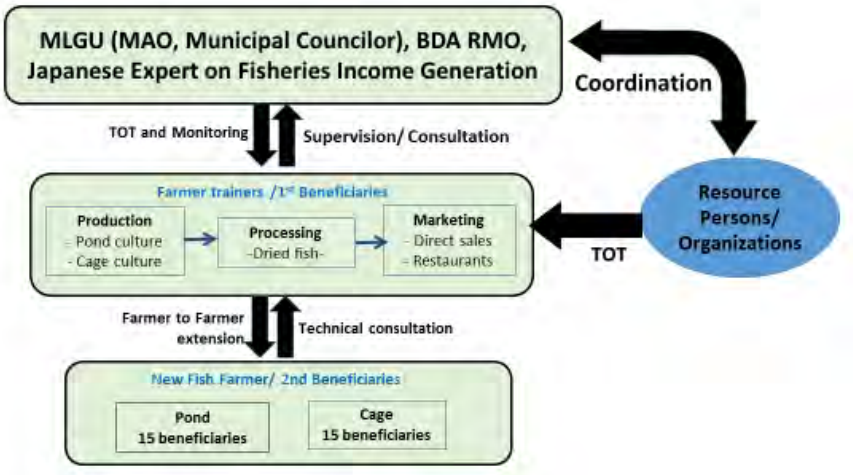


Figure 3.2.1.21: Implementation mechanism of TOT and FTF

Figure 3.2.1.21 shows that the overall implementation mechanism was comprised of two levels; at the top it was composed of the MLGU representative, and the BDA RMO who managed the technical activities with technical supports from a JICA expert in fisheries. They also coordinated with resource persons/organizations (referred as RPs) specifically in the implementation of the project. The role of RPs was to provide lectures and technical guidance during the project. The FTs were tasked with teaching the 2nd beneficiaries primary farm work related to tilapia production during the FTF extension with the support of the BDA to ensure that the knowledge and experiences acquired by the 1st beneficiaries were imparted properly by the 2nd beneficiaries. The FTs consulted the BDA and JICA experts when they faced managerial or operational problems during the FTF extension. The detailed roles of the stakeholders are described in Table 3.2.1.19.

Table 3.2.1.19: Roles and responsibilities of the stakeholders

Stakeholders	Roles/ Responsibilities
BDA RMO	1) Prepare activity plans in consultation with the other stakeholders and FTs. 2) Prepare reports after every field activity such as the main output, lessons learned, issues and concerns, solutions to the problems if there were any, and most importantly production data. 3) Monitor the progress of the tilapia culture regularly, report observations pertaining to water quality, and social issues to maintain good relations among the FTs and the learners. 4) Facilitate the visits of partners and guests and continue to provide project briefings if necessary. 5) Assist beneficiaries in market linkages, as well as collaborate with related government and non-government agencies for further assistance.
LGU (MAO, Councilor, Committee Chair of Fisheries and Agriculture)	1) Coordinate with LGU officials and the BDA for FTF and other field activities 2) Assist the beneficiaries in linking with other agencies (BFAR) for technical and funding assistance.

Resource Persons	1) Provide technical support to the FTs to make sure that tilapia production, processing and marketing are carried out efficiently upon the request of the BDA.
Farmer trainers	1) Plan extension activities together with the BDA, LGU, and RPs 2) Teach tilapia faming technologies using the Basic Manual on Tilapia Production, Processing and Marketing as a reference to other farmers under the supervision of the BDA and RPs. 3) Provide on-site technical guidance to other farmers in and out of the project sites under the supervision of the BDA and RPs. 4) Participate in the activities of the other farmers to establish more cohesive relationships among themselves.

A coordination meeting was held to discuss the major activities, present the progress and accomplishments, and confirm the schedule of the upcoming activities.

Figure 3.2.1.22 illustrates activity flows including TOT and FTF extension activities. Similar to the agriculture project, TOT was organized prior to the actual implementation of FTF extension activities. The TOT aims to a) train the 1st beneficiaries of CD-CAAM to be Farmer Trainers (FTs) who could then go on to teach tilapia production and processing technologies to the 2nd beneficiaries in other barangays in Sultan Mastura and Matungao, processing and marketing; and b) build up teams of FTs.

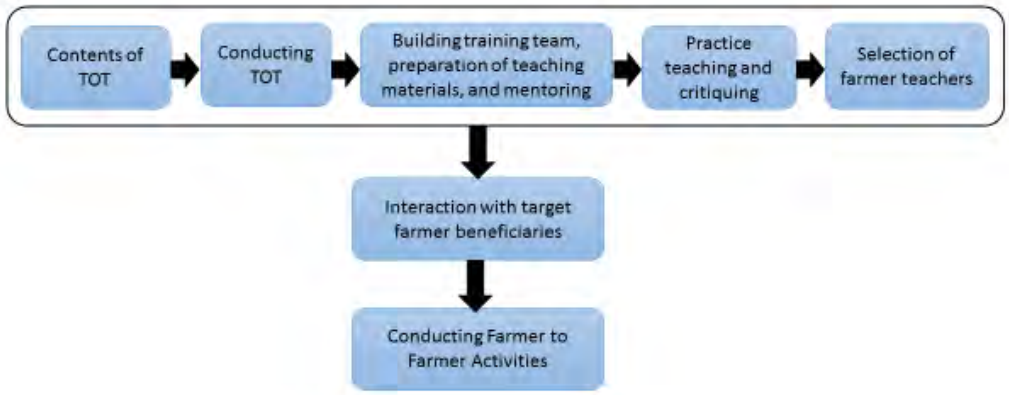


Figure 3.2.1.22: Flow of TOT to FTF

FTs received the TOTs which were carried out by the technical partners from the MSU-Maguindanao and the MSU-Naawan. TOT was mainly supervised by the respective BDA and or RMO as part of their capacity development and through cooperation with the MLGUs. The TOTs included subject such as; i) the contents of the TOT, ii) conducting TOT, iii) building training teams, the preparation of teaching materials, and mentoring; iii) the practice of teaching and critiquing; iv) the selection of farmer teachers, v) the planning FTF activities. Table 3.2.1.20 shows the training content and schedule of the ToT and the FTF extension for the fishery sector.

Table 3.2.1.20: The TOT and the FTF extension activities and the schedule of the fishery sector

Topic	No. of days	Contents	Materials	Facilitator
A) Training of Trainers (TOT)				
1. Preliminaries	1	Registration, opening prayer, messages, presentation of participants, and reading of the house rules	Prepared attendance sheet, hand-outs	BDA
2. Training of Trainers (Introduction)		Discuss the following: (1) concept and meaning of tot; (2) objectives; and (3) expected benefits	Hand-outs	RP
3. The trainer and his/her role		Explain the many roles of a trainer, and add the core values of the BDA (transparency, trustworthiness, and inclusiveness)	Hand-outs	BDA
4. TOT Teaching methods		Discuss teaching methods "adult learners-facilitation" which include the following: (1) learning through seeing, doing, and thinking; (2) guidelines for appropriate teaching aids; and (3) facilitation skills	Hand-outs	RP
5.Review lecture for tilapia production technology	0.5	Explain technicalities about pond/cage construction, grow-out operations and the importance of sampling and feed management	Basic manual on tilapia production, processing, and marketing	RP, BDA
6. Record keeping		Explain the record keeping sample from the pilot phase (Material costs, feed costs, fingerlings costs, and other expenses)	Record template	RP
7. Practicum	0.5	Practice on (1) sex identification for breeding and mono-sex culture, (2) Water and feed management, and record keeping	Live tilapia, water measuring apparatus, pelletized feed	RP, BDA
8. Topic selection by the FTs	1	Farmer trainers select their own topics of interest	Basic manual on tilapia production, processing, and marketing, notebooks, pens	BDA, FTs
9. Mentoring/ Peer Teaching		Farmer teacher mentoring, preparation of teaching aids	Manila paper, pentel pens, crayons, rulers, plastic tape, push pins	RP, BDA, FTs
10. Practice teaching by the Farmer Trainers and Critiquing		Practice teaching, critiquing	Prepared teaching aids	RP, BDA
11. Evaluation of Training		Feedback from the RPs	Evaluation forms	RP, BDA
12. Closing program		Closing remarks, distribution of completion certificates		RP, BDA
B) Preparation for Farmer to Farmer (FTF)				
1. Building a core training team and plan for FTF activities	0.5	Strengthen the training team and plan to implement the FTF activities		RP, BDA, FTs
2. Preparation of teaching materials	0.5	Preparation of simple teaching aids, and cage miniature	Manila paper, pentel pens, crayons, rulers, plastic tape, push pins, bamboo sticks	BDA, FTs
3. Dry-run for FTF Training	1.0	Practice teaching and critiquing by the RPs and the BDA	Prepared teaching aids, megaphone	BDA, FTs
4. Conduct FTF training	1.0	Conduct lecture on-site using local dialect using prepared simple teaching aids and hands-on work	Prepared teaching aids, megaphone, miniature of fish cage, hands-on work	FTs, BDA

Figure 3.2.1.23: Reviewing the tilapia production manual

At the field level, the selected FTs transferred related technologies through the FTF extension to the 2nd beneficiaries in the other barangays after the TOT. Before the actual FTF extensions, FTs conducted dry-run activities mainly managed by the BDA for further mastery of their assigned topics. By far the FTs have been more efficient in the hands-on transfer of technology to other farmers as opposed to the lecture-type; it was also observed that the level of learning has been high in the hands-on transfer. Besides the FTF, a JICA expert in fisheries provided hands-on training on new techonologies such as intetrated farming and mono-sex culture.

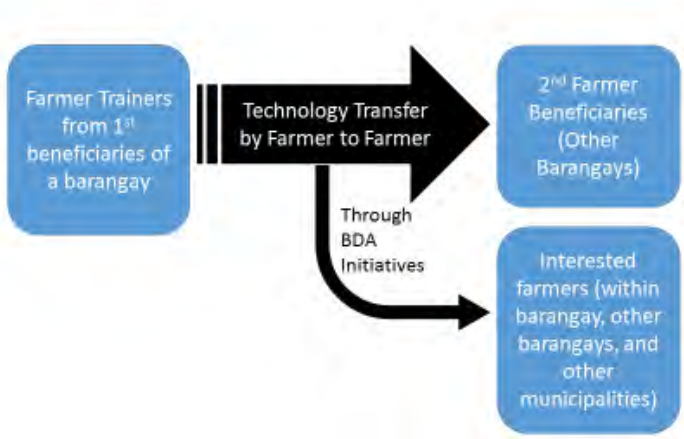


Figure 3.2.1.24: Flow of techno-transfers from the 1st beneficiaries to the 2nd beneficiaries in other barangays

Figure 3.2.1.25: FTs conducting a dry-run (left), and FTF training on fish processing (right)

A good start for planning FTF training is to hold discussions with the stakeholders involved to learn about the FTs' preparedness in technology transfer. Hence, a dry-run presentation (Figure 3.2.1.25) should be conducted among the FTs on their respective topics and methods during the lectures and hands-on training. The roles and responsibilities of the FTs discussed during TOT should be reiterated in the planning session to help them recognize how important their role is in helping fellow farmers. The local dialect is encouraged as a medium of communication except when dealing with technical terms which have to be explained further so that farmers are able to easily understand them.

To start the FTF program, the objectives need to be explained before the start of any activities in the field. As a result of this practice, the 2nd beneficiaries were able to clearly understand what to do, how to do it, and when tasks needed to be accomplished. After giving instructions, the FTs implemented their duties straightaway by giving demonstrations to the trainees. This approach was found to be efficient in the full transfer of technology at the farmer's level in the fishery sector.

The fishery sector has promoted the use of local materials, and has striven to keep the technologies as simple, practical and inexpensive as possible for higher replicability and sustainability. Therefore, the FTs presented their respective topics in the simplest possible manner with the technical supervision of the BDA.

Farmer-trainers conducted periodic training courses covering the technical aspects of their work (e.g., tilapia farming, processing, and marketing) and continued to develop the communication skills necessary to complete their tasks. The BDA in cooperation with the MLGU also capacitated the FTs on how to access the essential the information they need from the agencies by themselves. Major activities and process carried out through the FTF are as follows;

Construction of earthen pond and cage

Building an earthen pond is the most difficult and expensive part of fish farming. Ponds should be built using original soil as the primary dike, instead of using excavated soil that is weak and will cause heavy leaks, being susceptible to breakage in the future. As it may not be possible to use such heavy equipment, the beneficiaries had to use basic manual digging tools such as spades, digging blades, and ropes with the supervision of experts, BDA, and MSU Maguindanao and Naawan, in compliance with the technical specifications for a good and productive pond (Figure 3.2.1.26). Manual pond digging in Matungao requires strong motivation because the area is rocky and elevated, making it difficult for the beneficiaries to

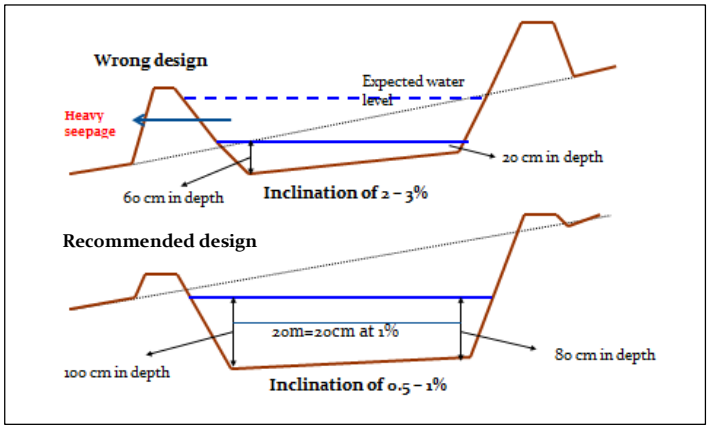


Figure 3.2.1.26: Recommended design of a productive earthen pond

excavate and remove the rocks completely.

In contrast, cage construction is relatively simpler than pond digging. The community uses special tying techniques to join bamboos that were taught by 1st beneficiary FTs. It took only 15 days to complete the construction of a 10m x 10m cage frame and cage bag. Women beneficiaries played a crucial role in the activity by doing net sewing and mending while men engaged in the construction and installation of cage-frame.

Stocking of tilapia fingerlings/fry

The community in Sultan Mastura obtained their initial stocking of fry from the BFAR-Kabacan even. Tilapia fries were first reared in fine-mesh nets (hapa-net) in cages in Barangay Tapayan for the beneficiaries to learn the fundamental nursery techniques and management with technical assistance from the BDA, expert team, and technical partner. The fish seeds were nursed in hapa nets for two to three hours to reach an ABW of 20-30 grams, which is an optimum size for transfer to grow-out cages as well as for manual selection of male tilapia for a mono-sex culture. Big-size fingerlings from the 1st beneficiaries of Barangay Tambu were stocked in cages of 2nd beneficiaries in order to practice and master sex identification for the mono-sex culture. In November 2015, another batch of bigger size fingerlings sourced from South Cotabato were transported and stocked in Tapayan cage and Balut pond.

Stocking was delayed for a month in Matungao on October 18, 2016 due to difficulties in pond digging that caused delays in the completion of the acceptable pond design suggested by the expert team. Transferring the fingerlings from uphill to the pond site was another challenging experience for the beneficiaries and the project team, as it required walk for approximately 45 minutes in order to accomplish the activities. The survival rate of big-sized fish is usually lower than that of small-sized fish while transporting because of hyperactivity and stress due to handling, confined spaces, and physical injury before and during transport. A high survival rate in the transportation and stocking of fry and fingerling was achieved owing to cooperation and the capability of BDA and 1st beneficiaries to guide communities and 2nd beneficiaries in carrying out the transporting and stocking of fry and fingerling in a safe and appropriate manner.

Farmer trainers displays packed tilapia fry from BFAR-Kabacan

Tilapia fingerlings 8.0 g ABW from South Cotabato

Nursery rearing of tilapia in hapa net at cage in Brgy. Tapayan, Sultan Mastura

Stocking tilapia fingerlings at Grow-out cages in Brgy. Tapayan, Sultan Mastura

Stocking of fingerlings in hapa net at pond in Brgy. Balut, Sultan Mastura, Maguindanao

Stocking of fingerlings at B-Net in pond at Sitio Koriod, Sta. Cruz, Matungao, Lanao del Norte

Figure 3.2.1.27: Stocking of fry/fingerlings in ponds and cages

Table 3.2.1.21: Fingerlings stocked in Sultan Mastura and Matungao

Date	Project site	No. of fingerlings/fry	Size/ABW
Oct. 15, 2015	Sultan Mastura	20,000 inds. (source: BFAR-Kabacan)	24
Nov. 17, 2015	Sultan Mastura	11,100 inds. (source: Koronadal, South Cotabato)	4-8g
Dec. 17, 2015	Matungao	20,000 inds. (source: BFAR Kisolon, Bukidnon)	17-22
Dec. 18, 2015	Matungao	13,000 inds. (source: Sto. Niño, South Cotabato)	3-10g

Monitoring and management of fish culture

The project emphasized on good pond and cage management and best aquaculture practices. BDA counterparts and expert team frequently visited the sites to assess the progress of the fish culture as well as to provide technical guidance to the farmers. The frequency of sampling became once a month from twice a month to lessen the stress on the fish because of the sampling. A new data sheet was introduced to collect and analyze operation/production data such as ABW, feed conversion ratio (FCR), and daily growth rate (DGR) to adjust the feeding amount appropriately for lowering production costs. Data collection and analysis was likewise practiced by BDA and community with close guidance from the expert team. The project establishes a manner of consultative lecture-type activity to strengthen the capacity of BDA and the community to resolve technical and social issues that resulted in positive outcome in terms of trust and understanding among the 1st and 2nd beneficiaries.

Sampling in pond using a cast-net to catch only bigger fish

Sampling in pond using a seine net to catch fish including fingerlings

Individual sampling of tilapia stocks using digital weighing scale

Bulk sampling of tilapia stocks using common weighing scale

Figure 3.2.1.28: Sampling of tilapia stocks

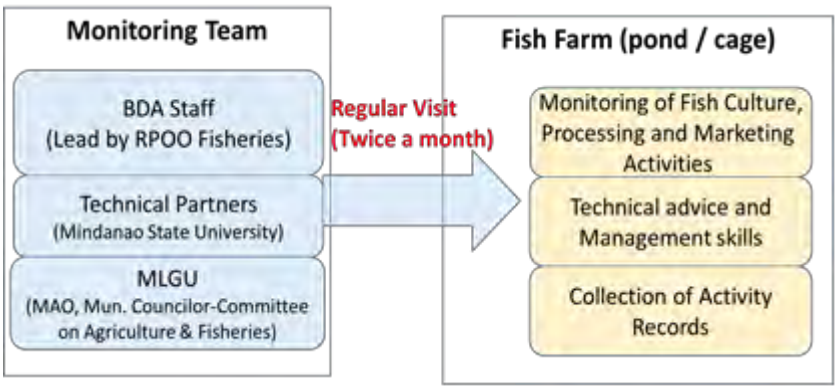


Figure 3.2.1.29: Project monitoring scheme and on-site guidance

Based on interviews with the FTs[56], their exposure to CD-CAAM during the pilot phase as well as the training of trainers (TOT) has equipped them with the knowledge of how to prepare and deliver lectures as well as trained them in the basic approaches of conducting hands-on training during the farmer to farmer extension with the 2nd beneficiaries. Mr. Abdullah Guro, [57] claimed that as farmer teacher he found it quite tough to deliver his lectures to the 2nd beneficiaries compared with his actual work because as a farmer doing the actual work is the most efficient way to retain what has been taught.

[56] Interview with Amroden Monib, a farmer teacher from Brgy. Pasayanon, Matungao, Lanao del Norte, on May 23, 2016.
[57] Mr. Abdullah Guro, farmer teacher from Brgy. Cadayonan, Matungao, Lanao del Norte, on May 23, 2016.

Meanwhile, to evaluate the capacity of the FTs, FTF extension in the fishery sector shows evidence of the effectiveness in the transfer of technologies to the 2nd farmer beneficiaries as well as to the other communities within and outside the target municipalities. This approach should substantiate the efficiency in the expansion of the geographic coverage of the project and increase the number of farmers taught and who are able to replicate the technology. In the case of Sultan Mastura, the FTs have extended their technical assistance to; Sitio Pahm, Brgy. Tambu (Sultan Mastura); Brgy. Lipawan (Municipality of Barira); Brgy. Gen. Luna (Municipality of Carmen) (Figure 3.2.1.30). While the number of production ponds has increased tremendously within the pilot municipalities the FTs have not only shared technical knowledge, but also opened the opportunity to help others understand that tilapia farming can be good business for small-scale farmers using the existing available bodies of water that have been dormant for many years in many cases.

FT (Mr. Esmael Panansaran) teaches tilapia farmers in Carmen, North Cotababato on the installation of a hapa net

FT (Mr. Tinga Panansaran) instructs a tilapia farmer in Sitio Pahm, Sultan Mastura on feeding and water management

Figure 3.2.1.30: Photos of the expansion site

Additionally, the FTF have strengthened the relationship between the 1st and 2nd beneficiaries through regular consultations and communication among them. The 2nd beneficiaries had received technical advice from the 1st beneficiary FTs related to tilapia farm management on issues such as stocking, feeding, and water management. Therefore, from time to time with the BDA's consent, the FTs visited farm sites to talk and give advice as necessary. To compensate the FTs' efforts, they were provided with daily allowances based on their individual days of engagement. It is hoped that the FTs will work well even without compensation because such payment may not be sustainable unless regular funding source is established. However, this approach has been observed to boost their morale and motivate them to perform even better.

2) Transfer of the new technologies

Fishery sector has carried out two (2) new approaches in tilapia farming. One is integrated fish farming with locally-available livestock and another is mono-sex culture. The former approach aims to reduce feed cost by utilizing natural organisms/plankton that grows in pond water through fertilization by livestock manure. The integrated farming also aims at diversification of income source. Farmers may have income from both fish and livestock. The latter is for utilizing fast-growing male tilapia by manual selection for grow-out operation.

a) Integrated fish farming with ducks

Integrated fish farming is a fish culture in ponds integrated with locally available livestock raising where the manure of ducks is collected and applied directly as a fertilizer to the ponds in order to propagate natural organism/plankton that contributes to fish growth. Ducks are raised in a fenced area or pen for convenience and collecting their manure efficiently. A duck house was constructed inside the pond or within the dikes for easy manure collection. This practice is more sustainable for fish farming with small inputs, specifically for village-based farming. Further, it generates income from both fish farming and livestock raising. Figure 3.2.1.31 illustrates comparison between culture practice with feeding and integrated fish faming.

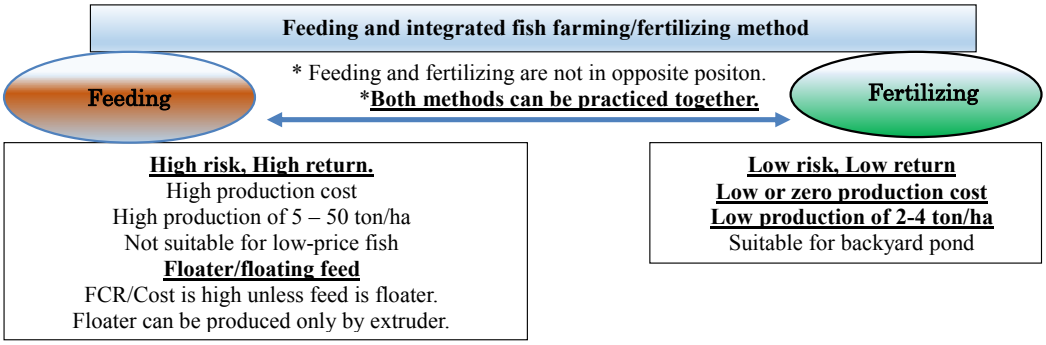


Figure 3.2.1.31: Comparison between culture practice with feeding and Integrated Fish Farming

Pond fertilization is an effective method to increase the available natural food called “plankton” for the tilapia. The abundance of natural food in the pond implies a reduction in operational costs, particularly of compounded pellets. Therefore, farmers can practice sustainable operation with less anxiety about the high production cost, and ultimately increase their income.

Although this project uses ducks in its integrated farming project practices, there are three types of useful locally available livestock for integrated fish farming in Mindanao: chicken, duck, and goat. These animals should be kept fenced and not in a free-range system because of the difficulty in collecting manure. Chicken has not been strongly recommended so far because of its vulnerability to disease if confined in a fence/cage. Chicken, however, is a reliable nitrogen/phosphate source when properly vaccinated for disease prevention. One chicken head produces approximately 3 to 4 kilos of manure per month if it is fed with mash. Therefore, one chicken head can cover a pond area of 30 m² to 40 m² if the manure application is 100g/m²/month. Ducks should be enclosed within a fence around the pond so that their fresh manure can directly be dropped into a pond to fertilize rearing water. One duck can cover a pond area of 10 m² to 20 m². Meanwhile, a cut-and-carry feeding system should be used to feed corralled goats and bam within a fence to allow for easy collection of manure. One goat can cover a pond area of 50 m² to 100 m².

A study on the growth performance of the integrated fish farming with the three types of livestock was conducted by the JICA project in Malawi from 2002 to 2006. The stocking density was 2 individuals/m².

The fish were not fed any artificial compound feed but only plankton. The study revealed that the average monthly weight gain (AMWG) was 18.0 g/month to 25.6 g/month. The AMWG of compound feed with stocking density of 6 individuals/m² ranges from xxg/month to xxg/month (figure to be inserted later).

Non-fertilized pond with clear or brown water before integration with ducks in Brgy. Tapayan, Sultan Mastura

Fertilized pond in green water after integration with ducks in Brgy. Tapayan, Sultan Mastura

Non-fertilized pond with clear water before integration with ducks in Sitio Koriod, Matungao

Fertilized pond in green water after integration with ducks in Sitio Koriod, Matungao

Figure 3.2.1.32: Integrated ponds with livestock

The chart provided below illustrates the possible material circulation for fish farming in villages. Livestock manure is applied to fishpond for fertilizing rearing water for the propagation of natural organisms for fish to feed on. While small/trash fish, such as fry/fingerling can be fed to duck/chicken, excess vegetables, household leftovers, grass, and insects can be fed to fish/tilapia because they are omnivorous. Similarly, fertilized pond water and soil are good materials for vegetable growing. Therefore, fish farming and agriculture can likewise be integrated, and a small-scale irrigation system is a suitable system for this activity.

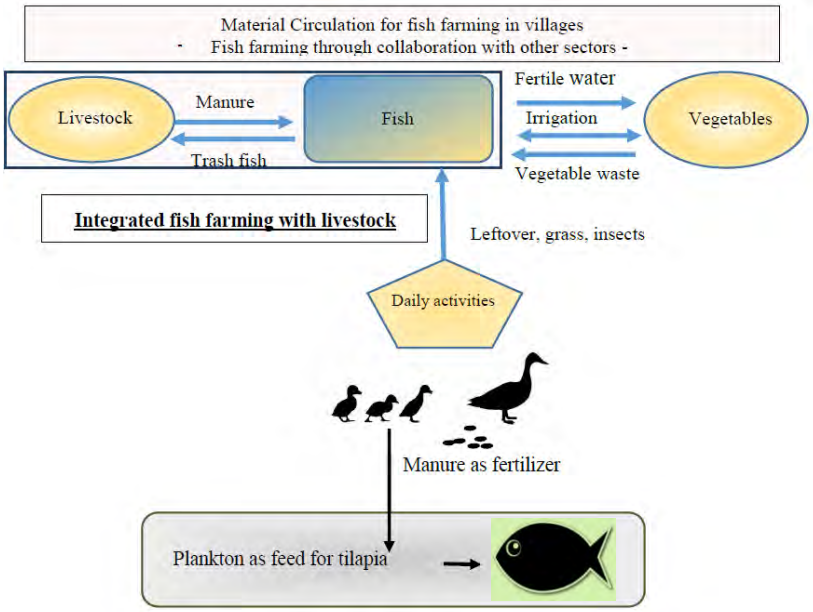


Figure 3.2.1.33: Resource cycle in Integrated Fish Farming

b) The Mono-sex culture

Mono-sex culture in this project refers to the selection of all-male tilapia through manual sexing for the cage and pen culture system. Mono-sex culture can produce a high yield compared to a mixed-sex population. For achieving increased productivity in growing tilapia, it is important to practice mono-sex culture involving mostly male fish.

Ratinale for the Mono-sex culture

- Tilapia is a mouth brooder. After the eggs are released and fertilized, the female fish carry the eggs orally until they develop into fry.
- Female fish seldom take food/feed during mouth breeding.
- Tilapia keeps on laying eggs once a month through the year under optimum conditions.
- In females, there is a greater reallocation of metabolic energy for reproduction.
- In males, the metabolic energy is channeled towards growth.

In commercial tilapia culture, fish is treated using hormones to produce all male hatchery-reared fry called sex-reverse treatment. It requires facilities, materials, and technology that are not affordable or practical for a village-based tilapia culture. Therefore, manual selection/sorting of male fish by viewing the genital organ was practiced for the mono-sex culture of village-based small-scale tilapia farming by 2nd beneficiaries both in Sultan Mastura and Matungao. The farmers practiced a cycle of pond operation for the mono-sex and mixed-sex culture with the stocking densities indicated in Figure 3.2.1.36.

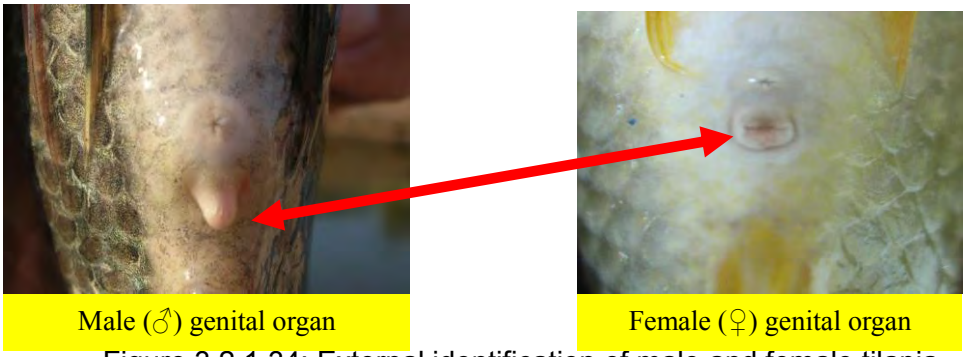
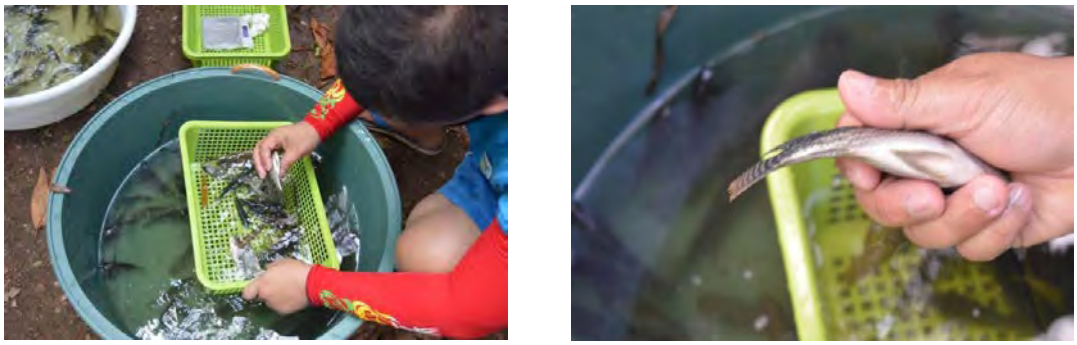


Figure 3.2.1.34: External identification of male and female tilapia



Manual sexing of 20-gram tilapia for mono-sex culture in Purok 3, Matungao, Lanao del Norte

Figure 3.2.1.35: Manual sexing of tilapia on-site

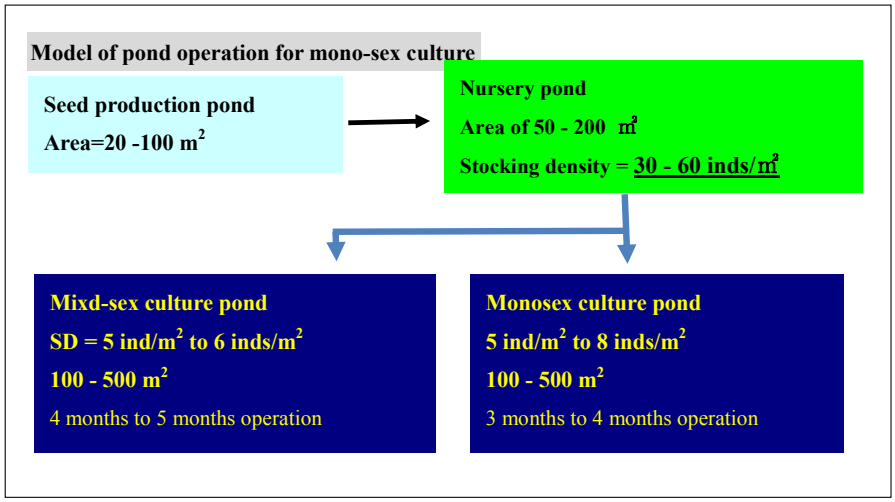


Figure 3.2.1.36: Cycle of pond operation for mono-sex and mixed-sex culture

3) Evaluation of quantitative outputs in terms of production and sales

a) Pond culture

Integrating tilapia culture with duck farming

In the pilot project with the first beneficiaries, production costs per kilogram were comparatively high with a cost of PhP 85.47/kg for pond culture and PhP 72.61/kg for cage culture. The feed conversion ratio (FCR) was 1.86 for pond culture and 1.60 for cage culture: 1.86 kg and 1.60 kg of compound feed was used to produce one kilogram of fish under pond culture and cage culture, respectively. The high production cost was caused by the high FCR. The FCR usually ranges from 1.0 to 1.5. The fish were raised in a mixed-sex culture. The pond water was so low in plankton that fish growth fully depended

on compound feed. Table 3.2.1.22 shows the results of the pilot project in Sultan Mastura, including earnings and the FCR.

Table 3.2.1.22: Production cost, profit and the FCR per kilogram for the pilot project in Sultan Mastura

	Pond	Cage
Production cost (PhP/kg)[58]	85.47	72.61
Selling price (PhP/kg)	99.62	110.29
Net income (PhP/kg)	14.15	37.68
ROI (%)[59]	16.5	51.8
FCR	1.86	1.60

A duck house on a pond dike.Water color is green due to plankton.

Swimming ducks in a pond

Figure 3.2.1.37: Ducks in a pond

The Lake Tumingay Aquaculture Marketing Cooperative, the 2nd beneficiaries in Tapayan, practiced mono-sex culture and integrated farming with duck farming. They had an earthen pond with an area of 100 m^2 in order to reduce feeding and production costs. Because of the duck manure, the color of the pond's water had maintained a green color, indicating that the water was rich in plankton, which that tilapia feed on. This trial, which utilizes the new fish farming technique, is still in operation, and has been operating for 90 days. The pond will be harvested in one to two months. Table 3.2.1.23 shows the production cost, income, earning rate, and the FCR, based on the sampling data and assuming that all fish will be harvested on Day 90.

Table 3.2.1.23: Results of integrated farming and mono-sex culture in Tapayan

	Integrated farming and mono-sex culture pond
1 Production cost (PhP)	**3,944**
2 Sales (PhP)	**26,268**
Total weight sold (kg)	218.90
Selling price (PhP/kg)	120.00
3 Net income (PhP)	**22,324**
ROI (%)	**564.8**
4 **Feed cost performance**	
FCR	**0.18**
Feed cost per kg of fish produced (PhP/kg)	**5.76**

[58] Production cost includes depreciation
[59] Return on investment (%) = (Net income/Production cost) x 100

The FCR in integrated farming is extremely low, with a ratio of 0.18. In the pond version of the pilot project, which was non-integrated farming, 1.86 kg of compound feed was used to produce one kilogram of fish. Table 3.2.1.24 shows a comparison in cost performance between integrated farming and non-integrated farming.

Table 3.2.1.24: Comparison in cost performance between integrated and non-integrated farming

	Non-integrated farming	Integrated farming
Production cost (PhP/kg)	85.47	18.05
Selling price (PhP/kg)	99.62	120.00
Income (PhP/kg)	14.15	101.95
ROI (%)	**16.5**	**564.8**
FCR	**1.86**	**0.18**
Feed cost per kg of fish produced (PhP/kg)	**65.10**	**5.76**

While both the feed costs per kilogram of fish produced and ROI of non-integrated farming were PhP 65.10/kg and 16.5%, respectively, those of integrated farming were PhP 5.76/kg and 564.8%, respectively. Integrated fish farming with ducks has been proved to be both a lower cost and more sustainable method for tilapia culture. Chickens, goats, and cows can also be used as livestock for integrated fish farming in villages for low-cost operation.

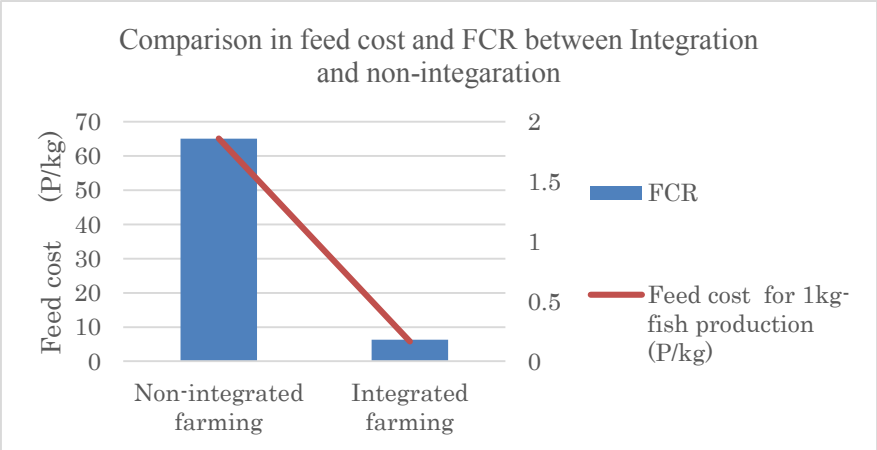


Figure 3.2.1.38: Cost performance and FCR between integrated and non-integrated farming

Mono-sex culture

The second beneficiaries in Barangay Balut practiced mixed-sex culture in an earthen pond with an area of 225 m^2. The project's aim was to demonstrate the effectiveness of mono-sex culture. Figure 3.2.1.39 shows the growth curve of the mixed-sex culture in Balut and the mono-sex culture in Tapayan. The results demonstrate that fish in mono-sex culture grow faster than fish in mixed-sex culture.

There are two major reasons why the growth rate of the mono-sex culture was greater than that of the mixed-sex culture. One reason is the rapid increase in the biomass of fingerlings that were produced by the original fish stock. Crowded pond conditions with a large number of fingerlings retarded the growth

of the original stock of fish. Figure 3.2.1.40 shows the increase in the biomass of both the original stock and fingerlings in the mixed-sex culture pond in Balut. On Day 30, there were no fingerlings observed in the pond, but on Day 60, many fingerlings were observed. The biomass of the fingerlings was 49.3 kg, while the biomass of the fish from the original stock was 62.1 kg. On Day 90, the biomass of the fingerlings sharply increased to 159.5 kg, nearly twice that of the fish from the original stock (78.4 kg).

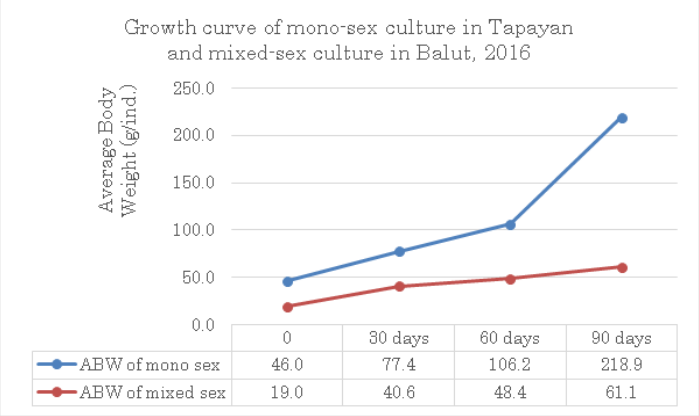


Figure 3.2.1.39: Growth curve of mixed-sex culture and mono-sex culture

Another reason is the peculiar reproductive behavior of the female fish. Tilapia has a high fecundity because female tilapia lays eggs approximately once a month all year round, under ideal conditions. Female fish seldom eat during breeding times. Because of their high fecundity and particular reproductive behavior, the growth of female fish is much slower than that of male fish. Therefore, the mono-sex culture made only of male fish is more productive than the mixed-sex culture. Fish from a mono-sex culture can fetch a higher selling price than fish from mixed-sex culture because they are much bigger.

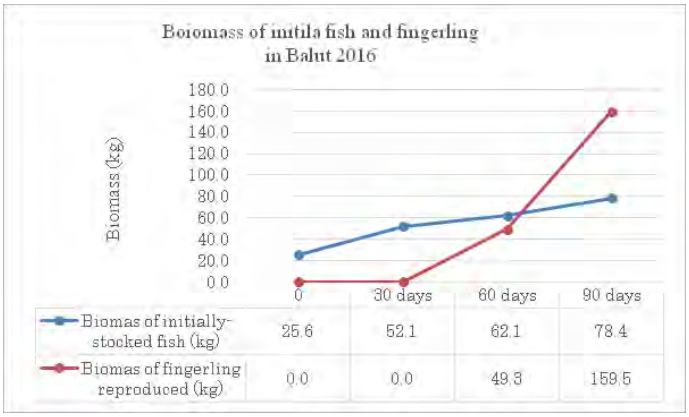


Figure 3.2.1.40: Biomass of initial fish and fingerling in a mixed-sex culture pond in Balut, 2016

Results of the mixed-sex culture with processing of fingerlings in Balut, Sultan Mastura

A large volume of fingerlings will be harvested in the mixed-sex culture pond in Balut, when the pond is completely harvested a few months' time. Base on sampling data collected May 16, the pond carries approximately 159.5kg of fingerlings (see Figure 3.2.1.40,). Table 3.2.1.25 shows the expected results of the mixed-sex culture, assuming the pond is harvested and the fingerlings are processed.

Table 3.2.1.25: Results of the mixed-sex culture with processing of fingerling in Balut, Sultan Mastura

1	**Production cost (PhP)**	**16,235,97**
	Cost of fish production	8,253.00
	Cost of processing: @PhP 50.05×159.5 kg	7,982.97
2.	**Total Sales (PhP)**	**26,422.75**
	Sales of initial fish (PhP): 78.4kg*@PhP 100/kg	7,840
	Sales of processed fish/fingerling: 159.5 kg×0.233×PhP 500/kg	18,582.75
3	**Net income (PhP)**	**10,186.78**
	ROI (%)	**62%**
4	**Feed cost performance**	
	FCR	**0.49**
	Feed cost per kg of fish production (PhP/kg)	**15.95**

Of the total sales, 70% (PhP 26,422.75) are of processed fingerlings, accounting for PhP 18,582.75. Processing fingerlings is very important for the financial viability of mixed-sex culture.

Results of pond culture in Matungao

In the extension phase, cage culture was not implemented in Matungao due to lack of a proper water source, and through the FTF, the 2nd beneficiaries learned the technologies on earthen-pond tilapia culture. Two grow-out ponds and two breeding ponds were constructed in Barangay Prok 3, whereas two grow-out ponds and one breeding pond were constructed in Barangay Koriod. All the ponds are still in the 1st operation as of June 2016 and total harvest will be conducted in July 2016. The table 3.2.1.26 is the expected results of pond operation and fish processing based on sampling data of May 26, 2016.

Table 3.2.1.26: Expected results of pond operation including processing in Prok3 and Korio, Matungao

	Prok3: pond1 Integrated farming	Prok3: pond 2 Integrated farming	Koriod Non integration framing
Area (㎡)	260	100	390
Production cost (PhP)	**17,464.00**	**7,534.00**	**24,721.00**
Cost of fish production	15,782.80	5,869.49	24,028.00
Cost of processing	1,681.68	1,664.64	693.04
Total Sales (PhP)	**26,422.75**	**11,600.00**	**27,239.00**
Sales of fresh fish (PhP)	26,925.31	7,725.00	25,626.04
Sales of processed fish/fingerling	3,914.40	3,874.74	1,613.18
Net income (PhP)	**13,375.00**	**4,066.00**	**2,518**
ROI (%)	**76.5%**	**53.96**	**10.19**
Feed cost performance			
FCR	**0.87**	**0.90**	**1.61**
Feed cost for 1kg-fish production (PhP)	**27.84**	**28.85**	**51.44**

A selling price in Matungao is lower (P100/kg) than that in Sultan Mastura (P120/kg) partly because Matungao has tilapia supplies from adjacent municipalities, Kapatagan. Lanao Del Norte. Two ponds in Purok 2 are operated through the integrated farming with duck raising. In pilot project phase, FCR and

feed cost of pond operation was 1.86 and PHP 65.00/1kg-fish production, respectively. Meanwhile, FCR of the pond 1 and the pond 2 in Purok 3 are 0.87 and 0.90 with very low feed cost per 1kg-fish production of PHP 21.84 and PHP 28.85, respectively. In contrast, FCR of pond in Koriod where integrated farming is not implemented, is relatively high (1.61). It can be said that low feed costs have been achieved in these two earthen ponds in Prok 3 due to the effect of integrated tilapia farming with duck raising.

b) Cage culture

Cage culture was practiced only by the 2nd beneficiaries in Tapayan, Sultan Mastura. There was no suitable place to establish cage culture in Matungao. Four cages (50 m^2 each) were constructed. Out of the four cages, two were used for mono-sex and two for mixed-sex tilapia culture. The two types were set up in order to practice manual sexing and to study the differences in growth rates between the two approaches. After five months, the fish reached a marketable size of 158.9 g/piece (6 pieces to a kilogram). The beneficiaries began harvesting the fish on April 14, 2016. Most of the beneficiaries' customers were community members, teachers, and office workers who became familiar with the site and would often visit.

Catching of tilapia in cages using scoop net

Women beneficiary weigh harvested fish for the buyer

Fresh tilapia marketing

Live tilapia marketing at aerated plastic tanks

Figure 3.2.1.41: First harvest at Cages in Brgy. Tapayan, Sultan Mastura, Maguindanao

Table 3.2.1.27 shows the results of the operation of the four cages in Tapayan. The FCRs of the mono-sex culture ponds were lower (0.58 and 0.41) than those of mixed-sex ponds (0.85 and 0.70). Therefore, the income rates of the mono-sex culture ponds (64.4% and 72.6%) were higher than those of the mixed-sex culture (46.8% and 52.9%). The cost performance of the mono-sex culture was much better than that of mixed-sex culture.

Table 3.2.1.27: Results of mono-sex and mixed-sex cage culture in Tapayan

	Item	Cage 1 Mixed-sex	Cage 2 Mixed-sex	Cage 3 Mono-sex	Cage 4 Mono-sex	Total
1	**Production Cost** (PhP)	**4,308**	**4,098**	**4,360**	**4,124**	**16,889**
2	**Sales** (PhP)	**8,100**	**8,712**	**12,258**	**15,060**	**44,130**
	Total weight sold (kg)	67.50	72.60	102.15	125.50	367.75
	Selling price (PhP/kg)	120.00	120.00	120.00	120.00	120.00
3	**Profit/Net income**	**3,792**	**4,614**	**7,898**	**10,936**	**27,241**
	ROI (%)	**88.0**	**112.5**	**181.1**	**265.1**	**161.2**
4	**Feed performance**					
	FCR	**0.85**	**0.70**	**0.58**	**0.41**	**0.59**
	Feed cost per kg of fish produced (PhP/kg)	**27.07**	**22.28**	**18.40**	**13.09**	**18.95**

Tilapia culture integrated with livestock, which is very effective method of reducing feed costs in pond culture, cannot be used for cage culture because plankton cannot propagate itself at a large enough scale to be effective. In the case of cage culture, the effectiveness of manure as fertilizer is diluted because the cages are set in open water. Careful feeding, therefore, is an effective way to reduce the amount of feed used, resulting in better cost performance. Farmers were trained to take additional care in feeding the fish.

Conscientious feeding had an immediate effect on the FCR and feed cost. Table 3.2.1.28 shows a comparison in the feed costs between the cage culture of the first beneficiaries in the pilot project and the cage culture of the second beneficiaries in Tapayan. The feed cost per kilogram of fish produced for the second beneficiaries in Tapayan was PhP 18.95 while that for the first beneficiaries in the pilot project phase was PhP 56.00. The reduction of feed cost was successfully achieved by the 2nd beneficiaries because they took additional care in feeding their fish.

Table 3.2.1.28: Feed cost performance of cage culture of the first and second beneficiaries

	Cage by the second beneficiary in Tapayan	Cage by the first beneficiaries in the pilot project phase
FCR	0.59	1.60
Feeding cost per kg of fish produced (PhP/kg)	18.95	56.00

c) Cost reduction of pond operation in Matungao and Sultan Mastura

Table 3.2.1.29 shows the comparison in results of production and sales between the pilot project phase and the project-extension phase. As discussed above, there are two new technical approachs in the extension phase, i.e. the mono-sex culture and the integrated fish farming. Feed cost of pond operation in the pilot phase was P65.10/1-kg production while that in the extension phase was only P 5.79/1-kg production. It can be said that, thanks to the new techniques, production costs, especially feeding costs, has been sharply reduced.

Table 3.2.1.29: Comparison of production between pilot project phase and extension phase

		Pilot phase		Project/extension phase			
		Cage	Pond	Cage	Cage	Pond	Pond
Integrated framing		None		None		Yes	
Mono-sex culture		None		None	Yes	None	Yes
1.	Production cost (PhP/kg)	72.61	85.47	56.91 - 63.80	32.86 - 42.68	68.21	18.01
2.	Net income (PhP/kg)	37.68	14.15	56.17 - 64.12	73.31 - 87.15	42.79	101.98
	ROI (%)	51.8	16.5	88.0 - 112.5	181.1 - 265.1	62.0	564.8
3.	Feed performance						
	FCR	1.60	1.86	0.70 - 0.85	0.41 - 0.59	0.49	0.18
	Feed cost Per 1kg production	56.00	65.10	22.07 - 27.07	13.09 - 18.40	14.95	5.79

d) Processing of dried tilapia

After the FTF training held March 3 and 4, 2016 by the 1st beneficiaries, the 2nd beneficiaries from Barangay Balut then had their first processing of tilapia from pond one on March 17, 2016. They harvested a total of 9 kg of wet weight tilapia, which produced 2.1 kg of dry weight fish. The market price of packed dried tilapia is PhP 50 per 100 g net weight, so the beneficiaries' net income was PhP 599.50 (Table 3.2.1.30).

Table 3.2.1.30: Income from first tilapia processing (dried) in Balut, Sultan Mastura

1.	**Total cost of processing (PhP)**	**450.50**
	Weight of fish process (g)	9.0
	Cost of fish @ PhP 20/kg, fish size = 20g/fish	180.00
	Cost of materials	270.5
2.	**Total sale of finished product**	**1050.00**
	Total weight of finished product (kg)	2.1
	Selling price per kg of finish product	500.00
3.	**Net profit**	**599.50**

Table 3.2.1.31: Cost performance of tilapia processing per kg of fish

1.	Total cost for processing 1 kg of raw fish (PhP)	50.05
2.	Total sale of finished product from 1 kg raw fish (PhP)	116.50
	Weight of finished product from 1 kg of raw fish (kg)	0.233
	Selling price of processed product per kg (PhP)	500.00
3.	Net profit of finished product from 1 kg of raw fish (PhP)	66.40
	ROI (%)	132.6

The selling price of small fish weighing approximately 20g, which was used for processing practice, is roughly PhP 20/kg only in markets where fish is not processed for dry package. It takes one kilogram of raw fish to produce 0.233kg of dry fish. The selling price of processed fish was PhP 500/kg, equivalent to PhP 116.50/0.233kg at the market. The drying process generates additional value of PhP 66.40/kg for small, raw fish.

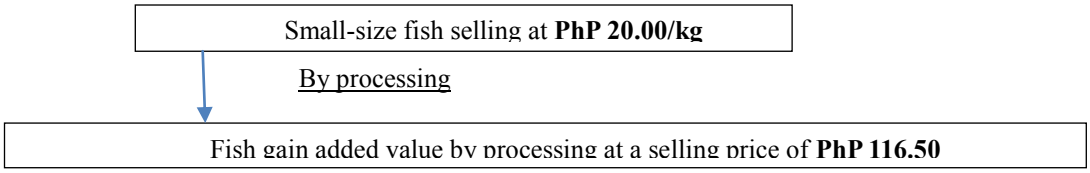


Figure 3.2.1.42: Value-added fish product by processing

Figure 3.2.1.43: Processing of small-size fish through FTF extension in Balut, Sultan Mastura

4) Capacity building of BDA

a) RMO CenMin

During the planning stage of FTF, BDA RMO, particularly the RPOO in charge of fisheries sector was able to lead the preparation for activities in coordination with the technical partner (MSU-Maguindanao) and JICA expert team. Following guidance from JICA expert team and resource organization, the BDA staffs facilitated the TOT, and became able to carry out the training by themselves. Table 3.2.1.32 shows activities carried out during the FTF extension in Sultan Mastura.

Table 3.2.1.32: Activities undertaken during the FTF extension in Sultan Mastura

Major activities	Contents	Issues	Action taken
Preparation of training materials (visual aids, miniature, manual)	Prepare visual aids using local materials	Limited number of FTs allowed by project	BDA selected most qualified FTs to deliver the lectures, while others are selected for hands-on based on current capacity.
Dry-run in delivery of topics	Attended by RPs, BDA, LGU, Fishery expert team, FTs	Capacitated FT's explained topics according to his learning and skills, but RPOO insisted to follow what was written in the presentation. Some FTs are not well prepared	RPs provided common suggestion to resolve the issue for both RPOO and FT's. Likewise, BDA provide continuous guidance and reminders to be prepared always.
Critiquing after dry-run	Critiquing by BDA and RPs	FTs explained too much on the topics. Giving unfriendly critiques	BDA and RPs recommended to summarize the explanation within allotted time. RPs further explained that giving critiques within topic scope
Delivery of lectures to 2nd beneficiaries	Attended by BDA, RPs, LGU, 2nd beneficiaries, FTs	- There are FTs who attends the training but did not deliver any lecture but wishing to be provided with allowance	- BDA raised provision of allowance to FTs to project management for consideration and approval.
Hands-on technical guidance to 2nd beneficiaries	- Cage/Pond construction, fingerlings stocking, feed management, tilapia breeding, harvesting, and processing - Encourage participants from other sitios to attend particularly fish processing - FTs have been invited to give lectures in Carmen, South Cotabato	- Difficulties in manual pond digging conducted in all sites. - Scheduling of FTF among FTs - Provision of compensation create an issue to some FTs	- BDA established cooperative endeavor between and among fishery sector from 1st and 2nd beneficiaries - BDA discussed issue with FTs and appoint team leader to manage all FTs and making sure all of them have given equal chances to teach 2nd beneficiaries

With regard to actual implementation of FTF extension as well as new activities such as integrated farming/mono-sex culture, it is fair to say that the RPOO and others mostly succeeded in facilliating the planned activities in effective manner, which produced satisfacotry results given the limited time allocated for the extension phase. The BDA staffs were capacitated not only in technical aspects, but also in administrative/financial aspects of the FTF works such as procurement, fund disbursement and liquidation acaccording to the standard set by the project. Being responsible for project management, the RMO understands reconciliation of operational needs vis-à-vis available budget is one of the essentials to be considered for successful implementation of the project on the ground. Eventually, the FTF extension attracted residents from other barangays to attend activities. In particular, several women from other communities attended training on fish processing. Similar to the agriculture sector, the RMO

staff in-charge of fishery sector hosted a radio program on tilapia culture at Voice FM 99.0 in Cotabato City.

In addition to the planned activities of the extension phase, it is remarkable that the RMO has initiatied its own extension work to disseminate technologies of tilapia culture to the wider population (Table 3.2.1.33). The RPOO and other staffs with the FTs, i.e. the 1st beneficiaries from the pilot project provided technical trainings (as well as initial fingerlings in some cases) to other farmers in Sultan Mastura and other municipalities in Maguidanao (Figure 3.2.1.44).

FT (Mr. Esmael Panansaran) teach tilapia farmers in Carmen, North Cotababato on installation of hapa net and stocking of tilapia fingerlings (8 May 2016)

FT (Mr. Tinga Panansaran) teach tilapia farmer in Sitio Pahm, Sultan Mastura on feeding and water management (18 March 2016)

Figure 3.2.1.44: FTF in Carmen, North Cotabato and Sultan Mastura, Maguindanao

The RMO also worked closely with the BFAR-Maguindanao in ARMM and Bureau of Fisheries and Aquatic Resources - Mindanao Freshwater Fisheries Training Center (BFAR-MFFTC) Kabacan, Region 12, in providing assistance to the Bangsamoro communities. On February 7, 2016, the BFAR Kabacan provided 77,250 individual tilapia fingerlings for technology adaptors in Sultan Mastura. Similarly, BFAR-Maguindanao ARMM provided for 2nd beneficiaries of Tapayan with funds for the construction of additional fishcages (10m x 10m), 10,000 individual fingerlings, and compounded pellets to increase their production. The agency cost-shared an estimated PHP 150,000 for the expansion of the tilapia culture project. Additionally, on May 17-19, 2016 BFAR-ARMM invited beneficiaries to display and sell tilapia products at the Office of the Regional Governor (ORG) compound during 25th DAF Devolution Anniversary.

BFAR-ARMM Maguindanao inspects 10m x 10m fish cages they provided to CD-CAAM beneficiaries in Brgy. Tapayan community (18 April 2016)

CD-CAAM beneficiaries display and sell live tilapia (black and red) and dried tilapia during 25th DAF-ARMM Devolution Anniversary upon invitation of BFAR at ORG Compound (17-19 May 2016)

Figure 3.2.1.45: Partnership with BFAR-ARMM

Based on such experiences, the BDA has launched a program called "Community Empowerment Program for Sustainable Economy and Livelihood (CEPSEL)". The first training activity was implemented on April 23–24, 2016, at Sitio Balas, Barangay Manarapan, Carmen, North Cotabato (Kapalawan Province). The program aims to capacitate local farmers, and to build self-reliance for sustainable livelihoods through the utilization of available resources and volunteer partners. It focuses on fisheries, agriculture, and livestock to address development needs and potentials of the communities. It is expected to cover 11 areas of the central Mindanao region, namely Kapalawan, Bukidnon, Ligawasan, North Cotabato, Damakling, Daguma, Buayan, Kutawato, Bandar, Maguindanao and Iranun. The program will adopt the FTF approach in transferring the technology to each of the sectors. The recipient areas are expected to fund the implementation of the program.

Table 3.2.1.33: List of extension works by the BDA RMO CenMin

Location	Number of farmers	Remarks
1. Lipawan, Ruminimbang, Barira, Maguindanao	15 individuals (soon to form a fishers' association)	No official technology training conducted. On-site technical guidance. Provided with 1,000 fingerlings on October 10, 2015.
2. Lipawan, Ruminimbang, Barira, Maguindanao	Family (private)	No official technology training conducted. On-site technical guidance. Provided with 1,000 fingerlings on October 10, 2015.
3. Mercedez, Buldon, Maguindanao	2 persons (private)	No official technology training conducted. On-site technical guidance. Provided with 1,000 fingerlings on October 20, 2015.
4. Mataya, Buldon, Maguindanao	3 persons (private)	No official technology training conducted. On-site technical guidance. Provided with 1,000 fingerlings on November 7, 2015.
5. Mamasapano, Maguindanao	56 cooperative members	Provided with 60 pcs tilapia (red, black) in September 2015.

Technology transfer on fish culture conducted at Mamasapano, Maguindanao and Isulan, Sultan Kudarat Province

Awarding of manual and tilapia breeders in plastic containers to adaptors by the BDA

Figure 3.2.1.46: BDA initiatives in extension

b) RMO Ranaw

The BDA staffs, particulary RPOO in charge of fisheries, have significantly improved their capacity for activity planning and implementation of the FTF and other new activities such as integrated farming and mono-sex culture. The TOT was effectively carried out on September 3–5, 2015 with supports from the technical partner (MSU Naawan) and the JICA expert team. The RMO staffs successfully facilitated and mobilized the 1st beneficiaries for actual FTF extension works, while coordinating with different stakeholders. Table 3.2.1.34 is a list of activities during the FTF extension. Limited education level among some FTs sometimes hampered effective technology transfer to the 2nd beneficiaries, and the BDA staffs provided supports to them in several occasions. The RMO staffs also became capacitated on administrative aspects of the technology transfer such as procurement, and financial management followingthe standard set by the project.

Table 3.2.1.34: Activities undertaken during preparation of FTF in Matungao

Major activities	Contents	Issues	Action taken
Preparation of training materials (visual aids, miniature, manual)	Prepare visual aids using local materials	Find difficulties in writing visual aids	- BDA led FTs to prepare visual aid based on their stored knowledge - Writing their own visual have boost their confident to present their work compared to ready made
Dry-run in delivery of topics	Attended by BDA, LGU, expert team, FTs	- Some FTs could not expressed well the topics assigned - Some FTs explaining away from assigned topic	- BDA encourages that should have confident because they are the main actor in the FTF, to speak and share what they have learned. - BDA reminded to give focus in giving explanation to the topic
Critiquing after dry-run	Critiquing by BDA	- Low voice tone of some FTs that cannot be heard and understood by listeners	- BDA advised to raise volume of their voice at least can be heard from the backseat

Delivery of lectures to 2nd beneficiaries	Attended by BDA, LGU, 2nd beneficiaries, FTs	- Could not expressed the given topics - Level of educational attainment greatly affects their performance in giving lecture - Lecture should be realistic and applicable in their respective project site	- BDA always guide 1st and 2nd beneficiaries to discuss what has not been discussed by FTs - Motivate to use local dialect as always - Abreast communication with community - Encouragement/ motivates - BDA developed strategy to conduct lecture and hands-on at the same time. - Question should be answered convincingly
Hands-on technical guidance to 2nd beneficiaries	- Cage/Pond construction, fingerlings stocking, feed management, tilapia breeding, harvesting, and processing - Encourage participants from other sitios to attend particularly fish processing specially women - FTs have been invited to give lectures in Carmen, South Cotabato	- Difficulties in manual pond digging conducted in all sites. - FTs have to follow technical suggestion by expert 100% - Scheduling of FTF among FTs - Provision of compensation create an issue to some FTs - Limited capacity of some FTs in lecture and in hands-on	- Constant motivation - Give multiple options, 1) Remove all boulders, 2) Stocking even not finished but with nets inside, 3) Excavated soil, community got motivated and finally selected best option.
Evaluation	Evaluation was carried out using questionnaires and observation after activities are completely done before closing the training program	Not all prospective FTs get the chance to deliver lectures due to time constraints	BDA and RPs evaluates FTs through questionnaires and individual group interaction and participation

The RMO Ranaw has also initiated its extension work to other communities. For example, it conducted the on-site guidance to the farmers in Barangay Cormatan and Daramba in the municipality of Poona Piagapo in Lanao del Norte, and provided them with fingerlings bought from 1st beneficiaries. Remarkabley, the RPOO was asked to be a resource person for training on basic tilapia culture of the World Food Program (WFP), for the beneficiaries in the municipality of Masio, Lanao del Sur.

5) Challenges and recommendations on further promotion/expansion

At first, the project team found it difficult to organize fish farmer beneficiaries. It was particularly hard for the team to organize the beneficiaries in manual pond building, which required the beneficiaries to work hard if the ponds were to be built according to technical suggestions and with productivity in mind. Therefore, in the upcoming income generation project, it will be necessary to transform the motivation

and values among counterparts. Meanwhile, it is highly recommended to use heavy equipment in order to construct earthen ponds while reducing the burden of manual excavation of ground.

To ensure effective technology transfer, particulary thorugh the FTF, ample time, including time for social preparations, is needed to practice fish culture at the community level. The fisheries sector practices a multiple tilapia culture technique to improve fish culture in a sustainable manner in the region. The time allocated in the extension phase was not sufficient to fully analyze and implement the lessons learned. In the future, the duration of project implementation should be extended at least 24 months.

The techniques of mono-sex culture and integrated tilapia farming with locally available livestock should be disseminated in a fast and practical manner. It has been proven that the two techniques can reduce the production cost drastically. Therefore, closer cooperation with livestock raising is highly recommended. The recommended animals are duck, chicken, goat, and cow. Additionally, to disseminate tilapia culture more widely, fish farming by backyard pond is recommended. A pond can be constructed near a farmer's house. Fish growth depends on household waste such as leftover food, vegetables from gardens, and compound feed if it is affordable. The production cost is nearly zero with high sustainability. This kind of practice is common in many Southeast Asian countries.

All in all, the project proves that tilapia is a suitable species for small-scale farmers because it is relatively inexpensive to produce and easy to care for. Meanwhile, there are other potential species in the area such as carp, catfish, and freshwater milkfish. It will be necessary to undertake a feasibility study to select profitable species. The feasibility study should target not only freshwater species but also marine species including grouper as well as seaweed. To diversify the cultured species, close cooperation with resource organizations such as the Mindanao State University (MSU) and the Bureau of Fisheries and Aquatic Resources (BFAR) is essential with regard to seed production. They can play an important role in providing hatchery-reared fry and juveniles of both freshwater and marine species because they have hatcheries of those species. They can also provide the project with up-to-date information and data of aquaculture.

3.2.2. Internal Technology Transfer within BDA

(1) Agriculture (Tawi-Tawi)

The agriculture sector conducted vegetable production and marketing activities targeting beneficiaries in the municipality of Panglima Sugala of Tawi-Tawi Province by applying the so-called internal technology transfer method. Here, the BDA RMO CenMin/Ranaw support activities by applying experiences and lessons learned from previous activities implemented in the municipalities of Sultan

Mastura and Matungao.[60] The activities follow the process of vegetable production training and marketing that was conducted during the previous phase of CD-CAAM.

The implementation mechanism used for the 10 beneficiaries of the Panglima Sugala municipality is essentially the same as that used in the previous phase of CD-CAAM. The BDA PMO Tawi-Tawi coordinates with resource organization, namely the TRAC and MLGU, especially the MAO or MPDC. This is supervised by the CMO. However, the absence of direct intervention by Japanese experts meant that the BDA RMO CenMin or Ranaw, who experienced project management at the ground level in the CD-CAAM phase, provided supportive actions to the BDA PMO Tawi-Tawi throughout the planning and implementation stages, as shown in Figure 3.2.2.1, Figure 3.2.2.2, and Figure 3.2.2.3.

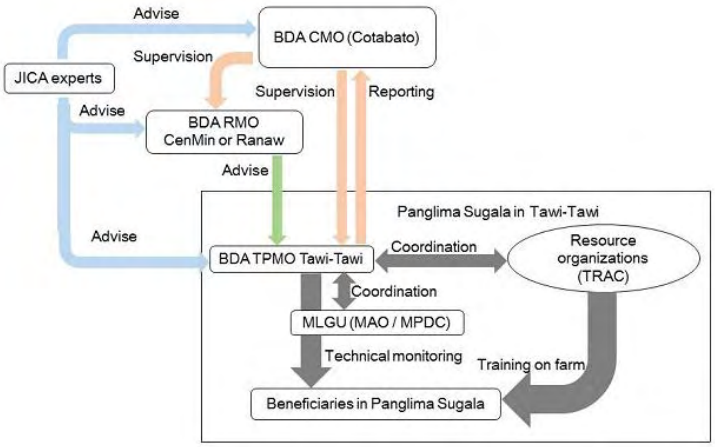


Figure 3.2.2.1: Implementation mechanism in Tawi-Tawi agriculture sector

Figure 3.2.2.2: The RPOO of BDA RMO CenMin and Ranaw (left two) support the PPOO and CO of PMO (right two) in compiling documentation during planning

Figure 3.2.2.3: The RPOO of BDA RMO CenMin (center) supports the PPOO of PMO (left) while interviewing for a market survey

Table 3.2.2.1 describes the roles of the main actors in the implementation of vegetable production and marketing activities in the Panglima Sugala municipality, Tawi-Tawi.

[60] Tawi-Tawi is an island some distance from the main Mindanao Island. Japanese experts cannot access the island for supervising purposes because of security reasons. Therefore, efficient and effective implementation was required using the internal technology transfer method.

Table 3.2.2.1: Roles of actors during implementation in the agriculture sector

Stakeholder	Role
BDA CMO	➢ Supervising all the activities conducted in Tawi-Tawi ➢ Organizing stakeholder meetings
BDA RMO CenMin or Ranaw	➢ Providing advice to its counterpart, the BDA PMO Tawi-Tawi, with regard to the following items: i) planning activities for community development projects on site; ii) monitoring on-site activities using supplemental technical inputs.
BDA PMO Tawi-Tawi	➢ Planning and monitoring project implementation on the site. ➢ Coordinating with the TRAC ➢ Coordinating with the MLGU, especially the MAO and MPDC ➢ Coordinating and interacting with beneficiaries on the site ➢ Reporting to the CMO with written documents ➢ Updating activities at stakeholder meetings
MLGU	➢ Collaborating with the BDA PMO Tawi-Tawi for the smooth implementation of activities on the site ➢ Monitoring all activities and output with the BDA PMO
Resource persons	➢ Providing hands-on training on demonstration farm ➢ Providing technology transfer tools, such as visual aids, during training ➢ Providing technical support/information on vegetable cultivation upon request by the BDA
Beneficiaries	➢ Ensuring commitment to participate and cooperate on implementation of the CD-CAAM Project in the agriculture sector ➢ Providing manpower for construction of facilities on demonstration farm and caring for them ➢ Practicing acquired technical knowledge and skills on their farms ➢ Transferring acquired knowledge and skills to other farmers within the municipality, if necessary

The stakeholder meetings are held throughout the implementation of vegetable production and marketing activities. These meetings aim to update activities on the site and to monitor the progress of the activities planned in the Operation Plan. Three (3) stakeholder meetings are conducted during the implementation, while training is carried out as shown in Figure 3.2.2.4.

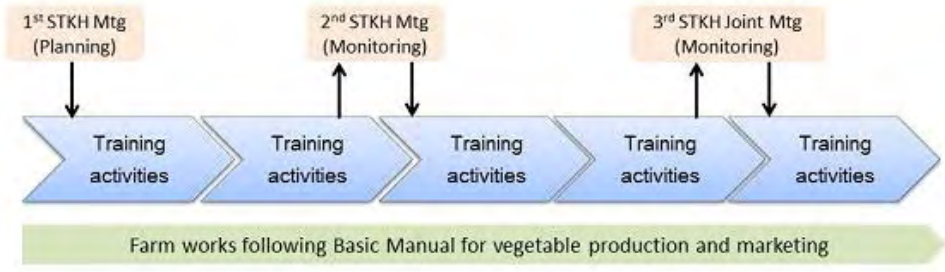


Figure 3.2.2.4: Implementation flow and stakeholder meetings

As one of internal technology transfer opportunities, the first stakeholder meeting, lasting four days, was held for stakeholders of Tawi-Tawi and the staff of the BDA RMO CenMin and Ranaw, MAO or MPDC of both Sultan Mastura and Matungao, and their RPs in order for them to share their experiences during the previous CD-CAAM phase. The objective of the first stakeholder meeting was to produce a POO through orientation, explanations of the training flow, exposure to demonstration farms and practice farms in Sultan Mastura and Matungao (see Figure 3.2.2.5), practicing market surveys, and exchanging views and experiences with actors on the activities implemented during the previous phase. During the

last day of the meeting, the BDA PMO Tawi-Tawi, the MLGU Officials, and RPs planned activities based on what they had learned from the program provided by the meeting. The BDA RMO CenMin and Ranaw supported them in structuring the plan.

Figure 3.2.2.5: The RC of BDA RMO Ranaw explains activities in Matungao during the first stakeholder meeting

Figure 3.2.2.6: The first beneficiary of Matungao (right) explains vegetable production training on a demonstration farm to the stakeholders from Tawi-Tawi after the meeting

1) Evaluation of quantitative outputs in terms of production and sales

a) Quantitative outputs

The training for vegetable production and marketing, based on the manual and related activities, began in November 2015, targeting 10 beneficiaries. The major technical training activities included the following: farm establishment, soil sampling, land preparation, companion plant planting, seed soaking, nursery making, soil bed preparation for transplanting, staking for planting density, application of vermi-cast as basal doze, vermi-composting, transplanting/direct sowing, concoction making, trellising, irrigation, pruning, pest and disease management, side dressing, harvesting and post-harvest, and the recording of production and sales. With regard to vermi-composting, the technology was first introduced to Tawi-Tawi by transferring ANC to the island by the RPOO BDA RMO CenMin during the training. He then conducted training on vermi-composting because no one was qualified to teach it.

Through a market survey conducted prior to the training on the demonstration farm, the beneficiaries decided to cultivate six crops (hot chili, eggplant, tomato, bitter gourd, string beans, and bottle gourd) on the farm, as shown in Figure 3.2.2.7.

Figure 3.2.2.7: Beneficiaries practice basal doze application (left) and the harvesting of eggplants (right)

Figure 3.2.2.8: Matchmaking on demonstration farm

Matchmaking, shown in Figure 3.2.2.8, was also conducted as the harvesting time approached. Seven buyers from the Batu-Batu public market in Panglima Sugala participated in the activity. An observation of the demonstration farm was conducted, followed by a business talk. Most of the vendors showed interest in the vegetables on the farm, and some discussed buying them. The buyers and the farmers discussed the prices of the commodities. One of the buyers told the beneficiaries that they were happy to know about the vegetables grown in this area because of the short supply of vegetables due to hot weather, resulting in a high cost of farm products in the market.

Table 3.2.2.2 shows the production and sales results for the first crop from the demonstration farm (about 1,000 m^2) as of the end of March 2016.

Table 3.2.2.2: Production and sales results of the first crop from the demonstration farm

Crop	Sowing / transplanting date	Date starting harvesting	Scale (m^2)	Harvest (kg or bundle)	Sale (PHP)	Expenditure for production (PHP)			Profit (PHP)
						seed	fertilizer	chemical	
Hot chili	Nov. 19, 2015	Feb. 17, 2016[1)]	270	16.5	2,130	385	150	465	1,130
Eggplant	Nov. 19, 2015	Feb. 5, 2016	180	24	240	385	120	465	▲ 730
Tomato	Nov. 19, 2015	Feb. 6, 2016	150	77	3,080	385	90	465	2,140
Bitter gourd	Dec. 13, 2015	Jan. 23, 2016	150	0	0	385	90	465	▲ 940
String beans	Dec. 13, 2015	Jan. 25, 2016	90	16	160	385	75	465	▲ 765
Bottle gourd	Dec. 13, 2015	Feb. 16, 2016	90	13	140	385	75	465	▲ 785

Source: Record of production and sales of the demonstration farm at Panglima Sugala as of the end of March 2016
Note 1): Harvesting is still ongoing as of the end of March 2016.

Figure 3.2.2.9: Hot chili variety survives under dry conditions (left); harvested hot chili packed in 1 kg bags for selling (right)

According to the results, profit was produced from hot chili (See Figure 3.2.2.9) and tomato. Although eggplant, string beans, and bottle gourd were produced, the results were negative. There was no harvest of bitter gourd because it was destroyed by pests and insects.

On the one hand, the variety of hot chili available in Tawi-Tawi was resistant to water stress and a particular pest, and tomato had enough irrigation water during the flowering stage in early January 2016, when rainfall helped in the growth. Lemon grass helped the growth of tomato as companion plants. On the other hand, insects (fruit borer) were transferred from neighboring farms. The use of chemical spray was limited so that the effect of the chemical would not have been observed. As a result, the bitter gourd crop was destroyed by the insect. In addition, irrigation water was in short supply from February 2016,[61] before the harvesting season. Thus, the dry spell, caused by El Niño, led to a poor harvest of the other three crops.

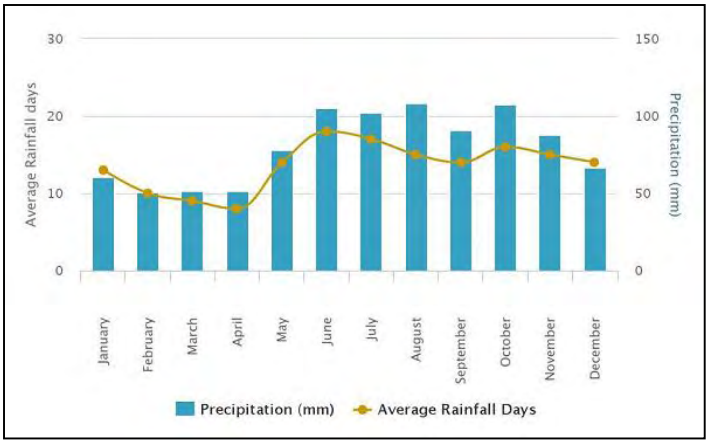


Figure 3.2.2.10: Average monthly rainfall in Tawi-Tawi (2000-2012)

Note that annual rainfall of Tawi-Tawi is about 1,000 mm, as seen in Figure 3.2.2.10,[62] while that of Cotabato city of the Mindanao Island is about 2,200 mm, according to meteorological data sources. [63] Therefore, compared with Sultan Mastura and Matungao, which are located on the main Island, much more attention should be paid to water harvesting and storage, considering the limited rainfall in the area. Moreover, water stress-resistant varieties or vegetable crops that are tolerant

[61] According to the MAO and RP from Tawi-Tawi, the rainfall pattern seemed to change two years ago; rain fell from November to December in 2015, then gradually reduced in January 2016, and there was no precipitation at all in February and March 2016.
[62] WORLD WEATHER ONLINE (http://www.worldweatheronline.com/Tawi-Tawi-weather-averages/maguindanao/ph.aspx).
[63] CLIMATE-DATA.OR (http://en.climate-data.org/location/2766/#climate-graph).

to low precipitation can be cultivated. The crop coefficient of each growth stage (i.e., initial, growth, and maturity) for the respective vegetable crops should be referred in order to identify crops with water requirements that match the rainfall amount and pattern in Tawi-Tawi. Hot chili is a good example of such a crop, and has a comparatively high market price.

b) Results of technology transfer

Group interviews were held, and most of the beneficiaries recognized that the technologies learned during training were useful.[64] The interviews also disclosed the degree to which the respective technologies were applied, as shown in Figure 3.2.2.11, after asking seven of the 10 beneficiaries if they had applied the technologies. The degree of technology transfer shows a positive result. More than 30% of the participants in the group interview had already applied 19 of the 21 technological topics in their farming. However, soil sampling and recordkeeping were not yet adopted by all participants, who felt that they would take time to apply, although they understood their usefulness.

Other reasons were disclosed for taking time to apply for land preparation and vermi-composting, as identified by more than 50% of the participants. With regard to land preparation, a power tiller was demonstrated, although animal draft power using carabao was used to establish the farm. Two methods proved to be first experiences for the beneficiaries. Female participants found it difficult to operate mechanically powered land preparation tools. Land preparation still relies on manual labor. Thus, an economical method should be considered by first introducing the animal draft power of carabao, which is often observed in small-scale farming in Mindanao. With regard to vermi-composting, participants were shown individually how to construct a compost box using coconut lumber and local materials.

As shown in Figure 3.2.2.11 and Table 3.2.2.12, some technologies learned from the training were applied on individual farms of the beneficiaries and used in production for income generation.

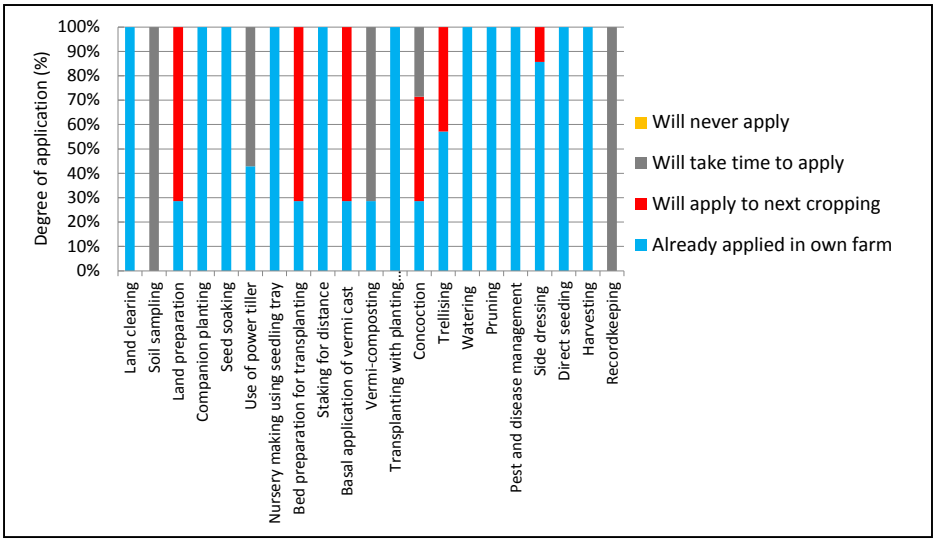


Figure 3.2.2.11: Degree of application of technologies learned

[64] The group interview with seven (three male, four female) of the 10 beneficiaries was held on the demonstration farm, Kulape, Panglima Sugala, Tawi-Tawi Province, on April 28, 2016. All seven participants in the interview agreed that the technologies were all useful.

Figure 3.2.2.12: Technologies applied on individual farms (left); eggplant planted with correct planting density (right)

Table 3.2.2.3: Record of individual production and sales of three beneficiaries of Panglima Sugala

Beneficiary	Crops	Production (Bundle, kg, pieces)	Unit Price (PHP)	Sales (PHP)
A	Bottle gourd	26	50	1,300
	Eggplant	70	10	700
	Bitter gourd	100	20	2,000
	String beans	70	10	700
	Cucumber	50	10	500
	Squash	N.A.[1)]		
	Hot chili	N.A.[2)]		
	Watermelon	N.A.[3)]		
B	Eggplant	40	10	400
	Hot chili	15	150	2,250
	Black pepper	45	180	8,100
	Eggplant	40	15	600
	Tomato	20	50	1,000
C	Bottle gourd	60	50	3,000
	Hot chili	9	240	2,160
	Eggplant	70	10	700
	Bitter gourd	15	20	300

Source: Interview with the beneficiaries of Kulape, Panglima Sugala, on April 28, 2016.
Note: 1), 2), and 3) Crops will be harvested after April 2016.

c) Other impacts

Farmers of Barangay Kulape in Panglima Sugala established the Kulape Kaadilan Farmers Association on April 18, 2016, by registering at the DOLE, Province of Tawi-Tawi, ARMM. There are 25 members of the association, which was the minimum number required to form the association. Ten (10) of the 25 members are beneficiaries of the CD-CAAM.

The long-term goal of the association is to work together to sustain organic vegetable production in the province. The farmers consolidated because they believe that by establishing the association, they can work more effectively and productively.

On October 27, 2015, during the orientation in the barangay to select beneficiaries for CD-CAAM, a basic group for the association was formed, and they elected the officials of the association. The CO of the PMO regularly visited and conducted meetings during the period of their registration with the DOLE. The CO facilitated the requirements for registration, such as the letter of intent for the group, a spot map

showing where the beneficiaries reside, the application for registration, the constitution, and the by-laws, among others.

2) Capacity building of BDA

The process of vegetable production and marketing during the pilot project in Tawi-Tawi is the same as that used in the previous phase in Sultan Mastura and Matungao. The difference between the two was the support provided to the PMO from the BDA RMO CenMin or Ranaw in the internal technology transfer within the BDA.

In this section, the process is divided into two stages, namely planning and implementation, and is reviewed to qualitatively evaluate the ability of the PMO, especially the PPOO (Provincial Project Operation Officer) and CO in agriculture, in terms of the management of the project on site. To do so, a review workshop was held and major activities, issues, and actions taken were discussed.[65]

a) Planning process

Table 3.2.2.4 shows the results of the review workshop on activities, issues, and actions taken during the planning stage.

During the technical survey, as social preparation, the PMO conducted interviews with farmers and observed the support provided by the BDA RMO CenMin and Ranaw. Farmers passing by were interviewed at random because of the inaccessible roads to particular barangays. Potential beneficiaries demanded an allowance to participate in the CD-CAAM project. The TMPO patiently explained that the project focused on capacity building, and was not cash for work. However, very few understood. As a result, the number of participants was reduced before selecting the beneficiaries. The BDA PMO found it difficult to convince potential farmers. However, 10 beneficiaries were finally selected, achieving the purpose of a barangay-wide orientation.

The first stakeholder meeting was effective in that it enabled the TMPO to understand the community development project of the CD-CAAM model. During the meeting, a POO was drafted with the support of the BDA RMO CenMin and Ranaw. As usual, the availability of RPs was an issue in creating the schedule. However, discussions continued until a compromise was reached. TMPO collaborated well with MAO and the resource persons from Tawi-Tawi. Logistical issued within the BDA were observed before holding the meeting. The CD-CAAM project staff had to reserve accommodation for the stakeholders before they arrived on the main island of Mindanao from Tawi-Tawi. Stakeholders used to be provided with hotel packages when participating in activities. Therefore, such arrangement should

[65] Review workshop with stakeholders from Tawi-Tawi held in Davao on April 19, 2016. The participants are representative of the BDA CMO, CO of TMPO, MAO of Panglima Sugala, resource persons of Tawi-Tawi Regional Agricultural College, CD-CAAM staff, and JICA experts.

have been done within the BDA.

Baseline and market surveys were well conducted by the BDA TMPO staff. The baseline survey found that most farmers of Panglima Sugala currently practice backyard farming because they are tenants and, thus, commercial farming is not observed. At the same time, the TMPO confirmed that vegetables sold in public markets mostly originate from Zamboanga City. Hence, the TMPO discovered and confirmed the significance of implementing vegetable production and marketing projects for community development in the target municipality.

Table 3.2.2.4: Activities, issues, and actions taken during the planning stage

Major Activities	Details	Issues	Actions
Technical Survey	• PMO visited barangays with support of BDA RMO CenMin and Ranaw • Observation and interview with barangay officials and farmers • Interview MAO and TRAC	Inaccessible roads to see existing farms in all the barangays	Random interview
Barangay-wide Orientation	• Oriented potential beneficiaries in the selected barangay about CD-CAAM • Presentation of criteria for selection • Confirmation of beneficiaries	Participants expected an allowance from the project because this is how other government programs operated	Project team explained that CD-CAAM is different from other programs; however, very few understood
First Stakeholder Meeting	• Orientation, exposure to demonstration and practice farms in Sultan Mastura and Matungao, and interaction with the farmers of the two municipalities • Drafting plan of operation (PO) • Practiced market survey, supported by RPOO BDA RMO CenMin	• Conflict of schedule with availability of RPs for drafting of PO • Participants from Tawi-Tawi used to be provided with accommodation for activities they joined	• Harmonize schedule between RPs and other stakeholders • IC Net staff reserved hotels and let them pay for themselves
Value Transformation Training (VTT)	All sectors' beneficiaries (30) attended three days' live-in training in Bongao, facilitated by BDA Basilan	Beneficiaries asked for an allowance for training	BDA explained that there is no allowance and that VTT is a requirement before any BDA project starts
Baseline Survey	Interview selected beneficiaries based on their farming	Production is backyard level and there is no commercial farming because most of farmers are tenants; thus, production data was not available	Recorded only information available from beneficiaries
Market Survey with Beneficiaries	• The survey was conducted at Batu-Batu public market with beneficiaries • Interviewed market vendors about saleable vegetables, origin of products, prices in peak seasons	Most vegetables originate from Zamboanga	

Source: Review workshop with stakeholders from Tawi-Tawi, held in Davao on April 19, 2016

b) Implementation process

Table 3.2.2.5 shows the results of the review workshop on activities, issues, and actions taken during

the implementation stage.

Before starting the hands-on training on the demonstration farm, three-day training was provided to teach basic vegetable production using the Manual developed by CD-CAAM. The manual was written in English, so the RP used Tausug.

During the implementation of the training provided on the demonstration farm, managerial and technical issues occurred. The problems the BDA encountered were typically caused by the location of Tawi-Tawi and its poor infrastructure. Though the BDA managed the activities under such circumstances, for future implementation, these issues should be considered during the planning stage for efficient and effective implementation in islands areas. Some examples are described below.

While establishing the demonstration farm with the beneficiaries, it was found that no beneficiaries owned carabao to use for land preparation. Therefore, the BDA TMPO approached the barangay chairman to use his animal for transportation. Moreover, it asked the TRAC for plows and harnesses. In reality, the land preparation was still difficult because no one knew how to prepare land using animal draft power in Tawi-Tawi. This was unexpected, and something the BDA did not face in Sultan Mastura and Matungao.

Agricultural inputs and tools needed for training could not be procured in Tawi-Tawi. These included fertilizer, chemicals, seedling trays, water hoses, pruning scissors, and plastic crates. Thus, they had to be procured in Cotabato and Davao and transported by CD-CAAM to the island. ANC was also transported to the island because none were available there. The RPOO BDA RMO CenMin transported it twice. The ANC should be maintained by MLGU and TRAC because they acquired the vermi-composting technology, and ANC increases the amount of compost produced in the compost-making box on the demonstration farm.

Efficient communication was difficult. Personal Wi-Fi modems were used among the BDA CMO, PMO, and CD-CAAM project staff because internet facilities are poor. In addition, on ground level, communication by cell phone was not reliable between the PMO and the beneficiaries. The PMO used a motorcycle to convey training information directly to the beneficiaries. The times and places where cell phone calls are possible from Tawi-Tawi to other areas are limited. At certain points, the cell phone signal is strong enough to call, but only within a limited time during the early morning.

Table 3.2.2.5: Activities, issues, and actions taken during the implementation stage

Major Activities	Details	Issues	Actions Taken
Three-day training on basic vegetable production	• Message delivery to the beneficiaries to understand that the program focuses on capacity building • Provision of lecture using the CD-CAAM manual • Demonstration farm established • Soil sampling	• The manual is an English version • Carabao could not be used to prepare land while establishing the demonstration farm because there is no animal draft power expertise in Tawi-Tawi. Thus, no beneficiaries owned draft power animals • Carabao are only used for transportation on the island	• During the lecture, the contents of the manual were translated into Tausug • The beneficiaries borrowed carabao from the barangay chairman and a plow from TRAC. However, land preparation was difficult. Therefore, training on plowing using carabao is required.
Technical training on demonstration farm	• Planning of next month's activity by PPOO, RPOO, and CD-CAAM staff • RPs recommend materials needed to PPOO, who create an activity plan based on the budget • PPOO prepares activity plan and budget • Training of each topic is provided to the beneficiaries on the demonstration farm, sometimes supported by RPOO BDA RMO CenMin	• Communication among PMO, CMO, and CD-CAAM project staff by e-mail, and between PMO and the beneficiaries by phone was very difficult because of nature of Tawi-Tawi • Cell phone signals are limited and available for limited times during the early morning • Limited availability of materials in Tawi-Tawi: fertilizers, chemical, seedling trays, water hoses, pruning scissors, and plastic crates • African Night Crawler was not available for vermi-composting • Stealing of farm products occurred once when beneficiaries were absent • JICA expert never went to observe for monitoring purposes in Tawi-Tawi	• Used personal Wi-Fi for e-mailing • Personally informed beneficiaries using a motorcycle • Procured materials in Cotabato and Davao and then transported them to Tawi-Tawi by someone going to the island • ANC was transported twice by RPOO BDA RMO CenMin
Matchmaking and selling	• Invited buyers to observe the demonstration farm • Exchanged contacts and prices	Production from the demonstration farm could not meet the demand of all eight buyers	MLGU will recommend expansion of the program to other barangays

Source: Review workshop with stakeholders from Tawi-Tawi, held in Davao on April 19, 2016

3) Challenges and recommendations for further promotion/expansion

The review workshops[66] and reviewing activity reports submitted by the BDA TMPO were used to identify challenges and recommendations for future promotion/expansion, especially for vegetable production and marketing activities, using the CD-CAAM community development model in Tawi-Tawi.

[66] The review workshop with stakeholders from Tawi-Tawi was held in Davao on April 19, 2016. The participants represent BDA CMO, CO of TMPO, MAO of Panglima Sugala, resource persons of the Tawi-Tawi Regional Agricultural College (TRAC), CD-CAAM staff, and JICA experts.

a) Mainstreaming of vegetable production and the CD-CAAM model marketing training program for community development in the MLGUs of Tawi-Tawi

Vegetables found in the markets in Tawi-Tawi are transported from Zamboanga. Promoting vegetable production in the island is worthwhile in order to meet the demand from the wet markets. The MLGU has to mainstream the vegetable production and marketing promotion activities in its socio-economic development, CDP-ELA. This needs to consider the circumstances on Tawi-Tawi experienced during the training on the demonstration farm in the Panglima Sugala Municipality. In this case, close coordination between the MLGU, TRAC, and BDA is required in order to sustain the demonstration farm. Beneficiaries need to be encouraged to be FTs to implement the FTF extension that was applied in Sultan Mastura and Matunago. Beneficiaries should also continue with collaborative farming on the farm as an income generation activity in addition to their individual farming.

b) Fostering farmer trainers for FTF

As mentioned above, applying the FTF extension approach requires fostering beneficiaries to be FTs. The experience of the BDA CMO, and BDA RMO CenMin and Ranaw will help the TMPO, MLGU, and TRAC to plan and implement the TOT and FTF. The same process used in Sultan Mastura and Matungao can be applied to the island.

c) Technical adjustment, considering the circumstances of Tawi-Tawi, for the effective implementation of the vegetable production and marketing promotion project

According to MAO and TRAC, rainfall patterns have changed in recent years in Tawi-Tawi. Vegetable production is heavily affected by the rainfall, so current climate changes should be studied carefully. The results can be used to plan appropriate training schedules for vegetable farming on the island. In addition, several technological adjustments are recommended that consider the circumstances on Tawi-Tawi: a) Securing irrigation water, b) Researching water stress-tolerant vegetable crops, c) Introducing animal draft power for land preparation, and d) Breeding ANC and maintaining vermi-composting technology.

With regard to a), facilities are required to harvest rain for irrigation and store it on a small scale for training purposes in order to mitigate the damage to vegetable crops caused by dry spells owing to climate changes. With regard to b), as seen in the growth of hot chili, other vegetable crops or varieties that are more resistant to water stress and that match the rainfall amount should be researched and introduced in the vegetable production training. With regard to c), it is recommended that skillful farmers are fostered who can operate animal draft power using carabao to prepare land. This is a challenge because plowing by animal draft power is rarely seen on the island. Lastly, ANC should be bred in collaboration with the MLGU and TRAC in order to maintain the vermi-composting technology because ANC is not available in Tawi-Tawi. The vermi-compost boxes of the demonstration farm can be utilized or can be duplicated as facilities for the MLGU or TRAC on their premises.

(2) Fisheries (Tawi-Tawi)

Tawi-Tawi is an island province with high potential for development of marine fisheries. Seaweed farming is a family-based enterprise and is considered one of the major sources of livelihood for coastal communities in Southern Mindanao. As the seaweed industry grows and expands, so do the number of farmers and families involved in seaweed farming, and it thus generates direct employment.

In the beginning, the project was expected to disseminate technologies of tilapia culture as an income generating source in Tawi-Tawi, which can be done through the internal techonology transfer within the BDA. However, based on a technical survey conducted by the BDA and the JICA expert team, it was found out that marine species, rather than freshwater species, are more suitable for aquaculture in view of development needs and potentials in Tawi-Tawi. As such, instead of internal technology transfer within the BDA, the seaweed culture was selected as a new livelihood project for the CD-CAAM model. Polyculture of seaweed and sea cucumber was also conducted alongside a site of seaweed culture as a pilot case. Commercial seaweed first began in the Philippines in the early 1970s in Tawi-Tawi, Sulu, and Zamboanga, and spread over to other parts of the country because of the high market demand for its industrial uses worldwide. However, seaweed producers experienced many challenges, such as the uneven quality of product that led to an unstable market price. Thus, the project aims to improve the quality of seaweed culture, post-harvest, and the marketing of the finished product. The poly-culture of sea cucumber is expected to give farmers a further opportunity to diversify their income source.

1) Implementation of seaweed culture project

The PMO Tawi-Tawi, the PPOO in charge of fisheries in particular carried out technical extension activities with supervision of a JICA expert team and coordination with MSU-Tawi-Tawi, whereas CMO and RMO provide managerial guidance for the efficient project implementation in the island. Figure 3.2.2.13 shows the project implementation flow in Tawi-Tawi

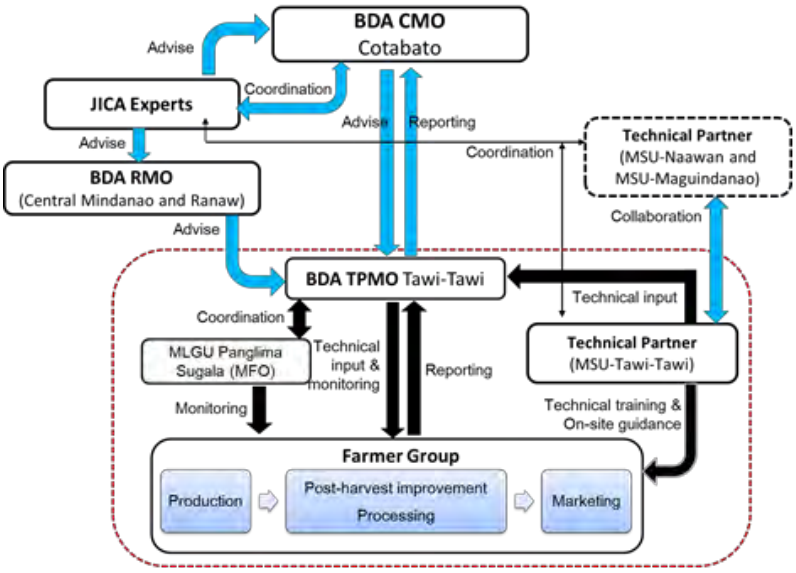


Figure 3.2.2.13: Project implementation flow of CD-CAAM Fisheries Sector in Tawi-Tawi

BDA PMO coordinated with a resource institute (the MSU Tawi-Tawi) and the Municipal Fishery Officer of MLGU. The MSU Tawi-Tawi provided technical training and on-site guidance to the PMO and community beneficiaries. As internal technology transfer within the BDA was one of the project purposes in the extension phase, the RMO Cen-Min and Ranaw and Central Mindanao provided advices to the PMO during the preparatory activities such as social preparation. CMO supervised overall activities of PMO, while the latter regularly reported the progress of the project to CMO to get proper guidance. As the project was on a new livelihood activity for the BDA, the JICA expert team in fisheries sector closely coordinated with BDA and MSU Tawi-Tawi, and provided necessary technical supports to BDA.

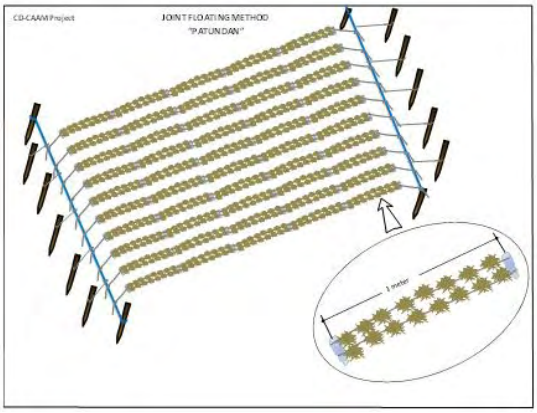
The BDA PMO staffs, with technical supports from the MSU Tawi-Tawi, conducted a site selection survey. The team gathered data on physical and ecological parameters, such as a) freedom from freshwater run-off, b) above 30 parts per thousand salinity, c) moderate water currents and wave action, d) protection by coves or bays, and e) at least 30 cm water depth at lowest tide. Biological factors such as the absence or minimal presence of macrograzers composed of large carnivorous fishes and invertebrates (puffer, surgeon fish, rabbit fish, parrot fish, sea star, and sea urchin), and the level of harmful epiphytes and diseases, were also considered. These are important factors to control during the culture period in order to sustain and succeed in the seaweed farming business.

BDA Tawi-Tawi measures salinity of seawater using a refractometer at the target site in Brgy. Buan

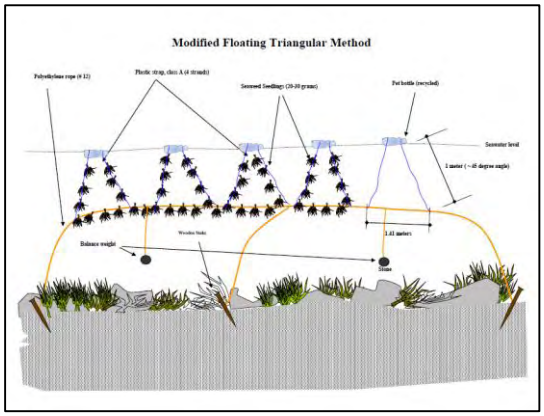
MSU Tawi-Tawi analyzes a water sample at the target site in Brgy. Buan

Figure 3.2.2.14: Water sampling at the target site for seaweed farming

The project adopted two types of seaweed farming methodsm, namely the stake-off bottom method and the floating method. The stake-off bottom method is normally applied in shallow water areas, sometimes dried-up during the lowest low tide. In this method, seaweed lines are tied to a wooden stake at both ends. Whereas, the floating method is adoptable in deeper water areas using float materials such as pet bottles, styrofoam, and bamboo poles. In this method, seaweed lines are tied to a raft constructed out of bamboos or polyethylene ropes. The CD-CAAM project applied a modified methods based on practice, applicability, and adoptability, which is locally termed the “patundan,” or the modified floating joint method, and “pasengkang,” or the modified floating triangular method (see Figure 3.2.2.15).



Modified floating joint method ("patundan")



Modified floating triangular method ("pasengkang")

Figure 3.2.2.15: Diagram of modified floating joint and triangular method

The main seaweed planting materials, such as polyethylene rope, plastic strap, softie, and recycled pet bottles (floaters), were sourced from local markets in the capital town of Bongao Tawi-Tawi, whilst other materials such as the wooden stake and seaweed seedlings were sourced from within Panglima Sugala and adjacent municipalities.

Softie plastic straw

Plastic strap, class A, 4 strands

Polyethylene rope, # 12

1 meter-float cultivation line with 4 strands plastic strap

Cultivation lines ready for tying with seaweed seedlings

Cutting of seaweed seedling

Wooden stake

Sledge hammer for driving stake

Stainless knife for cutting seaweed

Figure 3.2.2.16: Necessary materials for seaweed farming

On January 10, 2016, the community started the first culture cycle at two farm sites, namely the Hamri reef and Capitol, for the grow-out and nursery seaweed production sites. A total of 2,400 floats were planted in site 1 (Hamri reef) and 600 floats at site 2 (Capitol). In the succeeding cropping after two months, the first re-seedling was conducted, and production sites rose to six, namely Hamri reef, Tabba batu, Biha, Capitol, Taytayan, and Tinambang with 7,788 floats being planted. Harvesting of seaweed took time due to limited space for solar-dryer which can accommodate only 600-900 floats at one time.

(a) Loading harvested seaweed to transport boat

(b) Transporting seaweed from farm sites to stilt-type solar dryer

(c) Placing seaweed on top of solar dryer

Figure 3.2.2.17: Harvest of Seaweed

Dried seaweed should be packed in a cleaned sack free from dirt and impurities, as avoiding mixing different varieties of seaweed in one sack. Contact of dried seaweed with water (rain or seawater) must be avoided during transport as this reduces seaweed quality. Guidance was given to persons in charge of transportation to avoid falling-off seaweed to the sea during transport. The guidance included watching closely the weighing at buying station and keep separate record if necessary.

Additionally, a training for processing of seaweed-based food products was conducted for the beneficiary group to build their capacity on processing of seaweed into other food products, and sensitize them with the notion that seaweed is not merely for carrageenan extract for export market, but for value-added products which can be processed at community level. The training taught them Good Manufacturing Practice (GMP), that includes how to make seaweed-based food products out of dried seaweed available year round in their respective area. Table 3.2.2.6 shows some sample seaweed-based food products that can possibly be processed by community in Baragay Buan, Panglima Sugala.

Table 3.2.2.6: Sample seaweed-based products can be processed at community in Brgy. Buan

Processed products	Ingredients	Possible market distribution
1. Seaweed Noodles	1 cup seaweed puree, 3 cups all-purpose flour, 1 tbsp. Iodized salt, 1 ½ tsp. Lye, 1 g. food color (egg yellow)	Bongao, Tawi-Tawi
2. Seaweed jam	1 ½ cup puree, 2 cup white sugar, ½ cup pineapple (crashed), 2 tbsp. Calamansi juice	Bongao, Tawi-Tawi
3. Seaweed cracker	½ cup seaweed puree, 3-4 tbsps. Cheese/barbeque flavour (magic sarap), 1 ½ cups all-purpose flour, 1 tsp. Onion powder, 1 tsp. Iodized salt, ½ tsp white pepper, ¼ tsp msg, ½ tsp garlic powder, 2 tsps vegetable oil, ½ cup flour (for dusting)	Bongao, Tawi-Tawi
4. Seaweed yema	2 cans condensed milk, 1 teaspoon vanilla, 1 piece egg, ½ cup seaweed puree, ¼ cup peanut/sesame seed	Bongao, Tawi-Tawi
5. Seaweed Pastillas/Candy	1 cup seaweed extract, 1 tablespoon peanut, 2 ½ cups white sugar, food wrapper, 1 can condensed milk (small), 1 tablespoon calamansi juice, 3 teaspoons vanilla	Bongao, Tawi-Tawi

Processing of seaweed-based food products

Raw dried seaweed

Seaweed yema

Seaweed noodles

Seaweed kutsinta

Seaweed puto

Seaweed crackers

Seaweed jam

Seaweed ice cream

Figure 3.2.2.18: Sample processed seaweed-based food products

Trial of integrated sea cucumber culture with seaweed culture

Sandfish or sea cucumber is a high-valued commercial species with high demand both as a source of food and for its medicinal qualities[67]. Gathering of sea cucumber have been an important source of income for many coastal communities adding to seaweed and other fishery products in Mindanao, particularly in the Island provinces of ARMM.

Sea cucumbers are generally conspicuous in its natural habit and vulnerable to overfishing as apparent in many countries including the Southern Philippines. Due to its high market value that led this fishery product vulnerable to over fishing worldwide. Therefore, manager, planner and development partners in particular for Mindanao areas should take initiatives to keep this important and valuable species for marginal fishers within sustainable levels. Overfishing and depletion of this resources is generally a result of weak management, knowledge gaps about species ecology from which to formulate sound management, and generally data poor situation[68].

Technology and skills development on culture and hatchery of sand fish can be a defining factor to improve and upgrade efficient transfer of technologies to partners and eventually to community. Sea cucumber has high potential for culture in coastal areas in Mindanao because culture technology is simple, feeding on organic debris available at the substrate, and requires low investment capital to jumpstart the business.

The MSU Tawi-Tawi, the resource organization for seaweed culture project, is currently developing its own hatchery for sea cucumber, and CD-CAAM Project can complement the partnership with them by supplying broodstock or parent sea cucumber which may be required for future breeding. Therefore, beneficiaries from Baragay Buan and other coastal barangays in Tawi-Tawi could benefits and start sea cucumber culture without depending on unsustainable sourced from wild juveniles.

Sea cucumber farming is usually carried out in pens constructed from black net (B-Net) in reef flat alongside seaweed farm lots. As a trial, the project started with small-size pen measuring 200m² significantly to minimise risk while building the capacity of counterparts and seaweed farmers. In the future farmers may expand if the technology is proven effective. For stocking, the project bought mixed size sea cucumber from fishers who gathered it from natural environs. Sea cucumber for culture should be carefully, and it must healthy and without lesion on the skin to avoid problem in growth and mortality during culture period. Based on observation wild stock of sea cucumber are still available in Buan because it took only 5 days to gather 437 individuals.

[67] http://www.cgiar.org/consortium-news/sea-cucumbers-an-economic-savior/
[68] Conand et.al. A three-year project on sea cucumbers in the southwestern Indian Ocean.

Figure 3.2.2.19 shows construction of 10m x 20m (200m²) pen enclosure for sea cucumber brood development and culture. A total of 437 individual sea cucumber stocked of mixed size on February 11, 2016.

Figure 3.2.2.19: Construction of sea cucumber pen enclosure within seaweed farm site

(a) net sewing, (b) Fixing net enclosure, (c) Completed 10m x 10m sea cucumber pen, (d) Sea cucumber establish within seaweed farm.

Figure 3.2.2.20: Stocking of sea cucumber

(a) Community beneficiaries showing sea cucumber in plastic crate ready for stocking, (b) Stocking of sea cucumber, (c) Sea cucumber in plastic crate, (d) Sea cucumber burrowing at fine sand-silt substrate

Sea cucumber is high-valued species that is vulnerable to poaching because they are slow moving organism, and nocturnal, i.e. it is active at nigh time. Therefore, farmers have to closely monitor culture pen especially at night. Farmers also have to make sure that predators such as crabs are removed from

inside of the culture pen for at least an hour during each soring tide. Additionally, farmers performed other maintenance works such as cleaning of nets, repair, and control predator for once in a week to maintain good water exchange.

Figure 3.2.2.21: Sampling and monitoring of sea cucumber stocks
(a) weighing, (b) women beneficiaries keep record of sampled stocks

Figure 3.2.2.22 shows steps in processing and drying of sea cucumber conducted by community with technical supervision of an expert team and BDA. Prior to actual processing practice, basic lecture and video presentation were given for the benefiiaries to understand the basic procedure in processing sea cucumber. While some beneficiaries were previously engaged in catching wild sea cucumber, processing and selling the dried ones that greatly augmented their livelihood, however, overfishing of sea cucumber led to depletion of the wild stock and the activities were finally stopped. As such, trial pen culture of sea cucumber gave them a good opportunity to learn basic culture techniques and to revive their livelihood activity in the future especially if hatchery is in place for sustainable sea cucumber culture.


Harvesting sea cucumber


Gutting (removing intestines)


Cooking


Cleaning


Smoking


Solar drying/ finished product

Figure 3.2.2.22: Trial harvest and processing of sea cucumber (*Holothuria scabra*)

2) Evaluation of quantitative outputs in terms of production and sales and capacity building of beneficiaries

Table 3.2.2.7 shows the results of seaweed culture: 45-day culture in one block with an area of 600 m^2. The beneficiaries who managed the culture earned a net income of PhP 2,081 through 45-day operation with a return on investment (ROI) of 284%, which is a sufficiently high rate for sustainable aquaculture business.

Table 3.2.2.7: Results of seaweed culture per block in Buan, Tawi-Tawi (2016)

A.	**Total cost for facility per block (600 m²)**	**4,012**
1	Cost of materials	3,489
2	Cost of handling and transport :15% of material cost	523
B.	**Total production cost**	**2,138**
1	Seedling	1,920
2	Depreciation: 2-year life	218
C.	**Sales/gross income per block with 45-day culture**	**8,232**
1	Harvest: Dried weight, 35% Moisture content (kg)	329
2	Selling price (PhP/kg)	25
D.	**Net income per block**	**6,094**
E	**ROI (%)**	**284%**

(Unit: PhP)

The beneficiaries operate 60 blocks. By September 2016, the scale of seaweed culture will be expanded to more than 100 blocks. They can have seven cropping cycles per year of seaweed culture with 45-day operation. Table 3.2.2.8 shows the expected cost and profit per year in the project site based on the assumption that 100 blocks are in full operation in September 2016.

Table 3.2.2.8: Expected cost and profit of seaweed culture in full operation per year

A.	**Total production cost**	**1,496,600**
C.	**Sales/Gross income per block with 45-day culture**	**5,792,400**
D.	**Net income per block**	**4,265,800**
E	**ROI (%)**	**284%**

(Unit: PhP)

A full-scale operation with 100 blocks will have a major positive impact on income generation in the project area (additional records of the results of production and sales will be submitted later. In addition, results of a trial sea cucumber culture will be added later).

Harvesting and processing of cultured sea cucumber was conducted by community beneficiaries in trial basis, using sea cucumber weighing around 300g-400g/individual. The conservative assumption for grow-out period from 15-g juvenile to marketable size of 400g is 8 months, therefore, it is expected to have full harvest of sea cucumber cultured by the project on August to September 2016, by this time sea cucumber can also be selected as breeder/parent sea cucumber for hatchery production operated by MSU. The buying price of dried sea cucumber in capital town of Bongao is shown in Table 3.2.2.9.

Table 3.2.2.9: Buying price of sea cucumber in Bongao, Tawi-Tawi[69]

Sea cucumber size	Buying price in Bongao (PhP)
XL	4,000
L	3,000
M	1,400
S	200

In general, technology transfer to the beneficiary group was successfully completed as shown in Table 3.2.2.10.

Table 3.2.2.10: Technical and management achievement of beneficiaries (Self-evaluation survey)

Technical subject	A. Can practice by oneself	B. Can practice a little	C. Only know basic skills	D. Don't know any skills	Average Achievement Score
Preparation of seaweed farm site	80%	10%	10%	0%	3.2
Preparation of seaweed planting materials	90%	0%	10%	0%	3.6
Installation of seaweed planting materials	80%	20%	0%	0%	3.2
Sampling	40%	30%	30%	0%	1.6
Seaweed farm management (monitoring repair for any damages, etc.)	70%	20%	10%	0%	2.8
Harvesting of seaweed	100%	0%	0%	0%	4.0
Proper post-harvest management (drying, packaging storage)	100%	0%	0%	0%	4.0
Transport and marketing	90%	10%	0%	0%	3.6
Establishment and maintaining of seaweed nursery	90%	0%	10%	0%	3.6
Processing of seaweed-based food products	40%	50%	10%	0%	1.6
Sea cucumber culture, processing and marketing	40%	30%	30%	0%	1.6
Note: Achievement scores are calculated in the following manner Level A: 4.0 (can manage / handle technical matters properly), Level B: 3.0 – 3.9 (can manage / handle technical matters with proper guidance), Level C: 2.0 – 2.9 (need more experiences to manage/ handle technical matters), Level D: 1.0 – 1.9 (Need learn more technical matters)					

Additionally, as parts of sustainability plan, the beneficiaries registered their group as an official cooperative at the CDA-ARMM since May 2016 under the name of the Ridjikih Fisherfolks Marketing Cooperative, and expect to obtain the registration by July 2016.

[69] Market survey at Bongao Fish Trading, Bongao, Tawi-Tawi. June 16, 2016.

3) Capacity building of BDA

The BDA in Tawi-Tawi, and the PPOO in particular, carried out technical extension activities under the supervision of an expert team and in coordination with MSU Tawi-Tawi. The CMO and RMO provided managerial guidance to ensure the effective project implementation on the ground. Table 3.2.2.11 shows the technical activities, issues, and actions taken during the implementation of the project.

Table 3.2.2.11: Technical tasks carried-out by the BDA counterpart in Tawi-Tawi

Technical task	Content	Issues	Action taken by the BDA
(1) Preparation of materials for seaweed farming	• Preparation of seaweed materials based on approved procurement plan	• Some materials were not available in the locality • Transportation to the project site (by boat) was costly	• Referred to the expert team for advice and looked for a supplier in the locality that had materials with the same specification • Coordinated with the community to secure transportation and arranged necessary materials/inputs
(2) Establishment of seaweed farm	• Site selection and preparatory mobilization of community beneficiaries	• Beneficiaries requestd a transport boat and fuel	• Obtaining transportation was not easy for the project. It was discussed amongst members that somebody had to provide a boat for the project during field work
(3) Farm monitoring and data gathering	• Monitoring twice a week by the beneficiaries • Data gathering	• Beneficiaries could not monitor sometimes due to other committment • Data gathering was not easy because of farmers' limited capacity	• Assigned a community organizer to carry out on-site monitoring more closely
(4) Harvesting of seaweed	• Good harvesting practices	• Mixed-up debris and dirt with seaweed	• Supervised harvesting and observed quality control
(5) Post-harvest management	• Maintain quality of dried seaweed	• Mixed-up debris and dirt with dried seaweed during packaging	• Closely monitored activities to ensure the quality of dried seaweed
(6) Marketing of dried seaweed	• Local marketing of dried seaweed	• Price fluctuations and reductions due to moisture and debris in product	• Avoided price reductions by initiating discussions with buyers in order to understand desired moisture content of the product • Ensured that the dried seaweed did not make contact with water
(7) Seaweed nursery management	• Establish seaweed nursery for continuous supply of seedlings	• No established seaweed nursery in Barangay	• Explained the importance of having a seaweed nursery in each farm site to ensure a continuous culture cycle

Despite the initially very limited experiences in seaweed culture, the BDA generally demonstrated its ability of quick learning of the new technology. In terms of technical aspects, BDA became familiar with the basic skills necessary for seaweed farming and post-harvest improvement. The PPOO in charge of fisheries became able to provid a technical guidance and proper suggestions to local communities. However, he may need more experience on sea cucumber culturing and processing as there was not enough time for capacity building in the techonology.

Meanwhile, the BDA became adept at coordination with different stakeholders. PMO regularly communicated with both beneficiaries and updated the progress with the LGU staffs. The PMO staff

has also established a good rapport with the barangay LGU. In some occasions, the transport boat purchased for the project served as a sea ambulance to transport medical staff and medicines to the barangay, and it also helps teachers and students travelling to Bato-Bato during school related activities. While PMO established a good partnership with the MSU Tawi-Tawi, it may need further efforts to work more closely with the BFAR and other agencies.

4) Challenges and recommendations for further promotion/expansion

Given the distance of the island provinces from the mainland Mindanao, a dry-finished products have an advantage in its easier transportation. Abalone, sea cucumber, and seaweed can be processed to be dried products, among which seaweed is the most appropriate and easiest species for aquaculture because it requires the smallest input and most simple techniques for raising. As mentioned earlier, the return on investment (ROI) of seaweed was 284% in the first trial in the project. It indicates that, in seaweed culture, farmers can improve their income with a small amount of initial capital (according to the data collected by the project, farmers need capital of PhP 6,150 for one-block (600 m^2) operation of seaweed culture).

To further promote seaweed culture, capacity building on post-harvest management and an effective information campaign could help maintain the quality of dried seaweed in Tawi-Tawi that meets the quality standards of buyers and processors in both local and international markets. For example, local authorities must have seaweed farmers stop using agriculture fertilizer (NPK) completely. In particular, building a strong partnership with the BFAR will benefit farmers through the services of the agency. In the meantime, seaweed farmers often suffere from a monopoly by both exporters and middlemen that dominate domestic markets. Seaweed prices are often slashed for reasons such as moisture content and mixture of foreign matters. Farmers should act in a group rather than individuals, to build stable marketing linkages by establishing marketing contracts with different seaweed entrepreneurs.

Figure 3.2.2.23 illustrates sustainable approach of seaweed farming system developed based on the project experience. Seaweed farming can be more sustainable if seaweed seedling banks/ nurseries are established near the grow-out farm for systematic farming. The purpose of seaweed seedling bank is to provide sustainable supply of seaweed for successive farming cycle, to maintain quality variety of seaweed strains, and to reduce expenses from constantly procuring seaweed seedling from other areas/municipalities. Besides the seedling bank, farmers should establish multiple farm sites to adopt more than one farming techniques with nursery at each sites. In the area, selection of farm sites is increasingly critical for good growth rate, and having multiple farm sites would be advantageous for farmers to transfer or exchange seedlings from one site to another in case of impurities brought by epiphytes and other environmental factors, which often lead to contamination and diseases called “ice-ice”.

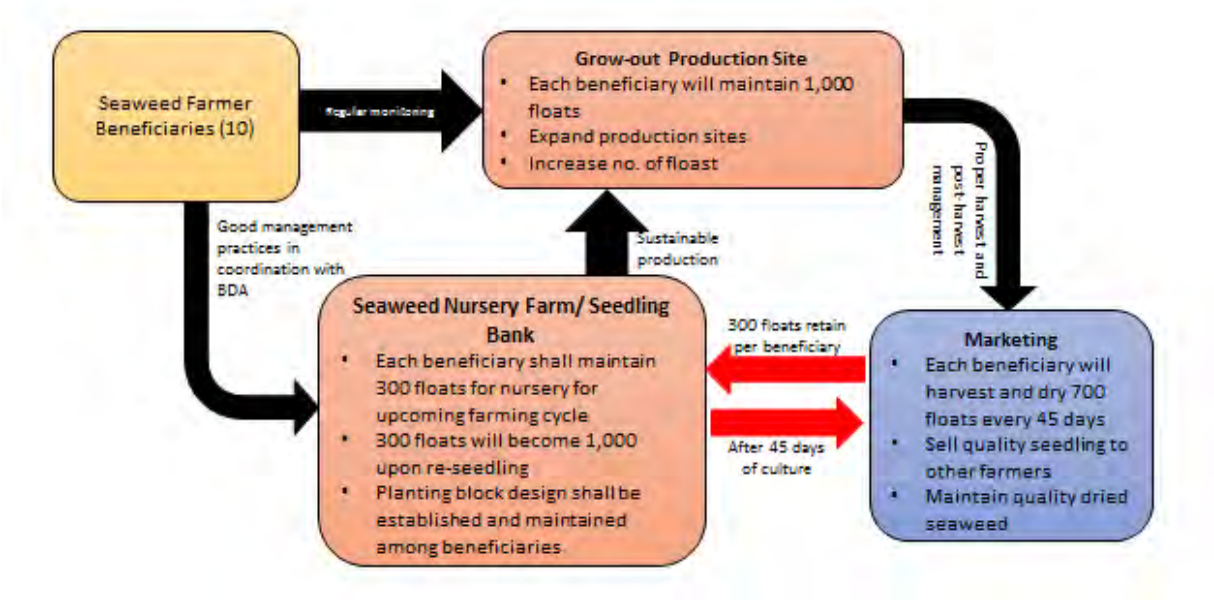


Figure 3.2.2.23: Sustainable cycle of seaweed farming system

Meanwhile, sea cucumber is an appropriate species for integrated seaweed culture because it is a benthic animal that feeds on detritus on the seabed. The animal takes in waste seaweed. Establishment of a seaweed nursery is often overlooked and has not been given priority. Given the limited period of the extension phase, the results of a trail sea cucumber culture are not fully analyzed yet, and some follow-ups may be critical to make the best use of this valuable experience and to further contribute to livelihood improvements for the communities in Tawi-Tawi.

(3) Livestock (Tawi-Tawi)

In rural areas of the Philippines, the goat is one of the most important domestic animals, especially for smallholders who keep more than 95 percent of the nation's total number under backyard conditions.[70] Furthermore, goats are indispensable for some religious festivities, especially for the Muslim population, who are dominant in the project's target area, namely Mindanao. According to the recent statistics of the nation's total number, which is more than 3.6 million in count, almost 40 percent of goats reside in Mindanao.[71] In this context, in the rural societies of this region – including the islands of Tawi-Tawi – the goat has an intrinsic value far exceeding its value as a mere meat providing animal.

Nevertheless, since the people of Mindanao have long been hit by the cycles of violent conflict and displacement in the past decades, they could neither fully take advantage of the goats as their livelihood resources nor grasp the opportunity to learn practical goat-keeping techniques. Therefore, the implementation of a goat-keeping scheme as a new tool for the CD-CAAM model was highly appreciated.

[70] Philippines statistic authority (2015); goat industry performance report
[71] Philippines Bureau of Agricultural Statistics (2013)

1) Results of technology transfer

Because the project, beginning in April 2015 and ending in July 2016, lasts only 15 months, a period which is shorter than the ordinary goat production cycle, special attention was paid to organizing various training courses. This was done so that all beneficiaries may witness every important stage of goat production, such as fattening, breeding, kidding, and selling.

As a capacity building tool: In anticipation of the phase-out of the project, all activities to be undertaken by the goat sector must be executed by the BDA itself, as a self-help creation period, under the auspices of the JICA experts. This is pursuant to the OJT approach of the CD-CAAM project, which works toward building the overall project management capacity of the BDA.

a) Preparation stage

Although the project does not provide the beneficiaries with high-tech and unreasonably modern equipment or high-maintenance machines, the demonstration farm is still considered an attractive showcase. Here, an ordinary livestock farmer, especially goat keepers, could learn the basic ideas and obtain practically and financially attainable know-how of production systems that are finely adjusted to the local socio-economic and climatic conditions. With regard to a model goat house, while there are many different kinds of farmers, a one-size-fits-all model is not appropriate. Thus, the model was considered to be a collection of various goat houses (two types) in which visitors, depending on their purpose, and/or technical and financial backgrounds, could find the most suitable one. In Tawi-Tawi, a semi-commercial type and a backyard type were constructed (Figures 3.2.2.24, 3.2.2.25).

Figure 3.2.2.24: Semi-commercial type

Figure 3.2.2.25: Backyard type

In addition, improved grass pastureland was established. In general, goats are reputed to be highly willing to eat a wide variety of plants, some of which cattle and sheep totally reject. This is one of the great advantages of the goat, because a small-holder can try many types of plants it may find in its environs such as roadside grasses, weeds, or scrubs. However, this does not mean that improved grass is not necessary for goats. In Tawi-Tawi, it is rather indispensable for beneficiaries to grow improved grass because almost all of the local farmers use only naturally grown plants, which are not nutritionally sufficient to keep their goats healthy. Thus, two of the highly renowned and locally (in the main land of

Mindanao) available improved grasses, namely Super Napier (*Pennisetum purpureum* "Super Napier") and Setaria grass (*Setaria anceps*), were introduced (Figures 3.2.2.26, 3.2.2.27). The establishment of the pasture land was delayed by more than two months. This is because of a severe drought which hit the island recently.

Figure 3.2.2.26: Super Napier grass

Figure 3.2.2.27: Setaria grass

Compared to other ruminants, especially cattle and carabaos, goats are efficient animals in terms of the use of water. This constitutes one of the greatest physiological advantages of goats. Goats obtain sufficient water from their feeds, which reduces the need for drinking water. Nevertheless, goats do require drinking water as well. Thus, it is extremely important to have water resources such as wells, rivers, or ponds. In Tawi-Tawi, as there were no stable water sources as mentioned above, the project provided a simple and practical well water system, including a pump.

As complementary instruments to the technology transfer, especially for demonstration farms activities, the project provided some materials and equipment for effective and efficient outputs as specified in Table 3.2.2.12. Some items such as goat houses may seem expensive; however, considering the durability and costs per year, they will pay dividends in the long run.

Table 3.2.2.12: Provision of materials for effective and efficient project performance

#	Items	Estimated total costs	Maintenance	Durability	Costs per year
1	Goats (13 does and 2 bucks to be delivered)	15 x @ PHP 4,800 = PHP 72,000	Daily care	5 to 6 years	Appx. PHP 13,000
2	Goat houses	PHP 60,000/ 2 units	Minimum	>20 years	PHP 3,000
3	Pastureland (cutting*)	5,000 x @ PHP 15 =75,000	Fertilizer	>10 years	PHP 7,500
4	Water supply system	PHP 25,000	Minimum	>10 years	PHP 2,500
5	Multi-purpose shed	PHP 40,000	Minimum	>10 years	PHP 4,000
6	Vermicompost shed	PHP 10,000	Daily care	>10 years	PHP 1,000

*A graft of stem, including at least two nodes from which a branch grows. The project used Napier grass.

b) Training

Many training courses for beneficiaries and the BDA and the LGU coupled with other complementary activities, such as technical meetings, were conducted. All these training courses had emphasized on business aspects of goat production. In addition, the project conducted a study tour to show beneficiaries both practical and advanced goat production activities in the University of Southern Mindanao (USM), Mindanao Baptist Rural Life Center (MBRLC), and some other advanced goat farms (Figure 3.2.2.28,

3.2.2.29). However, in this study tour, unlike those beneficiaries from Sultan Mastura and Matungao in the main island, beneficiaries from Tawi-Tawi did not participate because of the distance and duration of the trip from Tawi-Tawi to the main island. Thus, beneficiaries could not leave their daily activities for a long time as all of them were active farmers and the mainstay of their family. Therefore, the project arranged for some staff members from the BDA and the LGU, who would participate and then train the real beneficiaries on the new teachings and practices.

Meanwhile, in Mindanao, the majority of small farmers, like their counterparts in other tropical countries, grow some crops and raise animals, including some fish. Only a few farmers practice integrated farming in which an output of one subsystem, say livestock, which otherwise may be wasted, becomes an input to another subsystem, for instance, agriculture. In this context, vermicompost constitutes one of these activities. It uses goat manure and remains of grasses as a feed for earthworm, which form worm casting. The end product of the breakdown of organic matter is used as compost for growing crops. Vermicompost could also be a source of income. While the agriculture sector has already introduced this practice into its activities for vegetable production, vermicompost was also integrated as one of the training components for goat production (Figures 3.2.2.30, 3.2.2.31).

Figure 3.2.2.28: Study tour at Mindanao Baptist Rural Life Center (MBRLC) in Davao del Sur

Figure 3.2.2.29: Study tour at the University of Southern Mindanao USM demonstration goat farm

Figure 3.2.2.30: Shed for vermi-compost

Figure 3.2.2.31: Vermin (earthworm)

2) Quantitative outputs of production and sales

In Tawi-Tawi, like most parts in the Philippines, the main product for sale associated with goat-raising activities is goat meat. Farmers seldom sell goat meat at the farm gate. Instead, traders come to farms and buy live goats on the hoof and take them to local markets to sell again or for some occasions. Some

other farmers buy goats to raise them again for breeding purposes. As of April 2016, as the project has not yet introduced any goats into the demonstration farms, no output has been registered (a separate report on quantitative outputs will be submitted later).

Apart from main products, goat farmers have other materials or by-products that are marketable. This includes goatskins and goat manure for fertilizers, including vermicompost or cuttings of some improved grasses. In this context, it should be mentioned that in April some local farmers in Tawi-Tawi, having observed the lush Napier grass at the demonstration farm, asked whether they could buy some cuttings to plant as pasture for their goats' grazing. While the revenue earned from the sale of the grass cuttings was small (200 Php. total for 20 cuttings), the fact that a product or by-product of the demonstration farm was commercially attractive to local farmers seems promising both for the beneficiaries and for the local community, because those local goat farmers could be the first of many to visit the demonstration farm to buy grass cuttings or even other products and therefore see the technology that the project is providing to enable better livelihoods.

Based on the information gathered during surveys, including dialogues with traders of local markets, the most marketable sizes of goats and some other parameters for sale are as shown in Table 3.2.2.13.

Table 3.2.2.13: Marketable sizes and farm-gate prices of goat for sale

#	Parameters	Variables	Remarks
1	Live weight	15 to 25 kg	Information from traders
2	Withers height for sale	45 to 60 cm	
3	Price range per head	PHP 1,800 to 5,000	
4	Average price per head	PHP 3,000	

Considering both locally available data from USM and some scientific reports and manuals in the tropics, we have defined the general reproductive and productive parameters of native goats in Mindanao as shown in Table 3.2.2.14, based on which the outlook was predicted.

Table 3.2.2.14: Reproductive and productive parameters of native goats

#	Parameters	Variables	Remarks
1	Age at first kidding	14 months	Estimation
2	Litter size	1.5	Minimum No. of newborn kids
3	Kidding interval	10 months	Estimation
4	Time taken to finish weight or height	8 to 9 months	Ideal range
5	Economic life span and no. of kids	Ca. 6 years / 6 kids	Reproductively active life
6	Mortality of kids to 6 months	20%	Estimation (culling included)
7	Mortality of adults goats (does)	10%	Estimation (culling included)
8	Kidding rate*	90%	Estimation
9	Ratio of replacement	20% of doe kids	For breeders
10	Male/female ratio	1:1	General estimation

* The number of does kidding divided by the total number of the does, measured on an annual basis

Thus, a newborn female goat, a doe, will take 14 months to give birth for the first time, in which more than 50% of does have two or more kids (estimated as 1.5). Then, 60% of these does are sold when they are 8–9 months old for meat, while 20% of them are culled and 20% of the does are used as replacement.

In the meantime, 80% of does, as 10% are culled and another 10% are not bred for any reasons, should be cyclic, which means that they give birth at an interval of 10 months. Based on this calculation and supposing the number of initial does to be 13 with a mortality rate of 10% and to be bred at a ratio of 9 to 10, the breakdown of the demonstration farms herd would be as given in Table 3.2.2.15.

Table 3.2.2.15: Estimated goat sales from Tawi-Tawi demonstration farms

Years	Original does	Breakdown				
		Number of new does	Total number of does	Goat for meat		Kid goats culled
				Per year	Cumulative	
Starting year	13	0	13	0	0	0
1st year	11.7	1.4	13.1	12.6	12.6	3.5
2nd year	10.5	2.7	13.2	12.7	25.3	3.5
3rd year	9.5	3.8	13.3	12.8	38.1	3.6
4th year	8.5	4.9	13.4	12.9	51.0	3.6
5th year	7.7	5.8	13.5	13.0	64.0	5.6
6th year	6.9	6.7	13.6	13.1	77.1	3.7

According to this estimation, the number of goats for sale per year varies from 12 to 13 (*See* shaded rows). Therefore, based on the price range at the local markets (Table 3.2.2.(3)-2), the estimated goats sales revenue per year will be from PHP 21,600 (12 goats ×PHP 1,800) to PHP 65,000 (13 goats ×PHP 5,000), with the average being PHP 42,500 (12.5 goats ×PHP 3,400).

As mentioned in the previous section, some by-products from the goat keeping or some materials used for goats, which become occasionally abundant, could be sold as a sideline business. In the case of Tawi-Tawi demonstration farms, Napier grass and vermicompost were two of them. Based on the experiences from other demonstration farms in Sultan Mastura and Matungao, estimations were derived, which are given in Table 3.2.2.16.

Table 3.2.2.16: Estimations of sales of other items

#	Items	Estimated prices at local markets	Saleable amounts	Estimated revenues
1	Napier grass	PHP 15/cutting	400 cuttings/month	PHP 6,000
2	Vermicompost	PHP 250/sac	2 sacs/month	PHP 500

3) Capacity building of BDA

A notable method for capacity building of the BDA provincial project operation officer (PPOO) for the livestock sector was the internal technical transfer of practical guidance and coaching from BDA CMO and mainland RMOs to the PPOO, in conducting the ground activities of the sector, from the planning phase to implementation phase. In this manner, the capacity building efforts of the project not only address the current capacity of the newly established PPOO but also strengthen the BDA as an institution.

Pursuant to the concept of internal technology transfer, before any training sessions and other activities were initiated, a technical coordination meeting was conducted with the stakeholders of the sector, i.e., the BDA CMO, RMO, PMO, and the MLGU. Through this meeting, the BDA personnel (CMO and RPOOs) shared valuable practical tips and experiences with the PMO. The efficacy of the technical coordination meeting was proven in the subsequent social preparation 1 and social preparation 2

activities, which were: (1) technical survey, (2) community profiling, (3) value chain survey, (4) barangay-wide orientation, and (5) baseline survey (Table 3.2.2.17).

Table 3.2.2.17: Activities, issues, and actions taken during the planning phase

Major Activities	Details	Issues	Actions
Technical Survey	• PMO visited barangays with the support of BDA RMO, CenMin, and Ranaw • Observation and interview with barangay officials and farmers to validate the technical feasibility of the candidate demo farms	Some respondent barangay officials were not residing in the target barangays and were difficult to locate	Interviewed the respondents initially listed in the Technical Survey Guidelines
Value Chain Survey	• Interviews with PAO and MAO • Interviews with goat farmers • Interviews with traders in the public markets of Panglima Sugala and Bongao	• Live or chevon traders were nonexistent in the public markets • Neither PAO nor MAO have complete data on the consumption (usage) of live goats and chevon meat in the province	Apart from all procedures implemented as detailed in the technical survey guidelines, all survey limitations were also recognized and were noted in the reports
Community Profiling	Interviews with Barangay officials	All respondents did not have the data being requested; only estimates were given to the enumerators which were then physically validated	By using the community profiling tools, the enumerators interviewed the target respondents
Barangay-wide Orientation	• Inducted potential beneficiaries in the selected barangay about CD-CAAM • Presentation of project implementation plan (PIP) • Presentation of criteria for selection • Confirmation of beneficiaries	The participants of the orientation program recommended the integration of native chicken, which was not part of the project implementation plan	The project team thoroughly explained the background and profile of the project, which was understood and accepted by all
Baseline Survey	Interviews with selected beneficiaries based on their goat farming practices and experiences	Not all of the respondents were informed on proper goat production practices; they were also not engaged in extensive marketing activities to promote the sale of their stocks	Training courses were contextualized to the level of knowledge of the selected beneficiaries; highly technical procedures and practices were simplified for easier comprehension

Source: Reports from BDA PMO and goat sector coordinator

During the actual implementation, the OJT approach of the capacity building efforts of the project is highlighted. The BDA PMO has been extensively exposed to the following key competencies: (a) implementation of technical instructions from experts; (b) coordination with beneficiaries and LGU; (c) coordination between and among the BDA personnel; (d) managing ground activities; and (e) monitoring and evaluation activities. Table 3.2.2.18 details the activities, issues, and actions taken during the implementation phase.

During the implementation, the establishment of the demo farm was applied simultaneously along with the technical training sessions that were given to the selected beneficiaries. Thus, the magnitude of activities that the BDA PMO managed to implement was truly hectic and difficult.

One difficulty faced during the implementation phase is that no existing institution in the province has the capacity to provide immediate technical advice on the technicalities of the establishment of the demo farm and the management of goatherds besides the local experts from the University of Southern Mindanao, which is located in Kabacan, North Cotabato Province. Despite the critical remote supervision of the management of the project, the BDA PMO successfully implemented all the pointers and instructions from the local experts from USM and the JICA experts. Hence, the efficacy of the technical coordination meeting was again proven by the performance of the BDA PMO.

Another difficulty experienced during the implementation was the Internet connectivity in Tawi-Tawi, which is ever so intermittent. Submission of reports from the BDA PMO was frequently delayed due to the poor connection.

Availability of biologics (medicines, vitamins, syringes, etc.) was also identified as a constraint in the implementation because there are no shops or any veterinary suppliers that sell these in the province. The biologics had to be procured in Cotabato City or Davao City and shipped to the villagers occasionally.

Table 3.2.2.18: Activities, issues, and actions taken during the implementation phase

Major Activities	Details	Issues	Actions
Establishment of Demo Farm	Physical construction of demo farm facilities	• Construction supplies and materials are more expensive in Tawi-Tawi than in mainland Mindanao • Water supply needed for construction and maintenance of forage garden was inadequate during the drought • There were no existing commercial goat farms that sells upgraded goat breeds	• Specifications of materials for demo farm structures were adjusted to fit the limited budget • Water had to be bought during the construction and maintenance of forage garden • Dr. Atok of USM had to handpick the goats from a number of goat farmers during the stocking of the demo farm
Technical Trainings	The beneficiaries were taught proper goat production practices, farm record keeping, and how to prepare a business plan	• The lectures were quite technical, which the beneficiaries had difficulty in coping up with, despite the simplification of the modules • The simplified accounting subjects and preparation of business plan were still quite difficult for the beneficiaries' comprehension	Further guidance from the training team had to be given to ensure the comprehension from the beneficiaries

Major Activities	Details	Issues	Actions
Regular Goat Herd Monitoring Activities	The beneficiaries were required to record the body profiles (measurements) of every goat in the farm to monitor its growth and health.	The farmers were having some difficulties in diligently following the frequencies of record keeping of the goat herd body profiles	With the assistance of the BDA PMO and MLGU counterparts, they guide the beneficiaries in conducting the record-keeping activities
Preparation of Business Plan	With the intense coaching from the BDA PMO and MLGU counterparts, the beneficiaries were tasked to prepare their very own business plan to map out the sustainability plan of their association	The required mathematical computations in preparing production simulation projections, projected cash flow, and income seemed to be difficult for the beneficiaries	With the assistance of the BDA PMO and MLGU counterparts, the beneficiaries facilitate the preparation of the business plan

Source: Reports from BDA PMO and goat sector coordinator

4) Challenges and recommendations for further promotion/expansion

In rural areas of Mindanao, including islands, goats are commonly sold through local traders or middlemen. Usually, they are the ones who have wide commercial interests. They travel to farms in vehicles and goats are bought on the hoof. Usually, farmers are paid a sum without much bargaining. However, with more knowledgeable farmers, the price paid is based on live weight.

Besides, even in rural areas, some farmers try to add value to goat meat or goat products. Halal goat meat is one of them, as further discussed in the next section. Nowadays, there are many types of goat meat products such as sausages and cooked meat. Also, in consideration for sex and age is important because they influence meat properties, especially organoleptic ones such as tenderness, appearance, aroma, juiciness, and palatability. As the beneficiaries usually work in groups, they may take the initiative to set up an organization for processing goat products in the future. In this context, goat milk should also be considered because even in Mindanao, some institutes such as MBRLC are already exploiting goat dairy activities successfully.

To elaborate the challenges of and recommendations for further promotion/expansion of the goat as a commodity in the province, many highlights of the findings of the value chain survey in the municipalities of Bongao, Panglima Sugala, and Tawi-Tawi were defined, which are given in Table 3.2.2.19.

Table 3.2.2.19: Highlights of the findings of the value chain survey in Tawi-Tawi

Acceptability	● According to the latest data from the Provincial Agriculture Office (PAO), Panglima Sugala has 1,500 goat heads and the whole of Tawi-Tawi Province has 11,653 goat heads. ● Because the majority of the population in Tawi-Tawi is Muslim, goats are in high demand during Muslim festivities and occasions for ceremonial purposes. However, the general population does not prefer goat dishes as a daily or occasional meat compared to chicken, fish, and beef. ● According to the PAO, Christians prefer goat meat for their meal and are popularizing delicious goat dishes in Tawi-Tawi.
Production practices	● The majority of the goats are raised only on a backyard scale. In Panglima Sugala and Bongao, there are no commercial goat farms. ● The majority of the goats are raised by a free range method and are not fenced. ● There is a lack of proper forage grasses, according to the PAO and Municipal Agriculture Officer (MAO). ● The majority of the farmers believe that if they fence goats, they might die. ● The majority of the farmers do not have any know-how on goats' health management. ● The majority of the farmers do not have the ability to determine whether any type of grass is good or bad for goats. ● Skin diseases and worms are the most common problems faced by goat farmers in Tawi-Tawi. ● The major sources of stocks are Zamboanga City and Pagadian City.
Marketability	● Goats are saleable during Muslim festivities and occasions only. Residents from the neighboring island municipalities come to Panglima Sugala and Bongao to buy goats during such occasions. ● There are no live goats or chevon vendors in Panglima Sugala and Bongao. According to the PAO, selling of live goats in the public markets is rare in the whole of Tawi-Tawi province. Buyers usually buy goats directly from goat farmers. ● Prices of goats range from PHP 4,000 to 6,000 per head depending on the size. ● Male goats are more saleable than female goats as they are preferred for Islamic baptism (Aqiqa) and Eid'l Adha. ● The majority of the population in Tawi-Tawi does not prefer goat dishes due to its smell and taste. ● There are no existing eateries or restaurants that serve goat dishes.
Value-adding activities	● There are no existing value-adding activities for goat meat in Tawi-Tawi.
Programs	● Panglima Sugala was a recipient of a goat dispersal program from Payapa at Masaganang Pamayanan (PAMANA). ● Department of Agriculture and Fisheries-Autonomous Region in Muslim Mindanao (DAF-ARMM) had obtained technical assistance on animal health for the entire province of Tawi-Tawi.

Based on the first-hand information gathered from the survey as highlighted above, the current situation of the goat commodity in Tawi-Tawi in a nutshell is that the province has many goats but the demand is still limited due to relatively low acceptability of chevon as a meat dish owing to its perceived foul smell and taste. Many random interviews were conducted to find out as to why the majority of the population thinks the meat has foul smell and taste, and it was found that they lacked knowledge on proper slaughtering and preparation methods of the meat that would eradicate such smell and taste. As no existing restaurants or eateries in the province promote delicious chevon dishes compared to those in the mainland Mindanao, the wrong perception about the meat is yet to be changed. Nevertheless, despite the adverse perception, the meat's cultural and religious value keeps the demand for goats afloat.

In this light, the main challenge faced by the goat farmers regarding the goat commodity in the province is to change the population's negative perception on chevon dishes. Once this perception is swayed to the positive side and more restaurants and eateries serve good chevon dishes, the demand will definitely increase drastically and the sale of goats will not just be on an occasional frequency. Hence, the intensification of promotion of chevon dishes in the province is highly recommended. Whether it would be efforts from the government sectors such as DAF-ARMM and Provincial Agriculture Office or from the private sectors such as restaurants and eateries, any promotional activity of popular and delicious

chevon dishes such as *kilawin and caldereta* should be encouraged.

3.2.3. Implementation of a new program

(1) Livestock

1) Results of technology transfer

The demonstration farm is considered an attractive showcase where ordinary livestock farmers, especially goat-keepers could learn the basic idea and practical and financially attainable know-how on production system which is finely adjusted to the local socio-economic and climatic conditions. As mentioned earlier, a one-size-fits-all model is not appropriate. Thus, the model was considered as a collection of various goat houses (3 types) in which visitors, depending on their purpose, and/or technical and financial backgrounds, could find the most suitable one. In Sultan Mastura and Matungao, a commercial type (Figures 3.2.3.1, 3.2.3.2), a semi-commercial type and a backyard type (Figures 3.2.3.3, 3.2.3.4) were constructed.

Among the three types of goat houses, there is no difference in production, reproduction, or flock health, including growth rate, fertility, mobility, and mortality. However, the commercial type of goat house attracts more attention from farmers, especially financially capable ones. By contrast, farmers who have less financial resources seem a little bit intimidated by the somewhat sophistication of the commercial type. As such, the BDA staff and the beneficiaries tried to provide visitors with a clear concept of the demonstration farm as a trial of various alternative methods, some of which may be appropriate to their own situations.

Figure 3.2.3.1: Commercial type in Sultan Mastura

Figure 3.2.3.2: Commercial type in Matungao

Figure 3.2.3.3: Backyard type in Sultan Mastura

Figure 3.2.3.4: Backyard type in Matungao

Super Napier (*Pennisetum purpureum* 'Super Napier') and Setaria grass (*Setaria anceps*), were introduced (Figures 3.2.3.5, 3.2.3.6) in Sultan Mastura and Matungao. Although the establishment of pastureland was delayed up to two months because of a severe drought, it was impressive to see that both Super Napier and Setaria grasses have firmly taken root and grown lushly in the new lands.

Figure 3.2.3.5: Super Napier in Sultan Mastura

Figure 3.2.3.6: Setaria in Matungao

Both Sultan Mastura and Matungao have no stable waterholes. Thus, the project provided a simple and practical well water system: a shallow water well unit for Sultan Mastura and a water pumping unit for Matungao.

As complementary instruments to technology transfer, especially for demonstration farm activities, the project provided a few materials and equipment for effective and efficient outputs as specified in Table 3.2.3.1. Items such as goat houses may seem expensive. However, considering their durability and costs per year, they will pay dividends in the long run.

Table 3.2.3.1: Provision of materials for effective and efficient project performance (each demonstration farm)

#	Items	Estimated total costs	Maintenance	Durability	Costs per year
1	Goats (22 does and 3 bucks, already delivered)	25 x @ PHP 4,800 = PHP 120,000	Daily care	5 to 6 years	Appx. PHP 22,000
2	Goat houses	PHP 255,000/3 units	Minimum	>20 years	Appx. PHP 12,000
3	Pastureland (cutting*)	5,000 x @ PHP 15 =75,000	Fertilizer	>10 years	PHP 7,500
4	Water supply system	PHP 22,000**	Minimum	>10 years	PHP 2,200
5	Water supply system	PHP 70,000**	Minimum	>10 years	PHP 7,000
6	Multi-purpose shed	PHP 70,000	Minimum	>10 years	PHP 7,000
7	Vermi-compost shed	PHP 10,000	Daily care	>10 years	PHP 1,000

*A graft of stem including at least two nodes from which a branch grows. The project used Napier grass.
**For Sultan Mastura, a simple water pump, and for Matungao a more powerful one.

Various training courses for beneficiaries and the BDA and the LGU as well, coupled with other complementary activities such as technical meetings, were conducted. Additionally, the project organized a study tour both for the beneficiaries and staff members of the BDA and the LGU in USM, MBRLC and other advanced goat farms as seen in Figures 3.2.3.7 and 3.2.3.8.

Figure 3.2.3.7: Joint Study Tour in USM


Figure 3.2.3.8: Joint Study Tour in USM

As practiced in Tawi-Tawi and for the same reason, vermi-compost preparation was introduced in both Sultan Mastura and Matungao as part of integrated faming (Figures 3.2.3.9and 3.2.3.10).


Figure 3.2.3.9: Shed for vermi-compost in Sultan Mastura


Figure 3.2.3.10: Shed for vermi-compost in Matungao

Unlike projects of the projects for agriculture and fisheries in both Sultan Mastura and Matungao, the goat project originally did not include FTF due to its limited time frame. However, having observed and visited the demonstration farm, many local farmers in Sultan Mastura and Matungao requested to the BDA for technology extension of goat-keeping. In response to this request, a TOT was conducted by the USM to train the 1st beneficiaries to become a FT to further promote the technologies to other farmers.

2) Quantitative outputs of production and sales

The first batches of goats, 20 does and 3 bucks each, were introduced into the demonstration farm of both Sultan Mastura and Matungao in December 2016, respectively. As of April 2016, the flock composition of each demonstration farm and relationship between body weight and withers height as growth performance are shown in Table 3.2.3.2 and Figure 3.2.3.11 , respectively.

Table 3.2.3.2: Changes of goat numbers and flock compositions of demonstration farms[72]

Sites	Time	Breakdown of goats					Total
		Bucks	Does		Male kids	Female kids	
			Original	Newly brought			
Sultan Mastura	As of Dec. 2015	3	20	-	-	-	23
	As of Apr. 2016	3	19	10	4	4	40
Matungao	As of Dec. 2015	3	20	-	-	-	23
	As of Apr. 2016	3	14	-	2	2	21
Combined	As of Dec. 2015	6	40	-	-	-	46
	As of Apr. 2016	6	33	10	6	6	61

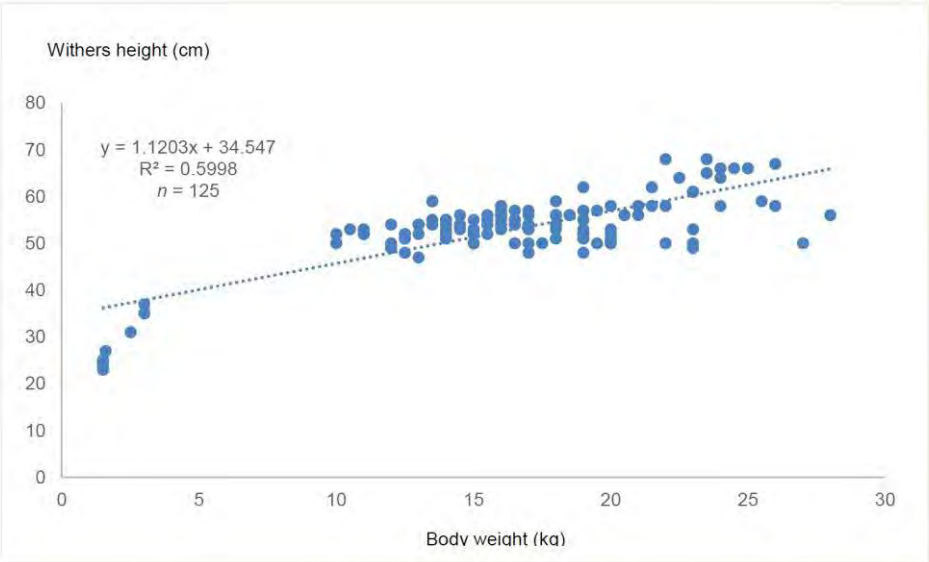


Figure 3.2.3.11: Relationship between body weight (kg) and withers height (cm)

During the period from December 2015 to April 2016, many goats suffered the stress caused by such factors as the long trip, a transfer from Davao to each demonstration farm, and adaptation to the new environments. Some of them died especially in the early stages in Matungao. However, the flocks regained their normal conditions. In fact, judging from the data in Table 3.2.3.3, it would be safe to say that the does are in good physical conditions and the number of kids is on the increase. Furthermore, as reported by other researchers[73], the regression analysis on body weight and withers height of the two demonstration farms (Figure 3.2.2.11) showed a strong correlation, meaning that the growth performance of goats is within the normal range.

Also worth noting is an initiative that the beneficiaries of Sultan Mastura had in cooperation with the BDA and the LGU. Considering the abundance of Napier grass and room in the goat houses of the demonstration farm, the beneficiaries decided to purchase more goats to fatten and resell on a trial basis because their own growing kid goats needed more time to be finished for meat, and this is why Table

[72] One doe in Sultan Masutra and six does in Matungao were dead.
[73] Rahman, A. H. M. S., Khandoker, M. A. M. Y., Husain, S. S., Apu, A. S., Mondal, A., and Nottera, D. R., (2008). Morphometric characterization and relationship of body weight with linear body measurements in Black Bengal buck. Bang. *J. Anim. Sci.* 37: 8-16.

3.2.3.2 had a row for "newly brought does." As of April 2016, the beneficiaries bought 10 does, of which they resold five of them. Table 3.2.3.3 shows the income that they earned.

Table 3.2.3.3: Breakdown of trial sales of goats in Sultan Mastura

Buying price	Selling price	Balance (income)	Fattening period
PHP 9,000/5 does	PHP 12,200/5 does	PHP 3,200 (PHP 640/goat)	Less than 1 month

In April 2016 the same beneficiary group, under the additional guidance of BDA staff, formed a farmer cooperative authorized by the CDA of the ARMM. In the near future, the new cooperative, which is comparable to the one previously formed by the CD-CAAM's vegetable group in Sultan Mastura,[74] may receive technical or financial assistance from the government or private donors. At this moment in time, however, the most laudable result is that the beneficiaries, who had long been divided by conflict, took the initiative to join together to improve the livelihoods of the members of their community.

As explained earlier in the Tawi-Tawi section, by-products or other materials from the demonstration farm such as goat skins, goat manure for fertilizers including vermi-compost, or cuttings of some improved grass might be marketable in the main island as well. However, no additional by-products or materials have been generated so far.

The most marketable sizes of goats and some other parameters for sale in the mainland, and general reproductive and productive parameters of native goats in the mainland are the same as those explained in the Tawi-Tawi section. Thus, based on these pieces of information shown in Table 3.2.2.3 and Table 3.2.2.4, and relevant literature[75], we have predicted the outlook as follows;
A newborn female goat, or a doe, will take 14 months to give birth for the first time, in which more than 50 percent of does have two or more kids (estimated as 1.5). Then, 60 percent of those kids will be sold in 8 to 9 months for meat while 20 percent of them are culled and 80 percent are kept for the replacement. Meanwhile, 80 percent of does, because 10 percent are culled and another 10 percent not bred for some reason, should be cyclic meaning that they have kids at an interval of 10 months. Based on this calculation and the number of initial does for each demonstration farm, which is 22 with a mortality rate of 10 percent and to be bred at a ratio of 9 to10, the breakdown of the demonstration farm herd would be as shown in Table 3.2.3.4.

[74] See "Other impacts" of (1) Agriculture in Chapter 3.2.1. Farmer-to-Farmer Extension.
[75] Among others, frequently cited are: Cosadio, A. L. *et al*., (2011). *Op. cit*., Devendra, C. and McLeroy, G. B., (1982). *Op. cit*., Dinh Van Binh, *et al*., (1997). *Op. cit*.

Table 3.2.3.4: Estimated goat sales from demonstration farms in Sultan Mastura and Matungao

Years	Original does	Breakdown				
		Number of new does	Total number of does	Goat for meat		Kid goats Culled
				Per year	Cumulative	
Starting year	22	0	22	0	0	0
1st year	19.8	2.4	22.2	21.4	21.4	5.9
2nd year	17.8	4.6	22.4	21.6	43.0	6.0
3rd year	16.0	6.5	22.5	21.7	64.7	6.0
4th year	14.4	8.3	22.7	22.1	86.8	6.1
5th year	13.0	9.9	22.9	22.3	109.1	6.1
6th year	11.7	11.4	23.1	22.4	131.5	6.2

According to this estimation, the number of goats for sale per year varies from 21 to 22 (See shaded rows). Therefore, based on the price range at the local markets (Table 3.2.2.(3)-2), estimated goats sales revenues per year would be from PHP 37,800 (21 goats x PHP 1,800) to PHP 110,000 (22 goats x PHP 5,000), with an average of PHP 73,100 (21.5 goats x PHP 3,400).

As mentioned in the previous section, some by-products from goat-keeping or some materials used for goats, which are occasionally abundant, could be sold in a sideline business. In the demonstration farms of the main island as well, Napier grass and vermi-compost are two of them. Based on the experiences of the local experts, estimations are shown in Table 3.2.3.5.

Table 3.2.3.5: Estimations of sales of other items

#	Items	Estimated prices at local markets	Saleable amounts	Estimated revenues
1	Napier grass (Sultan Mastura)	PHP 15/cutting	800 cuttings/month	PHP 12,000/month
2	Napier grass (Matungao)		500 cuttings/month	PHP 7,500/month
3	Vermi-compost	PHP 250/sac	4 sacs/month	PHP 1,000

3) Capacity building of BDA

In implementing a project on the goat sector, the progression of the BDA's confidence, efficiency, and effectiveness in all the project activities has been apparent. Throughout the implementation of the activities of the sector from Social Preparation 1 to Social Preparation 2, the following competencies of the BDA RMOs were clearly improved: (1) carrying out the monitoring activities; (2) reporting the results and findings of the monitoring activities; (3) facilitating financial management, logistics, and procurement; and (4) facilitating farm production in coordination with the sector's resource persons and the partner LGUs. The major activities undertaken by the sector as shown in Table 3.2.3.6 highlighted the abovementioned competencies, and Table 3.2.3.7 shows the evaluation of the capacity of the BDA in the implementation of the goat sector in the extension phase of the CD-CAAM project.

Table 3.2.3.6: Major activities by the goat sector for capacity building

S/N	Activity	Description
1	Basic Report Writing Workshop	This activity unified the reporting format of the Regional Project Operation Office of the BDA RMO, Sultan Mastura, and Matungao for every activity of the sector. The workshop was led by the BDA CMO and they have also annotated the Technical Survey Report format for the guidance of each RPOO.
2	Technical Survey and Community Profiling	The surveys were aimed at gathering crucial data to determine the most appropriate site for the goat demonstration farm based on the principles of the Six Pillars of the CD-CAAM Model. During the survey, the experience of the BDA enumerators clearly showed, and was translated into their confidence and efficiency in gathering the necessary information needed by the sector.
3	Barangay Selection Workshop	The workshop was held to select the most appropriate barangay for the demonstration farm based on the data collected during the technical survey and community profiling. The workshop used a scoring process which highlighted criteria that upheld the principles of the Six Pillars of the CD-CAAM model. The scoring process informed all the participants of the importance of the CD-CAAM model to objectively select a project site and avoid any unnecessary misunderstandings in the selection process.
4	PIP Workshop	The workshop finalized the contents of the project implementation plan. The workshop was facilitated by the JICA expert team and was attended by the BDA and MLGU representatives.
5	Barangay-wide Orientation	The orientation was held to inform the selected barangay of the CD-CAAM project and the specifics of the project implementation plan, and to gather the applicants for the sector's beneficiaries. This was done to ensure that the stakeholders in the selected barangay fully understand the project's activities and the responsibilities and commitment required to be a beneficiary. With the emphasis on the responsibilities of a beneficiary, it was proven to be a great strategy to ensure that the applicants are truly interested with the project and are willing to take the responsibility. The orientation was led by the BDA RMOs in coordination with the local government unit of the selected barangay.
6	Confirmation of Beneficiaries	This activity used a consultative process to validate the personal information from the shortlisted beneficiaries to the Barangay LGU representatives. This is to ensure that the information submitted by the shortlisted beneficiaries is true, especially regarding their status as farmers and their overall standing in the community. The whole process was facilitated by the BDA RMOs.
7	Establishment of Demonstration Farm	The activities to establish the demonstration farm highlight the BDA's capacity to facilitate procurement, logistics, and financial management. In addition, the constant coordination with the resource persons to ensure that the construction works are in accordance to the specifications instructed by the experts strengthened the BDA's capacity in the general coordination work.
8	Technical Training	The sector conducted four major technical training sessions on goat production including the study tour mentioned in the previous section (Evaluation of quantitative outputs with regard to production). In all the training sessions, the BDA RMOs had facilitated all the preparations such as the procurement of materials, logistics, and financial management. All the post-activity reports were also prepared by the BDA RMOs.
9	Training of Trainers (TOT)	The training of trainers is not originally programmed for the sector. However, with the rising popularity of the goat techno-demo farms, the BDA requested the JICA experts to conduct a TOT for the selected beneficiaries to ensure that they could properly echo the technicalities of goat production practices to other interested goat farmers. The techno-demo farm has been receiving numerous visitors ever since it was established, and has lately received training requests from organizations and individuals.
10	Regular Monitoring Activities	The regular monitoring activities by the BDA greatly strengthened their community organizing and reporting capacities.

Table 3.2.3.7: Capacity of BDA in the pilot project in goat sector

Categories	Observed Evidence	Level
Carrying out monitoring activities	- They are comfortable in handling technical instructions from the experts and relay it correctly to the beneficiaries - Monitoring days are executed more frequently - They easily identify potential problems and immediately coordinate with the expert team	A
Reporting	- Activity reports are carried out efficiently and accurately - Financial reports are submitted on time - They diligently report the beneficiaries' suggestions and concerns for immediate action	B
Facilitating financial mgt., logistics, and procurement	- Procurement activities were carried out efficiently and with quality - Logistical arrangements were properly documented and shared between and among the goat sector team - Procurement activities were implemented diligently and in accordance to the project's administrative policies	A
Facilitating farm production in coordination with partner LGUs and Experts	- Onsite technical advice was given in every visit - Farm records were being checked satisfactorily - Necessary farm inputs were inventoried satisfactorily - The municipal agriculturist was being involved in all of the farm monitoring activities	B
Enumeration and community organizing work	- They could manage the conduct of field surveys - They could easily organize and attain the interest of target communities - They were very comfortable in coordinating with BLGU and MLGU personnel - They constantly interacted with the selected beneficiaries to freely discuss ideas, issues, and concerns, and plans for further development	A
Level A: They can make basic arrangements, and manage necessary activities by themselves. Level B: They can make basic arrangements; however, sometimes they miss important matters in managing the necessary activities. Level C: They know basic arrangements; however, they cannot manage the necessary activities. Level D: They do not know what activities are necessary and how to manage them.		

In the light of the apparent improvement of competencies of the BDA RMOs, Sultan Mastura, and Matungao, the project has involved key BDA personnel from both sectors to guide the BDA PMO in conducting its activities in Tawi-Tawi based on their experiences in the first phase of the project. These efforts were meant to transfer the technology from the BDA mainland to the new management office in Tawi-Tawi.

4) Challenges and recommendations on further promotion/expansion

The following are challenges and recommendations:

- With the high projected production rate and aggressive buying and selling activities, the current forage area will not be sufficient. It is recommended that the beneficiaries expand their forage area and goat houses to accommodate the projected increase of stocks.
- With the rising popularity of the demonstration farm as the main source of goats in the municipality, marketing efforts should be intensified to solidify their take on the market. In addition, value adding activities such as slaughtered goat, goat dishes catering, and processed goat meat are needed. The beneficiaries are also encouraged to apply the technology they have learned in their farms or backyards to supplement the supply of the demonstration farm to take full advantage of the opportunity brought by the rising demand of live goats in the municipality and its neighboring cities.
- With the projected increase of production and fattening stocks of the demonstration farm, consistent implementation of proper record keeping is imperative to effectively manage the farm.

- Because the demonstration farm has perhaps the best bucks for breeding in the municipality, the beneficiaries are encouraged to charge a reasonable amount from farmers who want their does serviced as commonly practiced in the livestock industry.
- Aside from the popularity of the farm as a goat supplier in the municipality, the technology of the farm that it showcases also attracted many visitors. In addition, the jet water pump installed by the project also brought community people to the demonstration farm to fetch water for drinking because the water source is pure and pristine. Hence, diligence in the implementation of quarantine procedures is also imperative to prevent diseases from coming into the farm. To maintain the farm, it is also recommended to collect an environmental fee or entrance fee from study tour visitors.

With regard to sustainability of the project, thus far, there are five alternative approaches for the demonstration farms in Sultan Mastura, Matungao, and Tawi-Tawi. These alternatives are not necessarily mutually exclusive, meaning that some may be combined with one another;

- **Alternative I**: The same group will maintain the status quo, functioning as a showcase and continually producing goats for consumption as meat. Although this is just a continuation of the project, in regions such as Tawi-Tawi, where small-scale goat production enterprises have not yet been established, the demonstration farm's existence is quite meaningful in and of itself for the people of the community to recognize the goat's usefulness as a commodity.
- **Alternative II**: In addition to maintaining the status quo of the demonstration farm, the beneficiaries will raise some goats, produced at the demonstration farm, under their own management at their homes.
- **Alternative III**: In addition to maintaining the status quo, the demonstration farm will lease out its facilities, including floor space and surplus forage, to people in the local community, including the beneficiaries. Such a management approach, which is common in some communal pasturelands belonging to local governments in Japan, has already been practiced in Sultan Mastura at the initiative of the beneficiaries.
- **Alternative IV**: In addition to maintaining the status quo, the demonstration farm will sell its surplus goats not only for meat but for breeding.
- **Alternative V**: The demonstration farm will scale down its fattening activity in order to function as a small-scale breeding farm, a nucleus farm from which goats that have favorable traits are distributed to local goat-keepers for them to use in breeding. One of the most important missions of this nucleus farm will be to improve genetic traits of local goat flocks and to prevent or mitigate inbreeding. Inbreeding, or breeding between closely related animals, may have many negative consequences, such as low production, low growth rates, and even dwarfism. In fact, this mission is so important that in the majority of countries for which livestock is a mainstay, the government is responsible for it.

CHAPTER 4: CONCLUSION

4.1. Conclusion and recommendations on the CD-CAAM model

In its first part, this section focuses on the CD-CAAM model formulated through the five-year implementation of the CD-CAAM project, summarizes the relevant lessons learned, and discusses prospects and challenges for further promotion of the CD-CAAM model in Bangsamoro.

Given the dire socio-economic situation and limited service delivery capacity in many local governments, the Community-driven Development (CDD) approach is widely applied in different conflict-affected countries and communities. Since the late 1990s, CDD has become a key operational strategy for service delivery by empowering local communities in decision-making and resource management. Its effectiveness and relevance in conflict-affected contexts are also generally acknowledged. CDD was also promoted in the CAAM. However, many CDD projects in these areas tend to be small-scale grassroots interventions with limited local government engagement. Often, these projects focus on immediate community needs rather than long-term development potential. While CDD projects contributed significantly to improving community life, community development initiatives must be further expanded to respond to growing development needs and a rapidly changing socio-economic situation in the area. This is particularly important as the peace process progresses towards establishing the new Bangsamoro government.

Against this backdrop, the CD-CAAM project tried to establish an approach for community development that addresses the realities in Bangsamoro more effectively. Through the pilot phase, the so-called CD-CAAM model for community development was formulated based on experiences and lessons learned from the field operations, which was further strengthened during the extension phase. As mentioned earlier, the CD-CAAM model is illustrated by the following six distinct characteristics, or the six pillars.

Pillar 1: Balance between development needs vis-à-vis development potentials

The implementation of different types of surveys is an important component of the CD-CAAM model to select the most appropriate program contents, location and beneficiaries to address both development needs and potentials in a balanced manner. Besides the regular components of community profiling, technical survey, and market survey, it is also necessary to carry out other types of survey to ensure the

Figure 4.1.1: Market Survey

achievement of the first pillar through reconciling diverse perspectives of stakeholders on development of the communities. In the tilapia culture pilot project, a plankton survey and analysis was conducted by the MSU Naawan to reconcile stakeholders' different ideas on the most suitable tilapia culture site. Similarly, an additional field validation survey was conducted by a joint team of major stakeholders and professional surveyors to reach an evidence-based consensus on the scope of a road rehabilitation project. Technical and socio-political factors are often entangled in community development particularly in conflict-affected areas. Thus, a strategic and participatory decision-making process should be applied particularly at the planning stage. Sometimes a careful investigation forces the planners to consider a drastic change of their original plan. For example, the fisheries project in Tawi-Tawi was changed from tilapia culture to seaweed/sea cucumber culture to match the development potentials in the locality. While such comprehensive and flexible planning process is an essential part of the CD-CAAM model, it is time-consuming and has a financial implication. Given the somewhat pre-determined contents and scope of the interventions and set-timeframe in many donor-funded development projects, the challenge may be how the planners can maneuver within such constraints to balance development needs and potentials.

Pillar 2: Strong partnership with LGU

This second pillar is what sets the CD-CAAM model apart from the CDD most clearly. The municipal and barangay LGUs play a significant role in community development interventions under the CD-CAAM model. In the CD-CAAM project, the target municipality LGUs assigned their personnel such as MAO, MPDC, engineers, and agriculture and fisheries technicians to support the activities and beneficiaries of each community development project. For example, the Panglima Sugala LGU offered free use of the road grader (with an operator) and provided a water tank for the demonstration farm for livestock. The Matungao LGU established its own agriculture demonstration farm by replicating the one established in the CD-CAAM to promote vegetable production in the municipality.

In road rehabilitation and maintenance, the barangay captain in Sultan Mastura himself became a capable trainer for the LBT, and became able to disseminate the technologies to the residents of his community, which would greatly enhance the sustainability of the intervention. Similarly, a barangay captain with strong support from the municipal LGU played an important role in conflict resolution. Road rehabilitation often creates land-related disputes, and the so-called grievance committee was organized with the barangay captain and a member of the council of elders

Figure 4.1.2: LGU invited the CD-CAAM personnel to school graduation

as co-chairpersons and the barangay councilors as members. Issues on road rehabilitation such as the road right of way and cutting of the coconut tree raised by community residents were discussed and solved peacefully by the committee. In Sultan Mastura, learning from the practice in the municipality Panabo, the LGU enacted an ordinance to promote fisheries in the municipality. The ordinance aims to provide security for private fisheries activities while protecting natural resources through taxing the private fisheries activities in the municipality.

Through regular and continuous engagement, the BDA has successfully built rapport with the target LGUs, and the BDA sometimes played a catalytic role in connecting ordinary community people with the local governments and having the governments hear their voices. Such efforts helped greatly strengthen commitments of the LGUs as the above-mentioned cases suggest. The challenge is how such momentum can be sustained at the LGU without direct engagement by the BDA upon completion of the intervention. Follow-up activities such as periodic monitoring may be required until the good practices seen during the CD-CAAM project will be institutionalized in the municipalities.

Pillar 3: Inclusiveness

Inclusiveness is an important guiding principle of any intervention, especially in conflict-affected areas. By further emphasizing inclusiveness, the CD-CAAM model aims to help connect different socio-cultural and political groups in the communities. Under the CD-CAAM model, groups are formed for separate community development projects, and the model advocates that groups include members with diverse backgrounds with regard to such factors as religion, gender, political affiliation. For example, Christians and Muslims worked together in Matungao in the CD-CAAM project, and their group eventually became a registered PO. A member testified that they realized that they share such values as hard work, love, trust, honesty, respect, and cooperation. The beneficiaries became close, and when one was enthroned as the “Kabugatan,” a Muslim crown prince, all the group members were invited to celebrate it, which was not a common practice in the area. As armed conflict often fragments different groups, these success stories, although on a small scale, proved that the CD-CAAM model can help strengthen social cohesion at the grassroots level.

Figure 4.1.3: Active participation of women

Women are expected to play important roles in every aspect of activities and decision-making. Additionally, it was found that former combatants took part in the various livelihood training sessions in the CD-CAAM project, and actively disseminated the learned technologies to their fellow former combatants. While the Normalization, or

decommissioning of the MILF combatants, is one of the most critical components of the current peace process, the CD-CAAM model may enhance it by providing training and income generating opportunities to former combatants once they become civilians.

Pillar 4: Comprehensive management process

The strong emphasis on marketing and selling sets livelihood projects under the CD-CAAM model a little apart from many other community development interventions in CAAM. In the CD-CAAM project, the agriculture group of Sultan Mastura has gained access to the mega market in Cotabato City, whereas the group in Matungao delivered its products to the large shopping mall in Iligan City. Livelihood training sessions of the CD-CAAM project included training sessions on financial management, and each pilot project group was required to keep a record of all the expenses and sales very carefully. Such practices greatly enhanced the beneficiaries' awareness, skills and knowledge on financial aspects of income generation.

Figure 4.1.4: Matchmaking between producers and buyers

Meanwhile, to sustain income generation, the beneficiary groups of the CD-CAAM continuously conceptualized ways to innovate and add value to products to market products better as well as maximize the benefit by reducing the production costs. For example, introduction of organic fertilizer such as vermi-cast, and worm tea as well as pest attractants in vegetable production greatly reduced the production cost by decreasing the use of chemical fertilizer and pesticides. Semi-organic production in Sultan Mastura and full organic production in Matungao also added value to the vegetables at the markets: Sellers at a market in Cotabato appreciated the relative longevity of freshness of the products, whereas the organic production process of Matungao vegetables was one of the reasons that a school was attracted to the products for its school lunch. In addition, training on seed production technology under the pilot project aimed to reduce the production costs further by saving the cost of buying seeds from suppliers, and enhance self-sufficiency of the farmer groups. During the extension phase, so-called matchmaking sessions were organized to establish linkages between producers and potential buyers of vegetables. While it remains to be seen to what degree such initiatives can help create new market opportunities for the small-scale farmer groups, dialogue with the buyers and traders gave the farmers a good opportunity to become more familiar with the marketing and selling aspects of their farming endeavors.

In fisheries projects, the processing of the tilapia into dried fish (Tilanggit) was one way of adding value,

and production of so-called red tilapia, which can be sold at a higher price, was another. With regard to reducing the production cost, beneficiaries received training on the formulation of organic feeds. As feeds normally comprise 50–60% of the production costs, the application of organic feeds developed from indigenous materials could reduce the feed cost dramatically. A fisheries group also started producing fingerlings, which had been usually brought from an external hatchery. Fingerlings production can not only help reduce the production cost, but also create an opportunity to increase benefit as they can be sold to other tilapia producers in the locality.

Such comprehensive approach on community development, although time consuming, would greatly contribute to sustainable income-generation among community people. Thus far, the CD-CAAM model includes the following five packages of community development projects: vegetable production and marketing; tilapia culture, processing and marketing; road rehabilitation and maintenance through LBT; goat production; and seaweed and sea cucumber production. Other types of community development package may need to be developed to address diverse development needs and potentials in Bangsamoro.

Pillar 5: Mobilization and networking with locally available resources

The mobilization and use of locally available resources—technical, material, or human—is another characteristic of the CD-CAAM model. By ensuring the relevance of interventions to local contexts, community people could replicate the learned technologies relatively easily in their own livelihood. For example, in the CD-CAAM project, the agriculture beneficiaries in Sultan Mastura, appreciating the new technologies, immediately applied what they learned in their own home farms. By applying the new technologies, they increased the quality and quantity of vegetables harvested. Some fishery beneficiaries from Sultan Mastura also established their own fish pond and built fish cages in Lake Tareken. Similarly, the LBT approach was applied for the community road. The barangay Cadayonan of Matungao is a hilly area, and the water source is at the bottom of a valley where the fish pond for the CD-CAAM is located. The access road from the community of group members to the pond is steep and very slippery during the rainy season, which hampers the activities of the fisheries group, specifically pond management and harvesting. With technical guidance from LGU personnel and the BDA, fisheries group members successfully completed the rehabilitation work using the LBT approach. Integrated farming with tilapia culture and duck raising is another attempt to use locally available resources and technologies to increase benefits of an income generating activity.

Figure 4.1.5: Integrated farming with tilapia and ducks

Meanwhile, although Mindanao has suffered from the prolonged conflict, it has abundant valuable technical resources. The BDA built a partnership with local resource organizations such as the MSU (Maguindanao, Nawaan and Tawi-Tawi campus), the USM, the UAS, and the ATI, which greatly increased the relevance and sustainability of the interventions in the contexts of the CAAM. Although some of the technical resource people and organizations were reluctant at first to work at the target communities because they were not experienced in working with such conflict-affected communities. As the CD-CAAM project proceeded smoothly, the partnership among the BDA, the LGU, resource organizations and communities was greatly enhanced, and the resource organization became more confident in providing support to areas with different socio-cultural backgrounds. Networking with resource organization has also created small business opportunities. In Sultan Mastura, the UAS facilitated supply of products from the famer group of Sultan Mastura to a canning factory whereas the ATI introduced vegetable products for school lunch at a school in Iligan. The ATI also recognized the demonstration farm for vegetable production in Matungao as its official demonstration farm.

Many valuable technical resources are still untapped in Mindanao. Mapping out potential technical resource organizations and establishing a network with development organizations such as the BDA would be a valuable asset for Bangsamoro.

Pillar 6: Farmer to farmer extension of technologies

Another distinct feature of the CD-CAAM model is based on the innovative experiences of the pilot projects, i.e. volunteer extension work initiated by farmers who took part in the pilot projects. Given the shortage of agriculture extension workers in the municipality, under the initiative of the MAO with support from the BDA, the beneficiaries of Sultan Mastura started extension work to share their acquired agricultural technologies with neighboring barangays. The beneficiary group was divided into several teams, and visited most of the 13 barangays in Sultan Mastura to hold lectures for potential vegetable growers, particularly women's groups, to encourage them to grow vegetables in their backyard and have an additional source of income from selling vegetables. They also visited other barangays at their own initiative with no external financial support, and spent a few hours a day for several weeks to teach the residents in other barangays.

Figure 4.1.6: FTF extension

Built on such experiences, FTF was strengthened during the extension phase. The beneficiary group members from the pilot agriculture and fisheries projects were trained as Farmer trainers (FTs), and provided technical guidance to the new beneficiary groups during the extension phase. As examined in

Chapter 3, technology transfer through FTF was carried out relatively smoothly and effectively in the agriculture and fisheries projects both in Sultan Mastura and Matungao. Most of the FTs showed a strong commitment although they were provided with only a nominal honorarium for the service, and the quality of the technologies that they transferred to other farmers was as good as the one of the technology transfer directly from the experts to the farmers. Meanwhile, the demonstration farms of the livestock projects have attracted many visitors from neighboring communities, and the beneficiaries group has started transferring their learned skills to others, which was not intended within the scope of the extension phase.

As these cases illustrate, it is fair to say that the FTF approach can be an effective extension strategy in Bangsamoro given the limited human and technical resources within the LGUs. However, those FTs still need technical and financial support to sustain such extension efforts. Further advocacy by the development agencies such as the BDA may be needed to institutionalize FTF extension in the LGU so that the famer trainers' service may be financially supported by the LGU's development funds.

Meanwhile, although technologies can be transferred to the wider community population through FTF, famers often require financial capital to some degree in order to adopt the newly learned technologies. For example, according to the results of a fisheries project, the necessary initial capital amounts to PHP 50,000 to 60,000 in pond culture, and PHP 20,000 to 40,000 in cage culture depending on the scale of fish culture. These are not small amounts for local people and communities. Thus, some types of financial assistance such as subsidy, loan, or micro-credit may need to accompany technical transfer and extension. In the CD-CAAM model, the beneficiary groups were encouraged to register themselves as an official entity such as a cooperative and a registered PO. For example, the agricultural beneficiary group in Sultan Mastura has registered itself as a cooperative, and has opened its office in the municipality. The cooperative is now encouraging other community people to become members, will start services such as production loan for the members in the form of agricultural inputs, e.g., seeds, fertilizer, and pesticides, and plans to extend its extension work to promote vegetable production in the area. Additionally, the registered farmer groups may be eligible for bank loan in the future in Bangsamoro. Through such initiatives and the continuous support from the LGUs, the FTF extension approach should be further strengthened.

As examined thus far, each pillar itself is not necessarily innovative or original, but the uniqueness of the CD-CAAM model is that it combines different approaches and perspectives into something whole. Through carefully ensuring the six pillars throughout the whole process of community development interventions, the model aims to foster the resilience of the communities. Resilience can be defined as "the capability to anticipate risk, limit impact, and bounce back rapidly through survival, adaptability,

evolution, and growth in the face of turbulent change,"[76] and some argue that resilience springs primarily from the strength of internal social capital, trust networks, and leadership.[77] Intra-state violent conflict often fragments the population by undermining interpersonal and communal trust, destroying the norms and values that underlie cooperation and collective action for the common good.[78] An implication of the legacy of decades of conflict can be found in the recent trend of increasing 'horizontal conflict'[79] in Bangsamoro. To strengthen social cohesion, different sets of social capital, i.e., norms, values and social relations that bond communities together (such as kinship, ethnicity and religion) may need to be connected horizontally, whereas civil society and the state also need to be brought together on the vertical axis.

The CAAM model can be an effective and sustainable community development model in Bangsamoro, and its impact is not only economical but also social. An assessment of livelihood projects also revealed that some of the beneficiaries experienced positive attitude changes not only toward farming itself but also toward life as a whole. For example, a male beneficiary of an agriculture project did not have a farm and was not engaged in any productive activities before participating in the CD-CAAM training. After a year of training, he started cultivating vegetables at his backyard garden, and keeps himself busy. With the additional money that he earns from his garden, his daughter can go back to school now. Similarly, the husband of a female beneficiary was a coconut climber, and he could not generate a stable income from his work. Now, the couple established a backyard garden in their home and started vegetable farming. The husband helps his wife in selling the vegetables by using his motorbike, and they have become able to earn income constantly from their garden. Meanwhile, villagers who were involved in armed struggle for a long time are engaged in livelihood activities, which would facilitate their transition to normal living. In addition, different religious groups, gender groups, and groups with different political affiliations have nurtured friendship and partnership through joint activities on the ground. Cooperation was sometimes extended outside group members to the wider population in the municipality. In sum, if it can be replicated on a larger scale in a proper way, the CD-CAAM model of community development is likely to make a substantial contribution to peaceful and productive Bangsamoro through nurturing community resilience.

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[76] Plodinec, J. (2009). Definitions of resilience: An analysis. *Oak Ridge: Community and Regional Resilience Institute (CARRI)*.

[77] Menkhaus, K. (2013). Making sense of resilience in peacebuilding contexts: approaches, applications, implications. Geneva peacebuilding platform paper 6.

[78] Colletta, N. J., & Cullen, M. L. (2000). Violent conflict and the transformation of social capital: Lessons from Cambodia, Rwanda, Guatemala, and Somalia (Vol. 795). World Bank Publications.

[79] Horizontal conflict: violent struggles between clans, ethnic groups, rival insurgent factions, political parties and private armed groups or shadow authorities for control over land, natural resources, elective and non-elective positions, including government resources and rents (International Alert, 2014).

4.2. Conclusion and recommendations on the BDA's promotion of the CD-CAAM model

Now the question is how the CD-CAAM model can be replicated on a larger scale to address diverse development needs and cultivate development potentials in wider areas in Bangsamoro.

The BDA as a development arm of the MILF is expected to play a leading role in socio-economic development in Bangsamoro, and the CD-CAAM project aimed mainly to equip the BDA with sound skills and knowledge in implementing and promoting the CD-CAAM model. While the result of the capacity development of BDA was examined in Chapter 2, it may be safe to conclude that the BDA successfully carried out all the necessary tasks of the CD-CAAM project. The BDA also succeeded in adhering to all the six pillars of the CD-CAAM model, all of which were time-consuming and delicate tasks given the complex realities in the conflict-affected areas. During the extension phase, the BDA has also proved its flexibility and adaptability to carry out the activities and engage with the new LGU and communities even in a remote island province. As discussed in Chapter 2, the remaining challenges for the BDA are to reconcile the needs for quick and cost-effective implementation of the community development interventions while adhering to the six pillars of the CD-CAAM model, which inevitably requires time-consuming and costly engagement with communities, LGUs and other stakeholders. As pointed out in Chapter 2, while proper and efficient administrative and financial management should be the foundation of effective implementation of the CD-CAAM model, it remains to be seen whether the BDA's limited involvement in those tasks during the CD-CAAM project can equip the BDA personnel with enough skills to handle larger workload and funds when they are required to manage the CD-CAAM model on a far larger scale in the future.

Meanwhile, it is remarkable that the BDA has already replicated promotional activities of the CD-CAAM model in different locations. For example, the BDA, in cooperation with the BFAR-ARMM, has provided tilapia fingerlings and breeders as well as technical guidance to the fisheries groups in municipalities such as Barira, Buldon and Mamasapano. The RMO CenMin has also started preparing to replicate three livelihood projects in the municipality in North Cotabato with the support from the FTs of Sultan Mastura. Known as a development catalyst, the BDA volunteers who live in the communities play a vital role in initiatives to disseminate the experiences of the CD-CAAM model in various parts of Bangsamoro. The BDA, particularly RMO CenMin, now envisions establishment of provincial FTs and provincial demonstration farms for agriculture, fisheries and livestock that facilitate promotion of the CD-CAAM model at the provincial level. Another interesting example of the BDA's initiatives is a BDA radio program on vegetable production based on the experiences of the CD-CAAM project. As mentioned earlier, the weekly radio program hosted by the BDA provides practical information on vegetable production, and covers the Central and North Cotabato and other areas. As a de facto leading development agency within the ongoing peace process towards establishment of the new autonomous Bangsamoro government, the BDA is expected to scale up such initiatives and promote

the CD-CAAM model to the wider population in the region. It may be fair to conclude that almost five years of engagement with the CD-CAAM project provides the BDA counterpart personnel with enough capacities and confidence to become the vanguard for the CD-CAAM model in Bangsamoro.

Meanwhile, the BDA may still need external support in two major areas. First, while the CD-CAAM model was suggested based on the lessons learned from the field operation of different community development projects in CAAM, the model is still in its infancy has ample room for improvement. For example, choices of community development projects must be increased to match diverse development needs and potentials in Bangsamoro; thus far the CD-CAAM model includes five different community development projects. Additionally, it is necessary to seek new measures to expedite the time-consuming process of technology transfer while maintaining the quality of the interventions. The quick service delivery of so-called peace dividends may help greatly in building a new Bangsamoro government because it increases government visibility and legitimacy among hitherto marginalized communities. To strengthen the relevance and effectiveness of the CD-CAAM model, the BDA still needs to improve its expertise on community development, to which the organizations such as JICA can continue to provide technical support.

Another serious challenge for the BDA may be its still weak financial foundation. The primary task of the CD-CAAM project was to develop technical capacities among individuals, as well as between and within organizations of the BDA. However, there is a growing realization that capacity development must be viewed far more holistically, rather than focusing exclusively on the personal knowledge, abilities, and motivations of personnel[80]. Capacity should be viewed as the combination of skills and professionalism that determines staff quality, but the ineffective use of skills and professionalism because of inhibiting conditions and lack of resources can create an appearance of lack of personal capacity.[81] While the CD-CAAM project developed capacities within the BDA relatively successfully, the lack of sustainable resources is still likely to be a serious obstacle to the BDA's ability to promote the CD-CAAM model. In fact, most of the BDA personnel whose capacity was improved in the CD-CAAM project may leave the organization upon the completion of the project because they are not regular BDA personnel and their entire salary are paid by the project. The newly established PMO in Tawi-Tawi may be closed soon after the end of the CD-CAAM project because it depends completely on the financial support from the project. As mentioned earlier, a large pool of development catalysts is one of the valuable assets for the BDA to reach the wider population in the region. However, the BDA may not be able to fully use the asset without sound financial foundation. Continuous resource mobilization that can sustain the momentum created by the CD-CAAM project is one of the key issues. This has no immediate solution given the stalled peace process, but it may be one of the areas where

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[81] Fitzbein, A. 1997. "The emergence of local capacity: Lessons from Colombia." In *World Development*, 25 (7): 029-1043.

development partners such as JICA may need to continue their support to help build a peaceful and productive Bangsamoro in the long run.

[End of the Report]