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ENGINEERS • PLANNERS • SCIENTISTS • ECONOMISTS

October 10, 2013

Ms. Ma. Teresa Robielos
Development Assistance Specialist
Office of the Economic Development and Governance
USAID Philippines
3/F, Annex 2 Building, U.S. Embassy
1201, Roxas Blvd., Ermita, Manila

**Subject: USAID Contract No. 492-C-00-08-00001-00
Growth with Equity in Mindanao 3 (GEM 3) Program
Quarterly Performance Report (July 1, 2013 – September 30, 2013)**

Dear Ms. Robielos:

In accordance with Section F.6 of our contract, Reports and Deliverables or Outputs, and the requirements set forth in AIDAR clause 752.242-70, Periodic Progress Reports (Oct. 2007), we are pleased to submit a CD copy and two hard copies of our Quarterly Performance Report for the period July 1 through September 30, 2013.

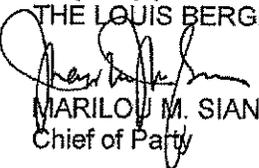
The report addresses the following areas:

- (a) Performance objectives and expected outputs for the quarter;
- (b) Summary of major accomplishments during the quarter as well as unexpected or unplanned outcomes and activities during the quarter;
- (c) Planned performance objectives for the next quarter; and
- (d) An administrative report covering expenditures by contract line item and status of funds to date.

It also includes supplemental chapters on Climate Change Vulnerability Assessment and Follow-on Activities in Compostela Valley and Davao Oriental and the USAID-GEM Relief Efforts for Zamboanga City.

Should you have any questions or comments regarding this report, please feel free to contact this office. Thank you and best regards.

Very truly yours,
THE LOUIS BERGER GROUP, INC.


MARILO M. SIAN
Chief of Party

cc: Mr. Andrew Holland, CO, USAID/Philippines



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USAID's Growth with Equity in Mindanao Program

GEM Quarterly Report July 1, 2013 – September 30, 2013



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October 2013

Submitted to:

**United States Agency for International
Development/Philippines**
Office of the Economic Development and
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Submitted by:

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1.0 Infrastructure Development

In response to the Typhoon Pablo disaster, USAID through the Growth with Equity in Mindanao (GEM) Program is providing emergency reconstruction assistance to affected municipalities in the Provinces of Davao Oriental and Compostela Valley. These two are the hardest-hit provinces in Region XI, and have suffered the most casualties and damages. USAID's GEM Program, through its Typhoon Pablo Recovery Assistance Projects, will help affected communities recover and revitalize local economic activities by providing, among others, quick gestating strategic municipal infrastructure. In addition to promoting economic growth, these infrastructure facilities are intended to demonstrate the continuing commitment of both the Philippine and U.S. Governments to fostering peace and development in Mindanao.

Twelve Typhoon Pablo Disaster Response Infrastructure Projects (PIPs) such as the construction of trading centers, market buildings, a footbridge and barangay bridges, and rehabilitation of overflow bridges and box culverts will be implemented under USAID's GEM Program. Designed to be more robust and sturdier than the normal-design structures, these municipal infrastructure projects are expected to withstand flooding and higher wind velocity making them functional even during extreme weather conditions. Additionally, these projects are potential evacuation facilities and routes for the local residents in future storm events. The projects are undertaken in coordination with the provincial and/or municipal and barangay government offices.

USAID then later approved the implementation of four additional projects, and extended the project life of the GEM Program to December 2013. These 4 projects are the Magangit-Batinao Bridge Rehabilitation (PIP-13) in the Municipality of New Bataan, Mamunga Bridge Rehabilitation (PIP-14) in the Municipality of Monkayo, and Poblacion Compostela Bridge Rehabilitation (PIP-15) and Compostela Market Building Construction (PIP-16), both located in the Municipality of Compostela, all in Compostela Valley Province. All of these projects were identified in coordination with the Provincial Government and the respective municipal government.

Additionally, USAID approved necessary enhancements consisting of Portland Cement Concrete Pavement (PCCP) extension, additional armoring of bridge piers and embankment/cut slopes and additional roadway ditches to concerned bridge rehabilitation projects and of additional toilet and drainage outlet to one trading center. Thus, implementation of disaster response infrastructure projects proceeded for the 16 PIPs and the other necessary enhancements.

Relative to the outcomes for the fiscal year, the activities of Barangay Infrastructure Projects (BIPs) undertaken in the 1st Quarter (October – December 2012) are also being noted. A number of additional BIPs were completed during the quarter, and this brings to full completion the contractual obligation of up to 760 BIPs under the GEM Program.

1.1 Performance objectives and expected outputs for 4th Quarter of GEM-3 in FY 2013:

The following provides a discussion of performance objectives and expected outputs that are scheduled to be completed in the 4th Quarter of GEM-3 in FY 2013.

1.1.1 General:

- Provide assistance for USAID/USG visits to RIP and BIP projects, and help organize various activities and events including turn-over ceremonies, launchings and inaugurations, and project warranty inspections.

1.1.2 Typhoon Pablo Disaster Response Infrastructure Projects (PIPs):

- Receive USAID and MinDA preliminary concurrence of one additional new project (PIP- 16)
- Receive USAID approval on the Environmental Screening Review (ESR) Report of one additional new project (PIP-16).
- Complete the survey, cost estimates and design preparation of the three remaining bridge rehabilitation projects (PIP-13, PIP-14 and PIP-15) and one additional new project (PIP-16) and other necessary enhancements to concerned bridge rehabilitation projects, and one trading center (additional toilets and drainage outfall for PIP-02).
- Receive USAID approval to the design, cost estimates, construction drawings schedules, and construction scheme of the three remaining bridge rehabilitation projects and one additional new PIP.
- Receive USAID approval to proceed with procurement and construction of the three remaining bridge rehabilitation and one additional new PIP.
- Complete twelve PIPs under their original scopes of work and commence construction of the three remaining bridge rehabilitation projects.

1.1.3 BIPs

- Relative to the fiscal year, the expected outputs are to complete the remaining 48 BIPs for a cumulative total of 760 completed BIPs by the end of the 1st Quarter (December 2012).

1.1.4 BIP Warranty Inspection and Beneficial Use Monitoring (BUM) Targets:

- Complete warranty and beneficial use monitoring inspections of remaining 220 completed barangay infrastructure projects (BIPs), and provide recommendations for subcontractors and local government units to do, when necessary.

1.2 Summary of major accomplishments as well as other outcomes and activities during the quarter:

Major outcomes achieved during the quarter are described briefly below:

1.2.1 General:

- GEM provided assistance for USAID visits and inspections to GEM-3 BIP projects, and helped organize various activities and events including the warranty visits to completed BIPs and inspections to ongoing PIPs of USAID's Civil Engineer.

1.2.2 PIPs:

- Completed the engineering survey, detailed engineering design, cost estimate and project package of the three remaining bridge rehabilitation projects (PIP-13, PIP-14 and PIP-15), and submitted to USAID for approval to implement these projects under the Typhoon Pablo Disaster Response Infrastructure Projects (PIPs).
- Completed the engineering survey, detailed engineering design and cost estimate which were used in preparing the necessary variation orders to various enhancements of concerned bridge rehabilitation projects and of a trading center (additional toilets and drainage outfall for the Poblacion Compostela Trading Center, PIP-02).
- GEM received USAID preliminary concurrence of one additional new project (Compostela Market Building Construction) on September 24, 2013. MinDA's concurrence to the same new project is still pending since September 30, 2013.
- GEM received USAID approval for the procurement of subcontract for the three remaining PIPs (three bridge rehabilitation projects) leading to the bidding and award of subcontract to two winning domestic subcontractors (PIP-13, Magangit-Batinao Bridge Rehabilitation, and PIP-15, Poblacion Compostela Bridge Rehabilitation). The bidding for the third PIP (PIP-14) was not successful because of unreasonably high bid prices, even after two rounds of solicitation and GEM's expression of interest to negotiate at a more reasonable price. As a result, the third PIP was decided to be constructed by direct administration under the GEM Program. The three projects have since been under construction.
- GEM received USAID approval for the construction by direct administration of the additional new PIP (Compostela Market Building) and the related Environmental Review Screening (ESR) Report leading to the procurement of materials and labor supply needed for construction activities commencing in the second week of October 2013. The approval for construction was issued on October 03.
- GEM completed nine PIPs that were constructed by administration, namely: Carmen Trading Center, Poblacion Compostela Trading Center, Baganga Market Building, Aguinaldo Trading Center, San Jose Suspension Footbridge, Sitio Mahayahay Overflow Bridge Rehabilitation, Purok Duranta Overflow Bridge Rehabilitation, Sitio Santol Overflow Bridge Rehabilitation and Ngan Overflow Bridge Rehabilitation.
- Construction for the three remaining original line-up of PIPs continued, namely: Lebanon-San Jose Barangay Bridge, Alegria Barangay Bridge and Panag Barangay Bridge. Target completion is before the end of October 2013. Likewise, rehabilitation of the three existing concrete bridges, namely: Magangit-Batinao Bridge (under a subcontract), Mamunga Bridge (by direct administration) and Poblacion Compostela Bridge (under a subcontract) also continued. Delay in construction is due to frequent rain and flooding at the project sites. Prior to construction, pre-construction meetings with LGU officials, community leaders and other project stakeholders were conducted for each project to discuss the scope of work, GEM personnel assignments, construction methodology and schedules and LGU counterpart responsibilities during construction and after project completion and turn-over (operation and maintenance). A Memorandum of Understanding was also prepared and signed for each project to confirm commitment and counterpart responsibilities of the LGU during and after construction including proper maintenance of the facility after its turn-over.

The 16 PIPs, nine completed, six under construction and one to start in October, are listed in Table 1.1 with their location, date started construction and completion date (or target completion).

Table 1.1: Summary of Typhoon Pablo Disaster Response Infrastructure Projects (PIPs)

PIP No.	Project Name	Location	Date Started	Date Completed (or target completion)
1	Carmen Trading Center Construction	Brgy. Carmen, Boston, Davao Oriental	June 07, 2013	September 12, 2013
2	Poblacion Compostela Trading Center Construction	Poblacion, Compostela, Compostela Valley	June 06, 2013	September 22, 2013
3	Poblacion Baganga Market Building Construction	Poblacion, Baganga, Davao Oriental	June 14, 2013	September 09, 2013
4	Aguinaldo Trading Center Construction	Brgy. Aguinaldo, Laak, Compostela Valley	June 09, 2013	September 12, 1013
5	San Jose Suspension Footbridge Construction	Brgy. San Jose, Boston, Davao Oriental	June 07, 2013	October 05, 2013
6	Sitio Mahayahay Overflow Bridge Rehabilitation	Brgy. Baylo, Monkayo, Compostela Valley	June 10, 2013	August 15, 2013
7	Purok Duranta Overflow Bridge Rehabilitation	Brgy. Union, Monkayo, Compostela Valley	June 25, 2013	September 07, 2013
8	Sitio Santol Overflow Bridge Rehabilitation (with enhancements)	Brgy. Salvacion, Monkayo, Compostela Valley	June 25, 2013	September 15, 2013 (October 31, 2013)
9	Ngan Overflow Bridge Rehabilitation	Brgy. Ngan, Compostela Municipality, Compostela Valley	June 19, 2013	September 30, 2013
10	Lebanon-San Jose Barangay Bridge Construction	Brgy. San Jose, Montevista, Compostela Valley	June 19, 2013	(November 30 2013)
11	Alegria Barangay Bridge Construction	Brgy. Alegria, Cateel, Davao Oriental	June 13, 2013	October 25, 2013
12	Panag Barangay Bridge Construction	Brgy. Panag, New Bataan, Compostela Valley	June 23, 2013	October 21, 2013
13	Magangit-Batinao Bridge Rehabilitation	Brgy. Magangit - Brgy. Batinao, New Bataan, Compostela Valley	September 01, 2013	November 14, 2013
14	Mamunga Bridge Rehabilitation (with enhancements)	Brgy. Mamunga, Monkayo, Compostela Valley	September 11, 2013	November 11, 2013
15	Poblacion Compostela Bridge Rehabilitation	Poblacion, Compostela, Compostela Valley	September 01, 2013	November 14, 2013
16	Compostela Market Building Construction (2 units)	Poblacion, Compostela, Compostela Valley	October 1, 2013	November 30, 2013

- GEM also prepared and submitted to USAID the Environmental Screening Review (ESR) Report of the new project (Compostela Market Building Construction) and received approval on October 02. Also, GEM Environmental staff continued conducting Construction Environmental Management Monitoring (CEMM) for PIPs to ensure the enforcement of construction safety regulations and standards prescribed in the Environmental Mitigation and Monitoring Plan (EMMP) for each project.

Of the 56 monitoring visits, 45% complied with safety and health of workers and the public, 95% complied for maintenance/protection of traffic and 88% complied for environmental control and protection. Two projects, Lebanon BB and Alegria BB, involved cutting of banana stands and coconut trees, respectively. The owners posed no objection of cutting and removal of the said banana stands and coconut trees as these were properly negotiated by barangay officials. Non-compliance and partial compliance of responsibilities were also noted with varying reasons as follows:

- 55% non-compliance/partial compliance (23% non-compliant and 32% partially compliant) for Safety and Health of which common reasons were discomfort and inconvenience to workers in wearing safety gadgets.
- 5% Non-compliant in the Maintenance and Protection of Traffic due to late installation of barricades and regulatory signs and notices.
- 12% non-compliance/partial compliance for Environmental Control and Protection were due to non-provision of garbage bags at the temporary facility (temfacil/bunkhouse), and of dedicated sanitary facility for workers.

Table 1.2 below provides the summary of the Environmental Compliance Monitoring of the 12 PIPs.

Table 1.2: Summary of PIP Environmental Compliance Monitoring

PROJECT DETAILS		Frequency of Monitoring Visits	COMPLIANCE INDICATORS								
PIP Code No.	Name		Safety and Health of Workers & Public			Maintenance & Protection of Traffic			Environmental Control & Protection		
			Y	N	PC	Y	N	PC	Y	N	PC
1	Carmen Trading Center Construction	5	1	2	2	5			4	1	
2	Poblacion Compostela Trading Center Construction	5	3		2	5			5		
3	Poblacion Baganga Market Building Construction	5		1	4	5			5		
4	Aguinaldo Trading Center Construction	4	2	1	1	3	1		3	1	
5	San Jose Footbridge Construction	5	2	1	2	5			5		
6	Sitio Mahayahay Overflow Bridge Rehabilitation	2	1		1	2			2		
7	Purok Duranta Overflow Bridge Rehabilitation	5	3	1	1	5			5		
8	Sitio Santol Overflow Bridge Rehabilitation	5		4	1	3	2				5
9	Ngan Overflow Bridge Rehabilitation	5	3	1	1	5			5		
10	Lebanon-San Jose Barangay Bridge Construction	5	4		1	5			5		
11	Alegria Barangay Bridge Construction	5	1	2	2	5			5		
12	Panag Barangay Bridge Construction	5	5			5			5		
Legend:		56	25	13	18	53	3	0	49	2	5
Y	Full Compliance		45%	23%	32%	95%	5%	0%	88%	3%	9%
N	Non-compliance										
PC	Partial Compliance										

1.2.2.1 Status of the PIPs

The status of the 16 PIPs is discussed below, which includes project data, description of work, accomplishment status and progress photos.

1. PIP-01 Carmen Trading Center Construction

Location: Brgy. Carmen, Municipality of Boston, Davao Oriental

Number of Beneficiaries: 2,838

Construction Cost: PhP2,278,270

Pre-construction Meeting Conducted: May 28, 2013

Start Date: June 7, 2013

Completion Date: September 12, 2013

Description of Work: Construction of a new 10 m x 18 m trading center building with roofing system and structural components designed to withstand high velocity winds, floor level elevated to prevent flooding on the structure, and toilets provided for the convenient use of people and to improve sanitation in the area.

Status: 100%

Photos:



2. PIP-02 Poblacion Compostela Trading Center Construction

Location: Brgy. Poblacion, Municipality of Compostela, Compostela Valley

Number of Beneficiaries: 23,074

Estimated Construction Cost: PhP2,264,799

Pre-construction Meeting Conducted: May 30, 2013

Start Date: June 6, 2013

Completion Date: September 22, 2013

Description of Work: Construction of a new 10 m x 18 m trading center building with roofing system and structural components designed to withstand high velocity winds, floor level elevated to prevent flooding on the structure, and toilets provided for the convenient use of people and to improve sanitation in the area.

Status: 100%

Photos:



3. PIP-3 Poblacion Baganga Market Building Construction

Location: Poblacion, Municipality of Banganga, Davao Oriental

Number of Beneficiaries: 4,922

Estimated Construction Cost: PhP1,761,534

Pre-construction Meeting Conducted: June 05, 2013

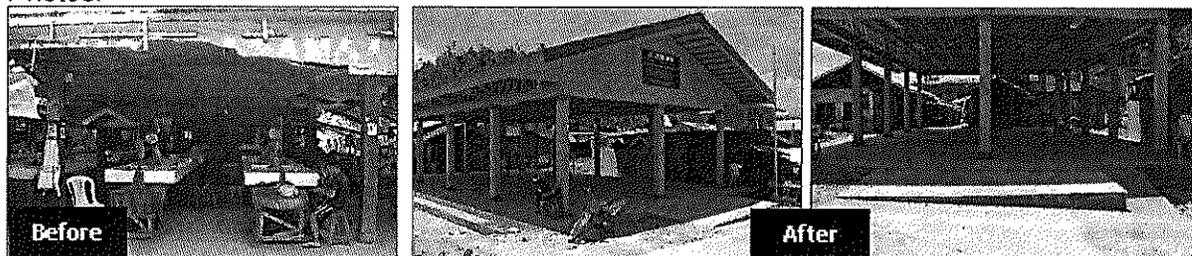
Start Date: June 14, 2013

Completion Date: September 09, 2013

Description of Work: Construction of a new 10 m x 18 m trading center building with roofing system and structural components designed to withstand high velocity winds and floor level elevated to prevent flooding on the structure.

Status: 100%

Photos:



4. PIP-04 Aguineldo Trading Center Construction

Location: Brgy. Aguineldo, Municipality of Laak, Compostela Valley

Number of Beneficiaries: 6,000

Estimated Project Cost: PhP2,054,834

Pre-construction Meeting Conducted: May 29, 2013

Start Date: June 9, 2013

Completion Date: September 12, 2013

Description of Work: Construction of new 10 m x 18 m trading center building with roofing system and structural components designed to withstand high velocity winds, floor level elevated to prevent flooding on the structure, and toilets provided for the convenient use of people and to improve sanitation in the area.

Status: 100%

Photos:



5. PIP-05 San Jose Footbridge Construction

Location: Brgy. San Jose, Municipality of Boston, Davao Oriental

Number of Beneficiaries: 1,879

Estimated Construction Cost: PhP3,377,684

Pre-construction Meeting Conducted: May 28, 2013

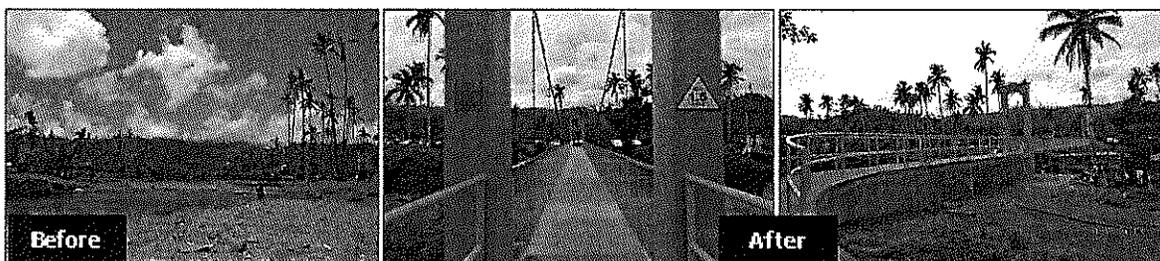
Start Date: June 7, 2013

Completion Date: October 05, 2013

Description of Work: The construction of a new 42 m suspension footbridge with a cable freeboard of about 1.5 m from the maximum experienced flood level, maximum load capacity of 1.5 tons which would allow passage of motorcycles and bridge components consisting of metal mesh floorings on a steel girder with steel cross bracings to minimize side sway and supported to a main cable carried by a "deadman" anchorage on both ends. Wire mesh sidings and plastic pipe handrail connected to the secondary cables that are anchored to both ends of the portals and reinforced concrete ramp approaches on both sides are also provided for safety and protection of pedestrians;

Status: 100%

Photos:



6. PIP-06 Sitio Mahayahay Overflow Bridge Rehabilitation

Location: Sitio Mahayahay, Brgy. Baylo, Municipality of Monkayo, Compostela Valley

Number of Beneficiaries: 5,430

Estimated Construction Cost: PhP1,707,807

Pre-construction Meeting Conducted: May 31, 2013

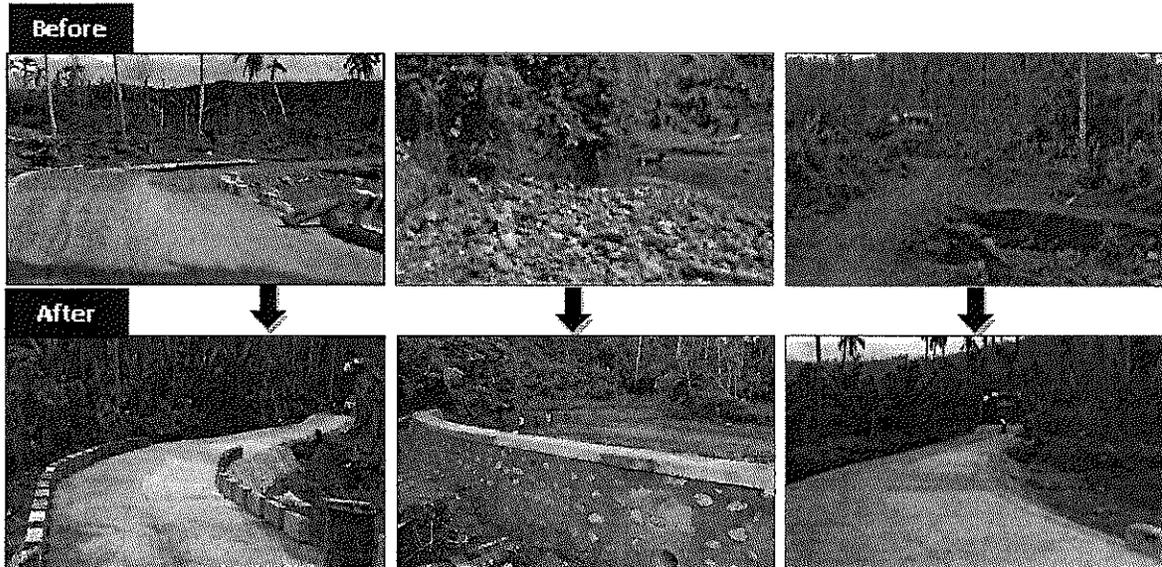
Start Date: June 10, 2013

Completion Date: August 15, 2013

Description of Work: Rehabilitation of the barangay bridge built under GEM-3 consisting of the construction of 20 m retaining wall and slope protection structures, Portland cement concrete pavement (PCCP) and gravel transitions on both approaches and river channel clearing and desilting on the upstream and downstream sides of the bridge structure.

Status: 100%

Photos:



7. PIP-07 Purok Duranta Overflow Bridge Rehabilitation

Location: Sitio Duranta, Brgy. Union, Municipality of Monkayo, Compostela Valley

Number of Beneficiaries: 3,334

Estimated Construction Cost: PhP1,525,271

Pre-construction Meeting Conducted: June 06, 2013

Start Date: June 25, 2013

Completion Date: September 07, 2013

Description of Work: Rehabilitation of the barangay bridge built under GEM-3 consisting of the construction of grouted riprap slope protection structures, 116 m Portland cement concrete pavement (PCCP), reconstruction of damaged concrete wheel guards and river channel clearing and desilting on the upstream and downstream sides of the bridge structure.

Status: 100%

Photos:



8. PIP-08 Sitio Santol Overflow Bridge Rehabilitation

Location: Sitio Santol, Brgy. Salvacion, Municipality of Monkayo, Compostela Valley

Number of Beneficiaries: 3,278

Estimated Construction Cost: PhP2,286,525

Pre-construction Meeting Conducted: June 06, 2013

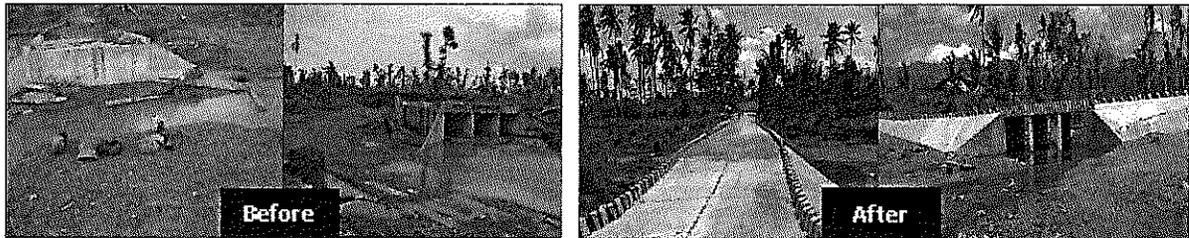
Start Date: June 25, 2013

Completion Date: September 15, 2013

Description of Work: Rehabilitation of the barangay bridge built under GEM-3 consisting of the construction of a concrete slab slope protection structure, 60 m Portland cement concrete pavement (PCCP) on both approaches and river channel clearing and desilting on the upstream and downstream sides of the bridge structure. Enhancements including 31 m PCCP with concrete mortar armoring and roadway ditches are to be implemented for an additional 18 calendar days.

Status: 100%

Photos:



9. PIP-09 Ngan Overflow Bridge Rehabilitation

Location: Brgy. Ngan, Municipality of Compostela, Compostela Valley

Number of Beneficiaries: 7,202

Estimated Construction Cost: PhP1,867,729

Pre-construction Meeting Conducted: June 05, 2013

Start Date: June 19, 2013

Completion Date: September 30, 2013

Description of Work: Rehabilitation of the barangay bridge built under GEM-3 consisting of the construction of grouted riprap slope protection structures, new 157 m Portland cement concrete pavement (PCCP), slope masonry retaining wall, cleaning of existing culverts and river channel clearing and desilting on the upstream and downstream sides of the bridge structure.

Status: 100%

Photos:



10. PIP-10 Lebanon-San Jose Barangay Bridge Construction

Location: Brgy. San Jose, Montevista, Compostela Valley

Number of Beneficiaries: 8,012

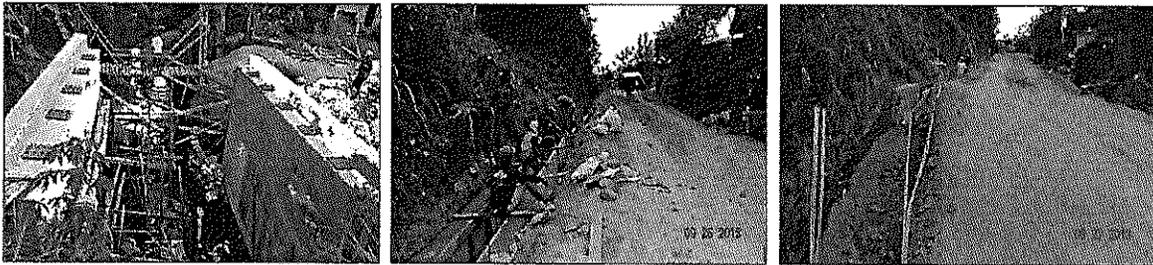
Estimated Construction Cost: PhP2,849,071

Pre-construction Meeting Conducted: June 07, 2013

Start Date: June 19, 2013
Completion Date: November 30, 2013

Description of Work: Construction of a new 6 m slab bridge, to replace the existing pipe culverts, with freeboard of about 1.5 m above the maximum flood level recorded at the site during Typhoon Pablo and components consisting of steel girder with reinforced concrete slab pavement, reinforced concrete abutments, PCCP on each approach (5 m approach slab and 90 m concreting on approach A only) and slope protection structures where necessary. Enhancements including an additional 150 m PCCP (additional 100 m at approach A and 50 m at approach B) are to be implemented for an additional 60 calendar days.

Status: 80.22%
Progress Photos:



11. PIP-11 Alegria Barangay Bridge Construction

Location: Sitio Liwan, Brgy. Alegria, Municipality of Cateel, Davao Oriental

Number of Beneficiaries: 5,065

Estimated Construction Cost: PhP2,851,779

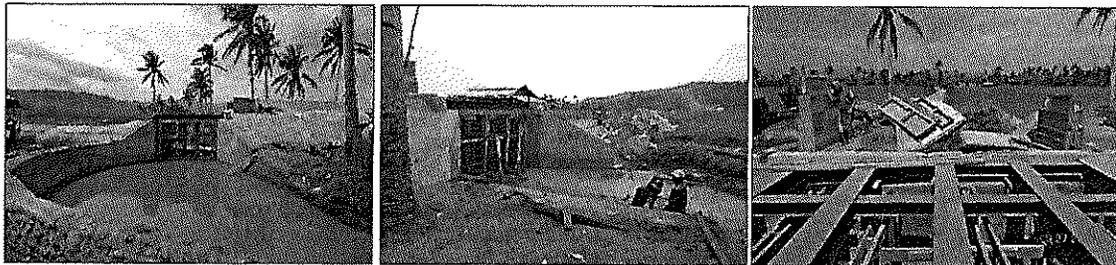
Pre-construction Meeting Conducted: June 06, 2013

Start Date: June 13, 2013

Completion Date: October 25, 2013

Description of Work: Construction of a new 6 m slab bridge, to replace the existing pipe culverts, with freeboard of about 1.5 m above the maximum flood level recorded at the site during Typhoon Pablo and components consisting of steel girder with reinforced concrete slab pavement, reinforced concrete abutments, PCCP on each approach and slope protection structures where necessary.

Status: 80.50%
Progress Photos:



12. PIP-12 Panag Barangay Bridge Construction

Location: Brgy. Panag, Municipality of New Bataan, Compostela Valley

Number of Beneficiaries: 6,146

Estimated Construction Costs: PhP2,949,985

Pre-construction Meeting Conducted: June 5, 2013

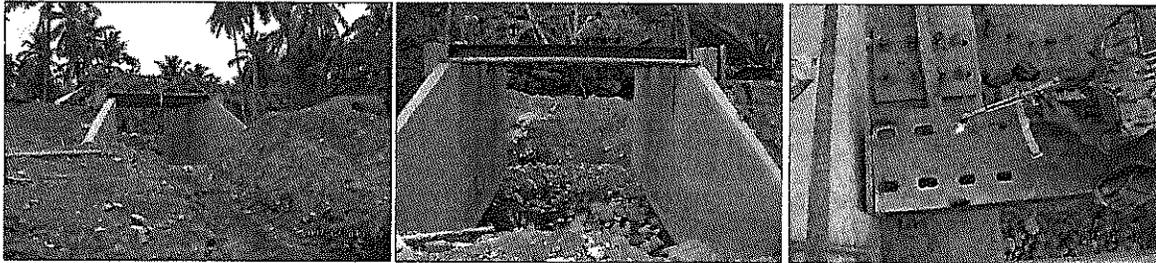
Start Date: June 23, 2013

Completion Date: October 21, 2013

Description of Work: Construction of a new 6 m slab bridge, to replace the existing pipe culverts, with freeboard of about 1.5 m above the maximum flood level recorded at the site during Typhoon Pablo, and components consisting of a steel girder with reinforced concreted slab pavement, reinforced concrete abutments, PCCP on each approach and slope protection structures where necessary.

Status: 90.10%

Progress Photos:



13. PIP-13 Magangit-Batinao Bridge Rehabilitation

Location: Brgy. Magangit - Brgy. Batinao, New Bataan, Compostela Valley

Number of Beneficiaries: 2,551

Estimated Construction Costs: PhP2,291,479

Subcontractor: Lyra Mae Construction

Pre-construction Meeting Conducted: August 28, 2013

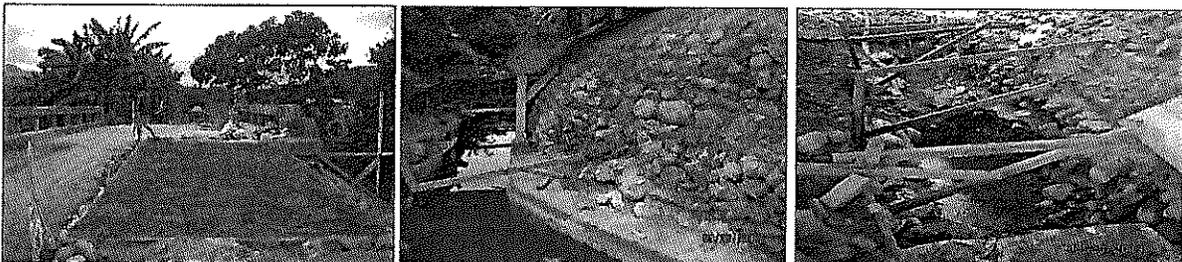
Start Date: September 1, 2013

Estimated Completion Date: November 14, 2013

Description of Work: The scope of work for repair entails repair of the damaged stone masonry bridge abutment protection, construction of new PCCP approaches (10 m on both sides), installation of 40 m reinforced concrete slab for river bank protection and channel, excavation and desilting work. The Design criteria will take into consideration the effects of the historical centennial storm as part of the hydrologic design analysis and structural design stability.

Status: 10.87%

Progress Photos:



PIP-14 Mamunga Bridge Rehabilitation

Location: Brgy. Mamunga, Municipality of Monkayo, Compostela Valley

Number of Beneficiaries: 7,742

Estimated Construction Costs: PhP968,376

For Preconstruction Meeting: September 11, 2013

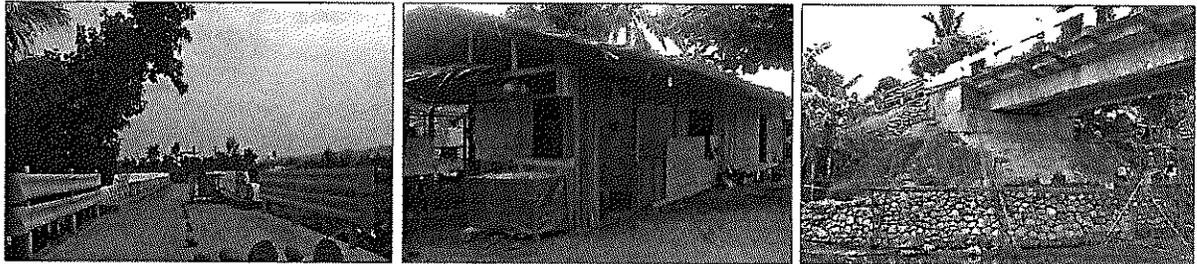
Start Date: September 11, 2013

Estimated Completion Date: November 11, 2013

Description of Work: The scope of work for repair entails provision of additional stone masonry wall around the toe of the existing slope protection structure, channel clearing downstream and upstream of the existing bridge (about 60 m), construction of new PCCP approaches (10 m on both sides), and installation of metal flex beam guard rails on both sides of both approaches. Enhancements including stone masonry armouring of the middle pier and additional 35.6 m PCCP are to be implemented for an additional 25 calendar days.

Status: 77.58%

Progress Photos:



14. PIP-15 Poblacion Compostela Bridge Rehabilitation

Location: Poblacion, Municipality of Compostela, Compostela Valley

Number of Beneficiaries: 26,773

Estimated Construction Costs: PhP3,284,270

Pre-construction Meeting Conducted: August 28, 2013

Subcontractor: Majda Construction

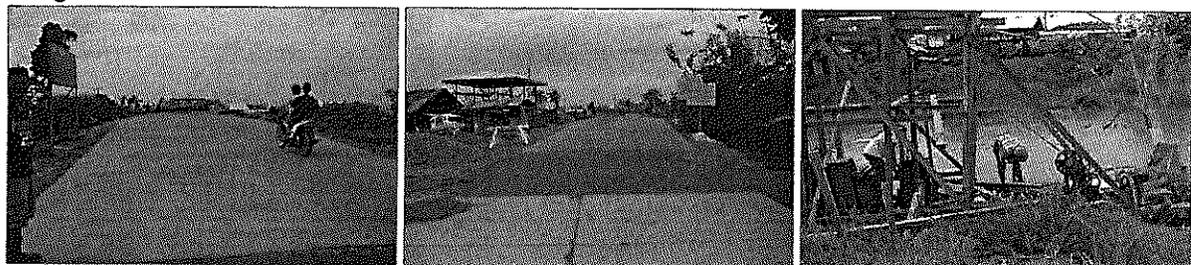
Start Date: September 1, 2013

Estimated Completion Date: November 14, 2013

Description of Work: The scope of work for repair entails the construction of 300 mm thick stone masonry slope protection on sheet piles, and 45.7 m PCCP approaches (25.7 m at Approach A and 20 m at Approach B). Enhancements including concreting of short gap (6.55 m) on the first approach and painting of the concrete railings, wingwalls and sidewalk are to be implemented for 15 calendar days under direct administration.

Status: 42.32%

Progress Photos:



15. PIP-16 Compostela Market Building Construction (2 units)

Location: Poblacion, Municipality of Compostela, Compostela Valley

Number of Beneficiaries: 23,074

Estimated Construction Costs: PhP3,400,000

Pre-construction Meeting Conducted: Oct 4, 2013

Start Date: October 7, 2013

Estimated Completion Date: November 30, 2013

Description of Work: The scope of work for repair entails the construction of 2 units 10 m x 18 m trading center structure for the wet market section and the fruit/vegetable section, each with concrete table-stalls and supporting drainage system inside and around the buildings, two pairs (male and female) of toilets and a market office. The structures are designed to withstand the adverse effects of extreme weather events similar to Typhoon Pablo.

Status: For Mobilization

Progress Photos:



1.2.3 BIPs

Relative to the over-all outcomes in the fiscal year, additional 48 BIPs were completed by the end of the 1st Quarter (December 31, 2013) which brought the cumulative total of completed BIPs at 760 projects. The completion of the additional projects brought to full completion the contractual obligation for BIPs under the GEM Program.

1.2.4 BIP Warranty Inspection and Follow-up

- Two hundred twenty completed BIPs were identified for warranty inspections during the GEM-3 extension in FY 2013, including 56 BIPs in Western Mindanao, 67 in Central Mindanao and 97 in Northern Mindanao. The warranty inspections started immediately after the Typhoon Pablo Assessment Study was completed in March 2013.

During warranty inspections, the inspectors determine and observe possible deficiencies, namely: 1) construction deficiency such as structural defects arising from poor workmanship;

2) materials deficiency for projects that are not constructed in accordance with specifications, inferior materials, rapid deterioration outside of normal wear and tear; 3) latent damage due to design and design assumptions; 4) defects or damages due to force majeure; 5) operation and maintenance such as defects resulting from inadequate maintenance and/or improper operation by the proponent; and, 6) other observations including the use of the facility, environmental concerns, etc. The inspectors then make the assessment and tag each project with any of 5 categories: GREEN: No defects noted - No action required; YELLOW: With normal wear and tear - LGU maintenance required; BROWN: Defects noted - Rectification required; RED: Defects noted - Major work required; and, PINK: Project not visited due to security issues.

- One hundred thirty-seven BIPs were tagged “Green”, forty-two BIPs “Yellow”, twenty-six BIPs “Brown”, six BIPs “Red” and nine BIPs “Pink”.

Table 1.3 below shows the summary of BIPs projects that were monitored and inspected including their tags and number of projects.

Table 1.3: Summary of BIPs Inspected under Warranty

Category	Tag	No. of Projects	%
(1) No defects noted - No Action Required	Green	137	62.3%
(2) With normal wear and tear - LGU Maintenance Required	Yellow	42	19.1%
(3) Defects noted - Rectification Required	Brown	26	11.8%
(4) Damaged - Not Warranty Issue - Typhoon Pablo - Force Majeure	Red	6	2.7%
(5) With Security Issues – Projects not visited	Pink	9	4.1%
TOTAL		220	100%

- On projects tagged “Green”, GEM warranty inspectors continued to coordinate with the proponent or LGU for proper O&M to ensure that the facility will benefit communities in its expected life span. On the 42 projects tagged “Yellow”, GEM sent letters to the respective LGUs to remind and encourage them to implement proper use and maintenance of USAID-assisted facility in their area so that it can continue to provide full service to residents and assure its long term beneficial use. Common observation was the lack of proper waste disposal bins resulting to accumulated garbage in the facilities. The LGU responded positively and assured to provide the necessary maintenance of the facility.
- On 26 projects tagged “Brown”, GEM sent notices to subcontractors to rectify/repair damaged sections and other defects that are under warranty.
 - Rectification to 13 projects were completed by subcontractors, namely: 1) B-0150 Purok Sampaguita Boat Landing, 2) B-0414 Tabigue Pedestrian Walkway , 3) B-0641 Virgo Barangay Bridge , 4) B-0707 Dampalan Suspension Footbridge, 5) B-0709 Astorga Barangay Bridge , 6) B-0710 Kawit Occidental Road Upgrading, 7) B-0715 Hadji Musa Barangay Bridge, 8) B-0730 Ditoray Road Upgrading, 9) B-0758 Sunflower Barangay Bridge, 10) B-0767 Banga Trading Center, 11) B-0773 Reconstruction of Northeast II-B Central School Classrooms, 12) B-0449 Lower Usugan Pedestrian Footbridge , and 13) B-0788 Norala Public Pavilion.

- Rectification of 7 BIPs were completed under GEM direct administration, namely: 1) B-0762 Reconstruction of Iligan City East High School - Santiago Annex Classrooms, 2) B-0772 Reconstruction of Digkilaan High School Annex Classrooms, and 3) B-0763 Reconstruction of Iligan City East High School – Sta. Filomena Annex Classrooms, 4) B-0751 Katipunan Water Supply Expansion, 5) B-0649 Upper Dalimdim Barangay Bridge , 6) B-0733 Lapu-Lapu Barangay Bridge , and 7) B-0774 Quipolot Barangay Bridge.
- Two projects with rectification were verified to be no longer necessary because the affected structure is outside the subcontractor's scope of work and was added by the Provincial Government after project completion to improve the structure. These projects are B-0739 Sinoron Road Upgrading and B-0740 Saliducon Road Concreting.
- Rectification of 3 BIPs is underway through direct administration, namely: 1) B-0639 Magsaysay Pedestrian Footbridge, 2) B-0750 Pasion Water System Expansion, and 3) B-0670 Camanlangan Water System Expansion.
- The B-0663 Culabay Trading Center Construction would require more follow-up on subcontractor for rectification.
- Follow up warranty inspection on 71 BIPs with warranty covering the period from August to December 2013 is ongoing.

1.2.5 Beneficial Use Monitoring (BUM)

- Of the 220 completed BIPs that are under warranty, two hundred six were tagged "Green", 4 BIPs were tagged "Yellow", which requires regular operation and maintenance. One facility is tagged "Red", which is the B-0472 Bantacan Suspension Footbridge in Compostela Valley, was not usable due to force majeure. The structure was washed-out during Typhoon Pablo with only Portal "B" columns were retained. This project is irreparable and unusable due to severe damages. Nine BIPs tagged "Pink" were not visited due to security issues.
- On the 4 projects tagged "Yellow", GEM warranty/BUM inspectors conducted meetings with local authorities, provincial, municipal and barangay government officials to emphasize the importance of proper operation and maintenance to sustain long-term beneficial use of completed projects. Discussions on GEM actions and LGU responses are listed below.
 - On B-01477 Upper Hinaplanon Water System Extension in Iligan City, residents were not able to benefit from the water facility due to some unresolved issues with the landowner, where the distribution pipelines were installed. The Iligan City Waterworks Management and the newly-elected city government officials were requested by GEM to mediate in the negotiations to resolve the issues. Both institutions committed to provide assistance to conduct a meeting for the mediation. No date has been determined as of reporting period.
 - The B-0575 Sitio Mahayhay Barangay Bridge in Compostela Valley was damaged by force majeure (Typhoon Pablo). The bridge and approaches have been cleared of debris and are now passable by four-wheel vehicles. This project is ongoing rehabilitation by GEM under the Typhoon Pablo Disaster Response Infrastructure Projects (PIPs) implementation.

- The B-0578 Sitio Baricade-Sitio Manuwang Road in Salvador, Lanao del Norte was damaged by the heavy rains of Typhoon Pablo that also affected the province. During the typhoon, the volume of run-off exceeded design assumptions causing damage to the road. Repair of the road will have to be done by the LGU through local funds or other assistance. This damage was caused by force majeure and is not covered by the contractor warranty. The road has been reduced to a single lane and is passable by light vehicles only.
- The B-0680 Purok Duranta Barangay Bridge in Compostela Valley was damaged by force majeure (Typhoon Pablo). The bridge and approaches have been cleared of debris and are now passable by four-wheel vehicles. This project is ongoing rehabilitation by GEM under the Typhoon Pablo Disaster Response Infrastructure Projects (PIPs) implementation.

Table 1.4 below shows the summary of BIPs projects that were monitored and inspected under BUM, including the tags and number of projects.

Table 1.4: Summary of BIPs Inspected under Warranty

Category	Tag	Number of Projects
(1) Facility properly used and adequately maintained	Green	206
(2) With issues on proper use of the facility; limited use of the facility due to poor maintenance, theft and/or vandalism or force majeure	Yellow	4
(3) Facility not usable	Red	1
(4) With Security Issues and not visited	Pink	9
TOTAL		220

1.3 Planned performance objectives for the next quarter:

Performance objectives to be met during the next quarter include the following:

- Construction of 2 PIPs will be completed by the end of October 2013.
 1. PIP-11 Alegria Barangay Bridge Construction
 2. PIP-12 Panag Barangay Bridge Construction
- Construction of 5 PIPs will be completed in November 2013.
 1. PIP-10 Lebanon-San Jose Barangay Bridge Construction
 2. PIP-13 Magangit-Batinao Bridge Rehabilitation
 3. PIP-14 Mamunga Bridge Rehabilitation
 4. PIP-15 Poblacion Compostela Bridge Rehabilitation
 5. PIP-16 Compostela Market Building Construction (2 units)
- Demobilization of Infra staff for survey, design and construction will be completed.

2.0 Agriculture and Aquaculture

2.1 Agriculture

As part of USAID's Typhoon Pablo Disaster Recovery Assistance Project, the GEM Program developed and implemented a package of technical assistance activities for agri-based growers and producers who were affected by the typhoon in the two provinces of Davao Oriental and Compostela Valley. The package of assistance provided immediate support to growers and local government units (LGUs) in restoring agri-based livelihood activities that were destroyed by the typhoon as well as developing strategies for the rehabilitation of heavily damaged agricultural areas and sectors.

2.1.1 Performance objectives and expected outputs for the 4th Quarter of GEM-3 in FY 2013:

- (1) Monitor planting of crops by farmer-beneficiaries;
- (2) Coordinate with LGUs and other agencies on the provision of additional support (i.e. land preparation and other inputs);
- (3) Monitor production stages in technology demonstration farms;
- (4) Conduct production technology training activities for the farmer-beneficiaries;
- (5) Plan strategic field events such as harvest festivals, Farmer Field Day, etc.; and
- (6) Present Crop Diversification Study results to Davao Oriental LGU

2.1.2 Summary of major accomplishments as well as unexpected or unplanned outcomes and activities during the quarter:

During the period July to September, the GEM Program continued to implement the following specific activities under the Agriculture component of the Typhoon Pablo Disaster Recovery Assistance effort:

- Continuation of limited input assistance (seeds and fertilizer) to up to 220 affected growers in Davao Oriental and Compostela Valley for the production of short-term food crops such as cardaba banana, vegetables and white corn;
- Establishment of technology demonstration (techno-demo) farms in twenty four (24) sites in the two provinces to showcase production technologies for the identified crops (cardaba banana, vegetables and white corn);
- Completion of a Crop Diversification Study to recommend suitable alternative crops for heavily-damaged coconut areas in the municipalities of Boston, Baganga, and Cateel in Davao Oriental;
- Follow-through activities to the Provincial Banana Forum, held in Compostela Valley on June 20, 2013, which recommended specific action plans for the rehabilitation of the banana industry in the province;
- Conduct of techno-training sessions for growers in the two provinces for the production of food and cash crops such as corn and vegetable.



(Left) Vegetable production by a women's group in Boston, Davao Oriental and sowing of seeds by assisted farmers in Monkayo, Compostela Valley *(Right)*.

As of September 15, the following activities have been undertaken and completed:

- Completion of limited input assistance to affected growers in Compostela Valley and Davao Oriental

A total of 364 growers (versus target of 220 growers) in the two provinces have been provided inputs (seeds and fertilizer) which enabled them to plant short-term crops such as cardaba banana, vegetables, and white corn to support their immediate need for food and income.

The breakdown of the number of assisted-growers per province is as follows:

- Davao Oriental – 248 growers (66 male and 182 female)
- Compostela Valley – 116 growers (85 male and 31 female)

The distribution of the number of assisted growers per municipality is presented in the following table:

Table 2.1 Number of Assisted-Growers per Municipality and Commodity in Davao Oriental

Municipality	Corn	Vegetables	Cardaba Banana	Total No. of Assisted Growers
Boston	15	153*	5	173
Baganga	15	20	5	40
Cateel	12	18	5	35
Total	42	191	15	248

*Includes 7 associations with 20 members. Associations received input assistance and implemented vegetable production as a group activity/project

Table 2.2 Number of Assisted Growers per Municipality and Commodity in Compostela Valley

Municipality	Corn	Vegetables	Total No. of Assisted Growers
Nabunturan	10	10	20
Monkayo	10	12	22
Montevista	12	10	22
Compostela	20	10	30
New Bataan	12	10	22
Total	64	52	116

Inputs were distributed to the growers in June 2013 while the planting activities commenced on the same month until August. As of the second week of September, most of the growers have completed the planting activities except for a few who encountered delays due to problems in land preparation and flooding occurrences in their areas.



Distribution on inputs (Seeds and fertilizer) to growers (*left*) in Montevista and planting of corn (*right*) in Nabunturan, Compostela Valley.

Based on reports from local agricultural officers and technicians, a few farmers began harvesting corn and vegetables starting late August and early September. The bulk of the corn and vegetable harvests, however, are expected by the month of October until early November.

A number of harvest festivals and field days were also organized by the growers and the local government units in Brgy. Union in Monkayo (vegetables), Brgy. Maparat (corn) in Compostela and in several barangays in Baganga and Boston in Davao Oriental.

- Setting up of Techno-Demo Sites for Corn, Vegetables and Cardaba Banana

To showcase recommended farming practices for the three identified food crops, twenty four techno-demo sites were established in eight towns in the two provinces. These techno-demo sites were selected by GEM staff in consultation with the local agricultural officers.

The list of techno-demo sites including important details are presented in the following tables:

Table 2.3 List of Techno-Demo Sites per Town and Commodity in Davao Oriental

Town	Corn	Vegetable	Cardaba Banana
Boston	Location: Brgy. Cabasagan (2 demo farms) Area: 1 hectare Planting Date: Early June; Expected Harvest: Mid-September	Location: Brgy. Carmen, Brgy. Cabasagan Area: ¼ hectare Planting Date: Mid-June Started harvesting in September	Location: Brgy. Carmen Area: 1,000 sq. m Planting Date: Early June
	Location: Brgy. Alegria Area: 1 hectare Planting Date: Early August; Expected Harvest: Mid-November	Location: Brgy. Aragon Area: ¼ hectare Planting Date: Mid-July Started harvesting mid-September	Location: Brgy. Sta. Felomina Area: 1,500 sq. m Planting Date: Mid-July
Baganga	Location: Brgy. Mahan-ub Area: 1 hectare Planting Date: Late July; Expected Harvest: Mid-November	Location: Brgy. Lucod, Brgy. Ban-ao Area: ¼ hectare Planting Date: Late July; Expected Harvest: Early October	Location: Brgy. Mikit (2 demo farms) Area: 1,500 sq. m Planting Date: Late June



(Left-Middle) A vegetable demo farm in Nabunturan and corn demo farm in Montevista Compostela Valley. (Right) A banana demo farm site in Boston, Davao Oriental.



16 sacks of corn grain harvested from a demo farm in Montevista, Compostela

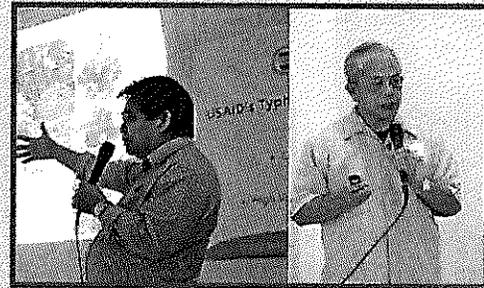
Table 2.4 List of Techno-Demo Sites per Town and Commodity in Compostela Valley

Town	Vegetable	Corn
Nabunturan	Location: Brgy. Magsaysay Area: ¼ hectare Planting Date: Early August; Expected Harvest: Late October	Location: Brgy. Magsaysay Area: 1 hectare Planting Date: Mid-July; Expected Harvest: Early October
	Location: Brgy. Union Area: ½ hectare Planting Date: Mid-June; Started harvesting late August	Location: Brgy. Poblacion Area: 1 hectare Planting Date: Mid-June; Expected Harvest: Early October
Montevista	Location: Brgy. Linoan Area: ¼ hectare Planting Date: Early August; Expected Harvest: Mid-October	Location: Brgy. Linoan Area: 1 hectare Planting Date: Late June Expected Harvest: Early October
	Location: Brgy. Bantacan Area: ¼ hectare Planting Date: Early-July; Started harvesting mid-September	Location: Brgy. San Roque, Brgy. Magsaysay Area: 1 hectare Planting Date: Late June; Expected Harvest: End of September (Magsaysay) Early October (San Roque)
Compostela	Location: Brgy. Maparat Area: ¼ hectare Planting Date: Mid-August; Expected Harvest: Mid-October	Location: Brgy. Maparat Area: 1 hectare Planting Date: Mid-June; Started Harvest: End September

- Conduct of Crop Diversification Study for three towns in Davao Oriental

In response to the request made by the Provincial Government of Davao Oriental, the GEM Program commissioned a team of consultants to undertake a Crop Diversification Study for heavily-damaged agricultural areas in Davao Oriental particularly in the towns of Boston, Baganga and Cateel.

The Crop Diversification Study (See Annexes) sought to identify suitable alternative crops (both short and long-duration) that can be viably introduced in the three towns to address the immediate food and income needs of the affected growers and support the long-term rehabilitation of the damaged agricultural areas.



Crop Diversification Consultants Dr. Pablito Pamplona (left) and Armando Sugcang (right) present findings of the study during a consultative meeting with Davao Oriental local government representatives.

The highlights of the study were formally presented to the provincial government and other local stakeholders in July. A series of presentations were also made to other relevant government agencies such as the Mindanao Development Authority (MinDA), Department of Agriculture (DA), Philippine Coconut Authority (PCA), Fiber Industry Development Authority (FIDA), Department of Science and Technology (DOST), National Economic and Development Authority (NEDA).

Among the important findings and recommendations of the Crop Diversification Study were:

- At least 90% of the coconut trees in the three towns and close to 100% of other crops (i.e. fruits, rubber, abaca, etc.) were destroyed by the typhoon;
- While the typhoon devastated most crop production in the three towns, it also presented the areas' rich agricultural endowments such as rich soils, high and evenly-distributed rainfall, large areas of plains and slightly sloping lands which are suitable to a wide range of short and long-duration cash and commercial crops;
- Recommended alternative crops which are suitable in the three areas are:
 - a) Short-term food crops such as rice, corn, vegetables and cassava to provide immediate food and income.
 - b) Medium to long-duration commercial crops such as new varieties of coconuts, rubber, fruit trees, banana, oil palm, rubber, cacao and coffee to provide long-term source of income and livelihood.
- Rehabilitation or replanting of damaged coconut areas may still be preferred by most farmers. However, hybrid seed nuts or improved varieties of coconut should be introduced to replace damaged trees.
- In the rehabilitation of damaged coconut areas, intercropping of coconut with other commercial crops such as cardaba banana, cacao and coffee as well as food crops such as corn and cassava should be promoted to increase income and encourage multi-cropping.
- Local government units (LGUs) in partnership with the Department of Agriculture (DA) and other agencies (Philippine Coconut Authority, Fiber Industry Development Authority) should focus on providing good quality planting materials for the identified alternative crops.
- To fast-track introduction of alternative cash and commercial crops, LGUs should consider studying and possibly replicating successful LGU initiatives such as the Plant Now-Pay Later (PNPL) and Plant and Take Care (PTC) efforts done by the local governments of North Cotabato and Agusan del Sur in their rubber and oil palm development projects.
- The national government should prioritize the immediate repair of damaged infrastructure such as roads, markets, irrigation systems and post-harvest facilities to accelerate the recovery and rehabilitation of the agricultural sector in the three towns.
- Follow-thru Activities to the Provincial Banana Forum in Compostela Valley.

A Provincial Banana Forum was also organized by the GEM Program in Nabunturan, Compostela Valley on June 20, 2013. The forum was held to bring together banana growers, major banana exporting companies, other industry stakeholders and government representatives to discuss urgent issues on the rehabilitation of the province's banana industry and formulate corresponding action plans. More than 180 participants attended the one-day forum.

During the forum, company representatives of major banana exporting companies operating in Compostela Valley Province provided updates on their plantation rehabilitation plans. The Department of Agriculture (DA) also presented the government's on-going and planned rehabilitation initiatives for affected banana growers which included cash-for-work assistance and provision of inputs and equipment. The Bureau of Plant Industry (BPI) also presented the government's response for the effective control of major banana diseases such as fusarium wilt and moko. The Landbank of the Philippines (Landbank) also presented the bank's financing package for rehabilitation of damaged banana farms which can be availed by interested growers.

To follow through on these commitments made by government agencies, GEM continued to coordinate with agencies such as the DA, BPI and Landbank on the progress of their additional banana industry rehabilitation efforts. According to DA, additional assistance such as planting

materials and other farm inputs have been included in the agency's budget for 2014. The BPI, on the other hand, is continuing its training programs on pest and disease management to small-hold banana growers in Compostela Valley and Davao del Norte.

GEM also relayed major banana industry rehabilitation issues such as additional assistance to affected banana growers and pest and disease training to the Banana Industry Council of Region 12 (BAICOR) for inclusion as priority concerns for action by the DA Secretary Proceso Alcala during the recent Mindanao Banana Congress held in General Santos City in August.

- **Techno-Training Sessions for Assisted Growers**

During this quarter, a series of production technology training on corn, vegetable and banana were also conducted to assisted-growers in the two provinces. The training sessions provided the growers recommended farming practices for these crops including basic pest and disease management techniques.

In Compostela Valley, a vegetable production programming and marketing seminar was also organized for assisted growers and local agriculture officers and technicians. The seminar was conducted in response to the request of the provincial government to help growers in properly programming their vegetable production activities to avoid over-supply of vegetables in the local market and take advantage of other market opportunities in neighboring areas.



(Left) Farmers Field Session on vegetable production in Monkayo, Compostela Valley. *(Right)* Technical Training on corn, vegetable and banana production technology in Cateel, Davao Oriental.

A total of 238 grower-participants attended these techno-training sessions broken down as follows:

- Davao Oriental – 150 participants
 - Boston (July 9) – Vegetable, Corn and Banana – 50 participants
 - Cateel (July 10) – Vegetable, Corn and Banana – 50 participants
 - Baganga (July 11) – Vegetable, Corn and Banana – 50 participants
- Compostela Valley – 88 participants
 - Vegetable Production Field sessions in Montevista, Nabunturan and Compostela (July 2, 23 & 29) – 50 participants
 - Provincial Vegetable Programming and Marketing Training in Nabunturan (July 16) – 38 participants

2.1.3 Planned performance objectives for the next quarter:

- (1) Identify and validate farmer-proponents and sites for techno-demo on coconut inter-cropping and introduction of alternative commercial crops in Davao Oriental and Compostela Valley Province;
- (2) Provide limited input assistance to farmer-proponents for the establishment of techno-demo sites including conduct of techno-transfer training;

- (3) Conduct training-workshop on Crop Diversification Planning and Promotion in three towns (Baganga, Boston & Cateel) in Davao Oriental;
- (4) Organize Province-wide Crop Diversification Forum in Davao Oriental;
- (5) Conduct Provincial Banana Pest and Disease Forum in Compostela Valley; and
- (6) Provide limited commodity assistance to up to two previously-assisted vegetable grower groups in Compostela Valley to support vegetable trading and marketing activities

2.2 Aquaculture

GEM is extending technical assistance to fisherfolk and aquaculture farmers in Compostela Valley and Davao Oriental, whose livelihood activities were adversely affected by Typhoon Pablo. This assistance will provide them with the skills and technologies needed to engage in climate-adaptive aquaculture, as well as high-value seafood production. Specifically, this technical assistance encompasses the following activities:

A. High-Value Aquaculture Development

1. Training and provision of techno-demo fish cage modules (including production inputs) to nine fisherfolk associations in eight coastal municipalities in the two provinces on the culture of high-value grouper in fish cages. Training will include all aspects of production, such as sourcing of inputs (juveniles, feeds, etc.), stocking and maintenance, feeding, health management, harvest and packing, as well as construction of modules using low-cost material with extreme-weather resistant design. Training will include installation of low-cost all-weather resilient techno-demonstration modules (as grant assistance) that can be replicated by existing and potential high-value aquaculture growers in the two provinces, and will be effective in enduring future possible typhoons.
2. Industry Development Plan for High-Value Aquaculture Production - viability assessment and industry plan for the development of High-Value Aquaculture as an alternative to traditional fisheries in Davao Oriental.

B. Technical Assistance on Climate-Adaptive Inland Aquaculture Technologies – this activity covers introduction of culture techniques and protocols for inland freshwater and aquaculture operations adjusted towards averting potential losses from climate-induced calamities and adverse weather conditions. This activity will also include provision of techno-demo materials (as grant assistance).

C. Convergence/Coordination Activities include identification, coordination, and provision of technical assistance to complement and augment related projects of other donor agencies. These may cover introduction of aquaculture-related livelihood activities; working with private aquaculture companies and service providers to channel their CSR activities towards supporting aqua-related rehabilitation efforts in the target provinces.

2.2.1 Performance objectives and expected outputs for 4th Quarter of GEM-3 in FY 2013:

- (1) Training activities completed;
- (2) Techno-demo materials completely distributed;
- (3) All stocking activities completed;
- (4) All techno-demo modules and farms under SAF 1293 installed;
- (5) Convergence Forum conducted;
- (6) HVA Industry Plan completed, submitted, and presented; and
- (7) Convergence activities initiated.

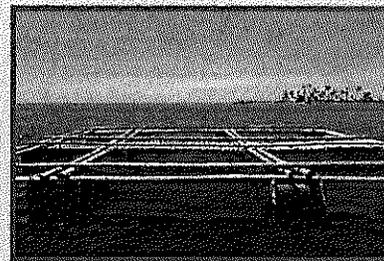
2.2.2 Summary of major accomplishments as well as unexpected or unplanned outcomes and activities during the quarter:

A. Training – around 750 fisherfolk belonging to 12 associations/cooperatives were trained in High-Value Aquaculture (HVA) production and Climate-adaptive Inland Aquaculture in 8 municipalities.

1. Seven (7) fisherfolk associations in coastal communities were taught how to culture high-value grouper using low-cost all-weather resilient fish cage modules. These were in the municipalities of Pantukan and Mabini in Compostela Valley, and in the municipalities of Baganga, Mati, and Boston in Davao Oriental.
2. Four (4) groups in Mabini and Pantukan, Compostela Valley and in Baganga and Cateel, Davao Oriental were trained in climate-adaptive aquaculture of milkfish and tiger prawn in brackishwater ponds.
3. Two (2) groups in the municipality of Nabunturan, Compostela Valley were assisted in tilapia culture in fish cages.
4. Two (2) associations located in Nabunturan and in Monkayo, Compostela Valley were trained in climate-adaptive aquaculture production of freshwater prawn and catfish, respectively.

B. Provision of techno-demo modules/ponds

1. Nine (9) groups were provided materials for the construction of techno-demo low-cost all-weather resilient fish cage modules, including production inputs. Two of these were for tilapia production as these were in inland areas while the rest were for high-value grouper production. Around 450 fisherfolk benefited from this activity.
2. Eight (8) groups received material assistance for the establishment of climate-adaptive inland aquaculture ponds. Around 800 fisherfolk benefited from this activity.



A typical techno-demo fish cage module with all-weather resilient design

C. Convergence Activities

Through convergence efforts, other programs and institutions collaborated with GEM to extend assistance to Pablo victims through aquaculture activities.

1. The World Food Program (WFP) included 5 of GEM's beneficiary associations in its cash-for-work program in the construction of 3 techno-demo fish cage modules and 2 climate-adaptive demo ponds.
2. The Conrado and Ladislawa Alcantara Foundation, Inc. (CLAFI) provided counterpart of more than 100,000 milkfish and grouper fingerlings to 5 associations.
3. The Provincial Agriculture Office of Compostela Valley provided counterpart catfish, tilapia, and freshwater prawn juveniles to 4 associations.

D. HVA Industry Development Plan

As part of GEM's assistance, the High-Value Aquaculture Industry Development Plan (See Annexes) was prepared and submitted to Davao Oriental province. This plan would serve as a guide in establishing and developing high-value aquaculture as a major industry in the province.

Highlights during this quarter:

1. On July 12, 2013, the HVA Industry Development Plan was presented to the provincial officers of Davao Oriental. On Aug. 29, the industry plan was officially turned over to Davao Oriental Governor Corazon N. Malanyaon during GEM's Provincial Conference on Disaster Management.
2. GEM met with the Compostela Valley Provincial Agriculturist's Office and Municipal Agricultural Officers and Municipal Fisheries Technicians concerned to formally turn over supervision of GEM's aquaculture projects to the LGU.
3. As of July 2013, all 9 techno-demo fish cage modules in the 2 provinces were completed and production inputs procured. On July 15-16, the GEM Aquaculture team facilitated the stocking of the modules with around 10,000 grouper fingerlings collectively.
4. On August 29, the Conrado and Ladislawa Alcantara Foundation, Inc. (CLAFI) turned over grouper and milkfish juveniles to 4 beneficiary associations in Mabini and Pantukan, Compostela Valley, and in Baganga and Cateel, Davao Oriental. This was followed by a second tranche of donated juveniles to another association in Mati, Davao Oriental on September 19. More than 100,000 juveniles were donated by CLAFI.
5. For the entire month of September, GEM continued to conduct follow-up training activities to the assisted groups, focusing on health management and disease prevention. Actual demonstrations on treatment applications were conducted among the beneficiaries.
6. On September 18 and 26, GEM met with the International Committee on the Red Cross (ICRC) and Save the Children Foundation (SCF), respectively, to encourage the two donor agencies to channel their existing conditional cash grant programs for Pablo-affected communities towards aquaculture livelihood. The ICRC committed to do a trial run, with GEM technical assistance, in Cateel while the SCF committed to do so on a larger scale in a number of municipalities, provided GEM would likewise extend technical support.

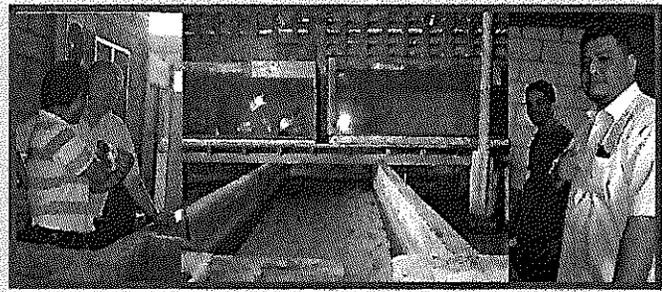


Turn-over of the High-Value Aquaculture Industry Development Plan to Davao Oriental governor Corazon Malanyaon.



GEM Sr. Mariculture Specialist Lauro Tito Ilagan (*right*) hands over grouper fingerlings to Kinablangan Development Cooperative (KDC) Chairman, Carlito Rabadan (*left*) for their fish cage in Brgy. Kinablangan, Baganga, Davao Oriental.

7. On September 23 and 24, GEM met with seafood buyers and exporters, Davao Agro Marine Resources, Inc. and Aquaphill Export Corp., respectively, to promote market linkages for the assisted growers. The two companies agreed to forge marketing agreements with GEM's beneficiary organizations with the possibility of doing contract-growing of grouper and other high-value seafood commodities.



GEM Aquaculture team inspects live fish consolidation station of seafood exporter Davao Agro Marine Resources, Inc. (DAMRI) with DAMRI president, Mr. Domingo Ang (2nd from left)

2.2.3 Planned performance objectives for the next quarter:

- (1) Training activities completed;
- (2) Techno-demo materials procured and distributed;
- (3) All stocking activities completed;
- (4) All techno-demo modules and farms under SAF 1300 installed; and
- (5) Convergence activities initiated.

3.0 Education

On December 4, 2012, Typhoon Pablo (international name: Bopha) made landfall in the Philippines. Its passage across the country left extensive damage and devastation to a number of municipalities in the Provinces of Davao Oriental and Compostela Valley. Initial assessment indicated that the worst typhoon-affected schools are in the municipalities of Compostela, Monkayo, Montevista and New Bataan in Compostela Valley, and in the municipalities of Baganga, Boston and Cateel in Davao Oriental.

USAID responded by conducting a Rapid Assessment and identifying the schools, in coordination with the Department of Education, affected by the typhoon in the worst-hit provinces of Compostela Valley and Davao Oriental. To these 30 schools, USAID, through the GEM Program, provided student and teacher kits, school furniture, blackboards, reference materials and reading books. The student kits included a school bag containing school supplies while teacher kits were mostly teaching materials and other creative educational supplies.

3.1 Performance objectives and expected outputs for the 4th quarter of GEM-3 in FY 2013:

The expected outputs and the accomplishments for the quarter relative to each output are presented below:

- (1) Continue the delivery of school furnishings in Davao Oriental.
- (2) Sorting of reading materials.
- (3) Delivery of reading materials in Compostela Valley and Davao Oriental.

3.2 Summary of major accomplishments as well as unexpected or unplanned outcomes and activities during the quarter.

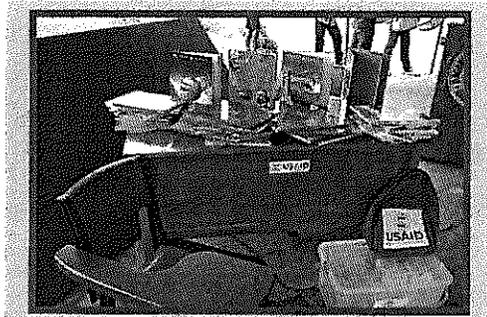
GEM gave assistance to 30 Typhoon Pablo affected schools in Davao Oriental and Compostela Valley by providing students and teachers with student and teacher kits, reference materials, reading books and classroom furniture to schools.

The first batch of school items were delivered on June 10, 2013—in time for the opening of School Year 2013-2014. These school items were composed of the following: 12,645 student desks, 281 sets of teacher tables and chairs, 25,018 student kits, 687 teacher kits and 30 sets of reference materials.

The deliveries for the second batch of school items began on July 21, 2013. These school items, delivered to twenty two elementary schools, included story books appropriate for children ages 4 to 8 years old and 9 to 12 years old.

GEM distributed a total of 151 sets of story books for children ages 4 to 8 years old and 422 sets of story books for students aged 9 to 12 years old.

The deliveries were completed on August 13, 2013.



School items delivered to Carmen Elementary School in the municipality of Boston, Davao Oriental province.

Below is the summary of GEM's assistance to the Education sector:

Items	Quantity
Student Kits	25,018 sets
Teacher Kits	687sets
Reference Materials	30 sets
Reading Books	
For Ages 4 to 8	151 sets
For Ages 9 to 12	422 sets
Classroom Furniture	336 sets
Student chairs	12,645 pcs
Teacher chairs and desks	281 sets

4.0 Support Activities

4.1 Facilitation Services

GEM provides a range of support services to other USAID projects and activities, and for the U.S. Embassy.

During the quarter, GEM provided assistance to **13** official visits and activities of USG officials, including U.S. Ambassador Harry Thomas Jr., Dana Linnet, Deputy Director, EAP/RSP, U.S. Department of State, and Thomas White, Deputy Director, RDMA/GVP (see table 6.1). Other visitors include Christopher Estoch, Political Affairs Officer, Marrion Miller, RDMA/OFDA, Benjamin Hemingway, RDMA/OFDA, Ma. Teresa Robielos, OEDG-USAID, Lee Forsythe, OEDG-USAID, and Melchor Ancla, OEDG-USAID. For these visits GEM usually prepared scene setters and schedules, provided logistical and security arrangements, arranged media coverage, arranged meetings with local business people and government officials, provided GEM briefings, arranged travel and hotel accommodation and/or prepared talking points for resource/guest speakers.

GEM provided logistical arrangements for two special projects of USAID/Philippines: Provincial Conferences on Disaster Management in Compostela Valley and Davao Oriental Provinces; and Assistance / Relief Efforts to Zamboanga City. GEM coordinated with various stakeholders (local government, other donor agencies, national agencies, and U.S. military) and provided logistical support to the implementation of the said projects.

Recently, the RSO requested that GEM coordinate with the PNP and/or the AFP re close-in and on site security escorts for USAID or USG staff traveling to Mindanao. Closer coordination with the RSO, staff traveling as well as the PNP and AFP was required.

To date, GEM 3 has facilitated **490** visits/activities of USG, USAID and GRP officials.

GEM's activities in this area are summarized in the following table.

Table 4.1 Visits/Activities July 1 – September 30, 2013

NO.	DATE	PLACE	VISITOR	ACTIVITIES
1	July 1-2, 2013	Cagayan de Oro, Iligan, Marawi	MA. TERESA ROBIELOS, OEDG-USAID LEE FORSYTHE, OEDG-USAID	Logistics and Vehicle Assistance
2	July 15, 2013	Zamboanga City	CHRISTOPHER ESTOCH, Political Affairs Officer DANA LINNET, Deputy Director, EAP/RSP, Department of State	Vehicle Assistance
3	July 18, 2013	Zamboanga City	MA. TERESA ROBIELOS, OEDG-USAID LEE FORSYTHE, OEDG-USAID	Vehicle Assistance
4	July 23-24, 2013	Zamboanga City	MA. TERESA ROBIELOS, OEDG-USAID	Logistics and Vehicle Assistance
5	August 16, 2013	Zamboanga City	HARRY J. THOMAS, Jr., U.S. Ambassador to the Philippines	Vehicle Assistance

NO.	DATE	PLACE	VISITOR	ACTIVITIES
6	August 19-21, 2013	Zamboanga City, Jolo	MA. TERESA ROBIELOS, OEDG-USAID LEE FORSYTHE, OEDG-USAID	Vehicle Assistance
7	August 26-27, 2013	Davao City	MARRION MILLER, RDMA/OFDA BENJAMIN HEMMINGWAY, RDMA/OFDA	Vehicle Assistance
8	September 11-12, 2013	Cotabato City	MA. TERESA ROBIELOS, OEDG-USAID LEE FORSYTHE, OEDG-USAID	Logistics and Vehicle Assistance
9	September 12-16, 2013	Davao City	THOMAS WHITE, Deputy Director, RDMA/GVP	Logistics and Vehicle Assistance

GEM also shares information and guidance regarding the security situation in various areas in Mindanao to staff of USAID and other USAID-supported projects as well as other foreign donors through an email-based "listserve". Security reports provide information and guidance on trouble spots to avoid, possible emerging threats, preferred routes to take when traveling, etc. In GEM 3, we have shared **143** security advisories to members of the "listserve". A total of **444** advisories have been generated including security information and security arrangements provided to the RSO and other USAID Programs/Projects for up to **301** VIP visits in GEM 3.

4.2 Communications and Information

From the inception of GEM 3 in January 2008, the Communications Team has generated **814** stories and photo releases about Mindanao and USAID's assistance to the region. A total of **5,818** placements were obtained in local and national dailies, magazines, news and information websites, and international publications.

For the 2013 Fiscal Year, GEM produced **43** press releases comprised of news and feature articles and captioned photos. A total of **94** placements were generated, including **13** in Mindanao newspapers, **15** in national newspapers and **66** in the web as shown in the following table.

OUTPUT	GEM-Produced Releases and Placements (GEM-3)						GEM Extension					TOTAL
	Jan-Dec 2008	Jan-Dec 2009	Jan-Dec 2010	Jan-Dec 2011	Jan-Sept 2012	TOTAL 2008-2012	Apr-June 2013	July 2013	Aug 2013	Sept 2013	TOTAL 2013	
GEM Produced Articles and Photo Releases	193	192	164	150	72	771	24	2	2	13	43	814
Local/ Provincial Print Placements	376	540	405	410	191	1922	5	4	1	3	13	1935
National Print Placements	252	398	275	240	124	1289	8		1	6	15	1304
On-Line Placements	406	653	540	595	275	2469	45	1	3	17	66	2535
International Placements	3	17	12	11	1	44						44

*The GEM Communications Team completed and exceeded its five-year contractual targets in September 2012. While documentation and graphics assistance continued, the Public Relations component was de-mobilized in December and re-mobilized in April 2013, under the GEM contract extension, to provide assistance to the Typhoon Pablo Disaster Recovery Assistance and other USG activities in Mindanao. Production and placement of press releases and news monitoring, resumed in the same quarter.

Events Coverage and Assistance

Since 2008, **105** USG and USAID visits and events under GEM 3 have been covered by the Communications Team in Mindanao and Manila. **194** events and other activities have been photo-documented, **60** of which were supplemented with video-documentation. **65** PowerPoint presentations have been produced and submitted to USAID. Media coverage was organized for **72** USG, USAID visits, GEM events and other activities.

Following is a summary of events covered and assisted by the Communications Team in FY 2013.

Visit of USAID/Philippines Mission Director Gloria D. Steele and USAID Office of Education Chief Robert Burch to Compostela Valley on June 14, 2013. The GEM Communications Team provided photo and video documentation, organized media coverage, prepared and disseminated a media advisory and press release in coordination with USAID. A PowerPoint slideshow was produced and submitted to USAID highlighting the following activities under the Typhoon Pablo Disaster Recovery Assistance: Turn-over of education supplies, furniture and books to Cabinuangan Central Elementary School; Ground-breaking of the Poblacion Compostela Trading Center; and Turn-over of farm inputs to local farmers in Brgy. Maparat, municipality of Compostela. Photos were endorsed to USAID immediately after the events. Six captioned photos were produced and released to press following USAID approval.

Visit of USAID/Philippines Office of Education Chief Robert Burch to Davao Oriental on June 21, 2013. The GEM Communications Team provided photo documentation. A PowerPoint slideshow was produced and submitted to USAID highlighting the following activities under the Typhoon Pablo Disaster Recovery Assistance: Turn-over of education supplies to Baganga Central Elementary School; Inspection of Baganga Market Trading Center; and Turn-over of high-value aquaculture production materials to the Kinablangan Development Cooperative and Kinablangan Seaweed Growers Association. Five captioned photos were produced and will be disseminated to press following USAID approval.

Visit of US Ambassador Harry K. Thomas Jr. and USAID/Philippines Mission Director Gloria D. Steele to Zamboanga City on May 29, 2013. The GEM Communications Team provided photo documentation, organized media coverage, prepared and disseminated a media advisory and press release in coordination with USAID. A PowerPoint slideshow was produced and submitted to USAID highlighting the following activities: Meeting with Zamboanga Mayor Celso Lobregat; Roundtable meeting with alumni of U.S Government youth programs; and Launch of three new USAID projects in Mindanao. Photos were endorsed to USAID immediately after the events.

Visit of US Department of State Program Management Officer Jeff Key's to USAID Projects in Tawi-Tawi on March 14, 2013. A PowerPoint slideshow was produced, highlighting the following projects and activities: Visit to Tawi-Tawi Bridge-Road Partnership Project; Visit to Batu-Batu Trading Center; Meeting with members of the GEM-assisted Lapid-Lapid Multi-Purpose Cooperative; Participation in the groundbreaking ceremony of the Philippine National Police (PNP) Maritime Group Special Boat Unit Bongao Station; Visit to Tawi-Tawi multi-species hatchery.

Visit of US Ambassador Harry K. Thomas Jr. and USAID Mission Director Gloria D. Steele to Cateel, Davao Oriental on February 20, 2013. At the request of USAID, GEM provided photo and video documentation, organized media coverage, prepared and disseminated media advisories, and

extended travel and logistics arrangements to seven representatives of major media outlets based in Davao City: Manila Bulletin, Newsdesk Asia, Sun Star Davao, Mindanews, Mindanao Times, ABS-CBN Davao, ABC TV5. A PowerPoint slideshow was produced and submitted to USAID highlighting the turn-over of USAID relief assistance to Typhoon Pablo victims.

Visit of USAID Deputy Mission Director Reed Aeschliman to Davao City on February 20, 2013. GEM provided photo documentation of the Deputy Mission Director's participation at the Department of Science and Technology (DOST) Smarter Philippines Program Launch held at the Marco Polo hotel.

Visit of USAID Mission Director Gloria D. Steele to Davao City on January 18, 2013. The GEM Communications Team provided photo and video documentation, organized media coverage, prepared and disseminated media advisories in coordination with USAID. A PowerPoint slideshow was produced and submitted to USAID highlighting the following activities: Turn-over of USAID relief assistance to Typhoon Pablo victims, which was also attended by high-ranking officials of the United Nations World Food Programme (UN-WFP) and the Department of Social Welfare and Development - National Disaster and Risk Reduction Management council (DSWD-NDRRMC); Roundtable II on women, peace and security (WPC). Photos and videos were endorsed to USAID and were also used in the preparation of USAID highlights.

Other Communication and Public Relations Activities

- USAID's Emergency Relief Operation in Zamboanga City, September 12 to 15, 2013
 - Daily Field Reports submitted to USAID
 - Assistance in delivery and monitoring of distribution activities
 - Preparation of press release/success story, media advisory and photo releases
 - Media coverage and management in coordination with USAID
 - Post activity report in PowerPoint format

- From planning to implementation, the communications team provided extensive support to USAID's Typhoon Pablo Disaster Recovery Assistance in the two provinces and eight municipalities that were most severely affected by Typhoon Pablo.
 - Assistance in the preparation of a climate change vulnerability assessment (VA) study for 15 USAID-funded infrastructure projects in the eight municipalities that were most severely affected by Typhoon Pablo
 - Research and coordination
 - GIS mapping
 - Content editing and final report production
 - Assistance in the implementation of VA follow-on activities, including:
 - Task 1: Two Provincial Conferences on Disaster Management
 - Task 2: Adaptation Capacity Assessment and Planning
 - Task 3: Mobilizing for Watershed Management
 - Task 4: Communications and Training Activities
 - Task 5: Terms of Reference for the Acquisition of LIDAR Data and Detailed VA for Davao Oriental Province
 - Provincial Conferences on Disaster Management, Compostela Valley (August 27-28, 2013) and Davao Oriental (August 29-30, 2013)
 - SAF preparation
 - Overall coordination with partners, subcontractors and GEM staff
 - Supervision of preparatory activities
 - Event setup and management

- Photo and video documentation support
 - Report editing
 - Production of post activity photo release and PowerPoint slideshow
- Provided editorial support to GEM teams for the following technical reports:
 - High-Value Aquaculture Industry Development Plan
 - Crop Diversification Study
- Assistance in the preparation of news articles, security advisories and USAID highlights
- To promote Davao Durian Summit , GEM facilitated the appearance of MinFruit officials at Kapehan sa SM, a media forum held in Davao City on March 7, 2013
- News monitoring in national broadsheets, Mindanao newspapers , news and information websites, and the broadcast media
- Photo documentation of education support activities under the Typhoon Pablo Disaster Recovery Assistance – Sorting and packaging activity on May 27, 2013 and distribution of supplies and furniture to Linoan Central Elementary School and Cabinuangan Central Elementary School on June 6, 2013
- Photo documentation of distribution of farm inputs to recipients in Davao Oriental (Boston, Baganga, Cateel) from June 4 to 7, 2013
- Photo documentation of the Compostela Valley Provincial Banana Forum on June 20, 2013
- Photo documentation of the presentation of USAID-GEM's Crop Diversification Study for Davao Oriental Province from July 11-12 , 2013
- In coordination with GEM management, organized and facilitate a weekly photo contest

Web and Graphics Support

Graphics and web maintenance activities for FY 2013 are described below.

- Scanning, digital imaging and photo manipulation, file conversion, PowerPoint slide layout and animation
- Maintenance and monitoring of the GEM Facebook page and the GEM website, www.mindanao.org
- On-going layout of the GEM Final Report Magazine
- Data archiving and back up (2003-2013 files)
- Production of program collateral materials such as letter head stationary design, identification cards, business cards, report covers, and infrastructure project markers
- Preparation of event collateral materials for USG visits to GEM project sites and GEM-supported events
- Production of a tribute video presentation for U.S. Ambassador Harry K. Thomas
- Production of USAID Stickers, including truck stickers to be used in livelihood, education assistance activities and relief operations
- Conduct of an interactive map briefing for USAID officials (Lee Forsythe and Tet Robielos)
- On-going layout of the GEM Final Report Magazine
- Web upload of procurement documents, notices and amendments

5.0 Climate Change Vulnerability Assessment and Follow-on Activities

The provinces of Compostela Valley and Davao Oriental sustained heavy damage to population centers, infrastructure, forest, upland, and coastal ecosystems due to the onslaught of Typhoon Pablo (international name "Bopha"). This Category 5 super typhoon, which struck Region 11 starting December 4, 2012, represented the most southerly Category 5 typhoon to have occurred to date throughout the world.

In January 2013, the United States Agency for International Development (USAID) through its Growth with Equity in Mindanao (GEM) Program, completed a rapid assessment of the impacts of Typhoon Pablo. The study identified the eight most severely affected municipalities: (*Province of Compostela Valley*) Municipalities of Laak, Monkayo, Compostela, New Bataan, and Montevista; (*Province of Davao Oriental*) Municipalities of Baganga, Boston, and Cateel.

A multi-component disaster recovery assistance program was then designed and implemented to effectively provide support in areas where needs were greatest. This included assistance to the education sector, livelihood and infrastructure projects, and the conduct of a climate change vulnerability assessment (VA) which focused on the 15 infrastructure projects in the eight municipalities that would either be rehabilitated or constructed with USAID funding.

Rapid Climate Change Vulnerability Assessment Study

The VA study, which was completed by GEM in June 2013 in collaboration with experts from the University of the Philippines – National Institute of Geological Sciences (UP-NIGS), provided an analysis of the potential impacts of climate change, focusing on increased rainfall, flooding, landslide, debris flow events, as experienced during Typhoon Pablo. Mitigation, adaptation and institutional measures, and follow-on activities for potential USAID assistance were recommended to reduce future vulnerability and increase local resilience to extreme rainfall and typhoon-related events by identifying hazard zones and responsive measures, including long-term adaptation planning.

These recommendations were organized into five major tasks and were implemented by GEM with concurrence from USAID:

- **Task 1: Two Provincial Conferences on Disaster Management** to present and validate the results of the USAID-GEM's VA study; and coordinate activities under Tasks 2, 3 and 4 that require intensive collaboration between the participating local government units (LGUs) and GEM, in order to effectively implement a "learn-by-doing" approach.
- **Task 2: Adaptation Capacity Assessment and Long Term Planning** in support of the review and update of the disaster management plans of Compostela Valley and Davao Oriental Provinces and the eight most severely affected municipalities.
- **Task 3: Mobilizing Watershed Management** in two pilot watershed areas by providing recommended action plans for improved management and public education.
- **Task 4: Communications and Training Activities** to develop an applied communications program and conduct training activities (including hazard map reading and appreciation, utilization of GPS, disaster preparedness) to increase local awareness to climate change vulnerabilities and adaptation strategies.
- **Task 5: Preparation of the Terms of Reference (TOR)** for conducting Light Detection and Ranging (LIDAR) or similar quality data acquisition and vulnerability analysis for Davao Oriental.

These Tasks are in line with Strategic Objective 2 of USAID's *Climate Change and Development Strategy*, to increase the resilience of people, places, and livelihoods to changing climate. Further, it will support USAID/Philippines' Development Objective 3 (DO3), under its *Country Development Cooperation Strategy*, to improve environmental resilience, specifically increasing climate change resilience (Sub IR 3.2.3) and reducing disaster risks (IR 3.1).

5.1 Summary of Activities and Accomplishments¹

Task 1: Provincial Conferences on Disaster Management

Plenary Session

GEM in collaboration with GEOS, Inc. organized and successfully conducted two provincial-level disaster management conferences in Nabunturan, Compostela Valley (August 27-28, 2013) and Cateel, Davao Oriental (August 29-30, 2013).

The results of the USAID-GEM VA study was presented to about 100 participants composed of local chief executives, municipal and provincial planning, environment, social welfare, municipal disaster risk reduction management council action officers, among others.

The GEM Infrastructure Team presented the climate adaptive engineering design standards used for the 15 USAID-funded infrastructure projects in the two provinces. These facilities are being constructed or rehabilitated to withstand 100-year flood levels and resist extreme wind velocities, higher than that of Typhoon Pablo.

Eight Local Government Units (LGUs) from the two provinces presented the current status of their Municipal Disaster Risk Reduction Management Plans (MDRRMP) to a panel of experts who then provided valuable feedback on areas that need to be improved to help strengthen disaster preparedness. The panel was composed of representatives from the Department of Science and Technology (DOST) - Project NOAH (Nationwide Operational Assessment of Hazards), Philippine Atmospheric Geophysical Astronomical Services Administration (PAGASA), Department of Public Works and Highways (DPWH), Department of Interior and Local Government (DILG), Mines and Geosciences Bureau (MGB), Philippine Watershed Management Coalition, United Nations Office for the Coordination of Humanitarian Affairs (U.N.-OCHA), and the GEM Program.

➤ Key Discussions: Compostela Valley Provincial Conference

New Bataan

- Relocation of people living within identified hazard-prone areas to safer zones
- Development of counter measures in dealing with debris flows
- Concentrate future development on lower risk areas
- Incorporation of data and input from Comprehensive Land Use Plan to the DRRM plans
- Proper zoning of livelihood such as planting of crops (away from hazard prone areas / areas known to be vulnerable to debris flows)
- Procurement and placement of instruments to detect debris flows

¹ The GEM Program collaborated with industry experts in the implementation of VA follow-on activities. GEM worked with GEOS Inc. of the University of the Philippines – National Institute of Geological Sciences (UP-NIGS) led by Dr. Mahar Lagmay, Project Nationwide Operational Assessment of Hazards (NOAH) Executive Director, in the conduct of Tasks 1, 4 and 5. Task 2 was implemented by Kahublagan Sang Panimalay Foundation led by Dr. Jessica Salas Executive Director of Philippine Watershed Management Coalition. GEM engaged the services of an Environmental and Natural Resources Management Expert, a GIS and Remote and Sensing Expert, and a Community and Governance Expert for Task 3.

Compostela

- Proper location of signage in hazard prone areas
- Re-evaluation of locations of evacuation centers using resources such as new hazard maps
- Placement of hazard maps in every barangay hall
- Creation of a “war room” with internet connection to enhance information gathering and dissemination capabilities

Laak

- Further development of the DRRM plan to address specific programs and projects concerning risk reduction and disaster management
- Concentration of objectives to DRRM matters (Context: In Laak, the MDRRMO handled agriculture projects which should fall under the jurisdiction of the Department of Agriculture)

Montevista

- Formulation of plans for risk reduction and mitigation (Context: In Montevista, the MDRRMP focused on preparations. The panel of experts suggested exploring risk reduction and mitigation)

Monkayo

- Implementation of adaptive measures in the construction of infrastructure facilities
- Re-evaluation of locations of evacuation centers using resources such as new hazard maps

➤ *Key Discussions: Davao Oriental Provincial Conference*

Baganga

- Accessibility of roads (with the assistance of DPWH)
- Re-assessment of risk and vulnerability (Context: Baganga lies beside the coast which makes them vulnerable to storm surge. They are also near the Philippine trench which makes them vulnerable to earthquakes and tsunamis. Their DRRMP lacks recognition of these possible hazards)
 - Use of the maps to foresee potential damage
 - Highlight the hazards of the Philippine trench regarding tsunamis and include this in the DRRMP

Boston

- Development of specific programs aside from structural solutions to hazards (Context: In Boston, they build sea walls to protect the residents from storm surges. The panel of experts suggested exploring other solutions such as relocation rather than regularly funding the construction and repair of these structures)
- Mitigation measures for storm surges and designation of pre-emptive evacuation areas

Cateel

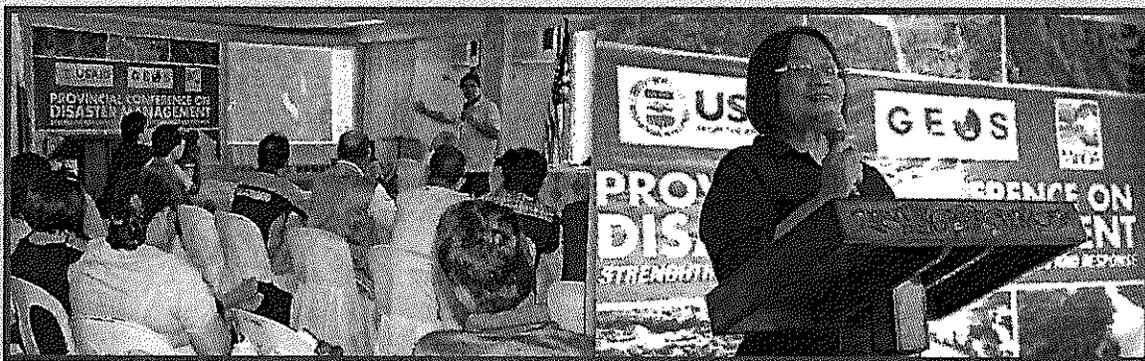
- Adaptation measures in infrastructure (may review structural design of infrastructure and houses in Bicol and Batanes regions that are resilient to high wind velocity)
- Planning for quick response measures (e.g., immediate evacuation) that can be implemented during earthquake and tsunami events

Break Out Working Meetings

The break-out sessions held during the conferences served as a venue for the conduct of workshop and hands-on training and capacity assessment activities under Tasks 2, 3 and 4, specifically:

- a) Workshop on watershed management mobilization and public education planning
- b) Validation of initial findings and assessment each LGUs capacity and capacity building needs in addressing the impacts of climate change and natural disasters.
- c) Orientation on the Philippine DRRM structure, and training on Global Positioning System (GPS) technologies and geo-hazard map reading.

Designed as interactive small group discussions, participants were able to share best practices and raise questions directed to the three task teams.



(Left) Project NOAH (Nationwide Operational Assessment of Hazards) Executive Director Dr. Alfredo Mahar A. Lagmay presents the results of USAID's climate change vulnerability assessment. *(Right)* "We are in the reconstruction and restoration stage so let us continue to integrate all the other relevant concerns, particularly disaster management and climate change adaptation," Davao Oriental Gov. Corazon Malanyaon said in her remarks.

Task 2: Adaptive Capacity Needs Assessment and Long Term Planning Assistance

The conduct of an adaptive capacity needs assessment and long-term planning assistance was part of the recommendations of the VA study, subsequently implemented by GEM from August to October 2013. Task 2 aimed to assess local capacity and capacity building needs in addressing climate change vulnerability. It also intended to provide hands-on technical assistance to the two provinces and eight municipal LGUs in reviewing and updating their disaster management plans. The assessment was anchored on the UN Framework of Risk which focuses on capacity as a determining factor in managing risk and exposure.

Assessment design covered two levels: a) a general assessment of the capacity needs of LGU on Disaster Risk Reduction and Management (DRRM) through Focus Group Discussions (FGDs); and b) a detailed evaluation of current capacities and needs in terms of knowledge, skills, and practices using structured survey instruments. The two levels are focused on institutional capacity, database management, IEC/advocacy and financial capacity.

The following committee members of DRRMC in the respective municipalities and provinces participated in the FGDs and survey:

1. The Local Chief Executives, Chairperson;
2. The Local Planning and Development Officer, member;
3. The Head of the LDRRMO, member;
4. The Head of the Local Social Welfare and Development Office, member;
5. The Head of the Local Health Office, member;

6. The Head of the Local Agriculture Office, member;
7. The Head of the Gender and Development Office, member;
8. The Head of the Local Engineering Office, member;
9. The Head of the Local Veterinary Office, member;
10. The Head of the Local Budget Office, member;
11. The Division Head/Superintendent of Schools of the DepED, member;
12. The highest-ranking officer of the Armed Forces of the Philippines (AFP) assigned in the area, member;
13. The Provincial Director/City/Municipal Chief of the Philippine National Police (PNP), member;
14. The Provincial Director/City/ Municipal Fire Marshall of the Bureau of Fire Protection (BFP), member;
15. The President of the Association of Barangay Captains (ABC), member;
16. The Philippine National Red Cross (PNRC), member;
17. Four (4) accredited CSOs, members; and
18. One (1) private sector representative, member.

FGDs were conducted among LGUs from August 27-30, 2013. Both qualitative and quantitative methods of data analyses were employed. Output was validated from September 11-13 as a basis for enhancing their respective DRRM plans. A suggested DRRM plan format was provided to each LGU, which was patterned on the national DRRM plan. Discussions also focused on exploring possibilities of extending technical assistance so that LGUs can begin to develop more comprehensive, responsive and community-based programs for DRRM.

Task 3 - Mobilizing for Watershed Management of Two Pilot Watersheds

GEM, in collaboration with KSFPI, conducted a series of meetings with LGUs to identify and evaluate the pilot watershed areas for the two provinces and assessed watershed planning and management capacities and needs. Below is a summary of findings and recommendations for each province.

Compostela Valley: The demo-watershed chosen in Compostela Valley is the Agusan River sub watershed which traverses three municipalities: New Bataan, Compostela and Monkayo. The river joins Batoto River making the head waters of the Agusan River.

The land area of the delineated sub watershed is estimated at 64,197 hectares, comprising 32 barangays: 10 in Monkayo, 11 in Compostela and 11 in New Bataan. The land area of each municipality is estimated at: (33%) Monkayo, (98%) Compostela and (40%) of New Bataan. The population in the watershed area is estimated at 90,918.

Compostela Valley: Summary of Findings

1. Economic activities were not linked with watershed services and watershed health;
2. A disconnect of authority, responsibility, and accountability in enhancing watershed services existed;
3. Impact of slow variables of the ecosystem was not considered;
4. Existence of top-down projects was the regular mode of operation;
5. Linkage between upstream and downstream communities was not recognized;
6. Conflicts in land use persisted;
7. No mechanism to level off stakeholders' contrasting interests and to decide on mitigating measures; and
8. Implication of land use on water not adequately understood.

Compostela Valley: Summary of Recommendations

1. Integration of watershed services to support the broad socio-economic development plan of the province, particularly in its disaster risk reduction and climate change adaptation plans.
2. Creation of a multi-sector, multi-stake, multi-interest body was also recommended to serve as a platform for discussing issues in the watershed.
3. Embed watershed management in the socio-economic development process of the local government.
4. Since watersheds cross political boundaries of barangay and municipal LGUs, form alliances to protect the watershed supported by a sustained public education watershed management program.

Summary Action Plan for Compostela Valley

The Plan of Compostela Valley Province has a time table of three years; 2013 to 2016, with an estimated budget of half a million pesos. The activity components of the plan include:

1. Passing an Executive Order to create a Technical Working Group (P-TWG) to study and draft a comprehensive policy to strengthen watershed management based on ecosystem, ridge-to-reef for the province;
2. Preparation of the comprehensive policy to strengthen watershed management;
3. Public education;
4. Alliance Building in Demo Watershed, the Agusan River Sub Watershed (ARSuW Board);
5. Embedding Watershed Management at ARSuW with the LGU planning and development process; and
6. Monitoring and Evaluation.

Davao Oriental: The contiguous micro watersheds in Barangay Mainit, Barangay Abijod and Barangay Santa Felomena were chosen as the demonstration area for watershed management. This cluster of watershed (4,312 ha) was chosen because it demonstrates the importance of protecting water and a near-shore landscape where the rivers are short, and where a population of 4,815 people are at risk of reduced water supply, sea level rise, storm surge, tsunami, land slide and other hazards. Given the guidance and leadership of the provincial local government unit, the people could optimally utilize their natural assets in their watershed to create a safe place, produce more, and protect themselves from another possible destructive event.

Davao Oriental: Summary of Findings

1. Economic activities were not linked with watershed services and watershed health;
2. A disconnect of authority, responsibility, and accountability in enhancing watershed services existed;
3. Impact of slow variables of ecosystem was not considered;
4. Existence of top-down projects was the regular mode of operation;
5. Linkage between upstream and downstream communities was not recognized;
6. Conflicts in land use persisted;
7. There was no mechanism to level off stakeholders' contrasting interests and to decide on mitigating measures;
8. Implication of land use on water was not adequately understood.

Davao Oriental: Summary of Recommendations

1. Integration of watershed services to support the broad socio-economic development plan of the province, particularly in its disaster risk reduction and climate change adaptation plans.

2. Creation of a multi-sector, multi-stake, multi-interest body was also recommended to serve as a platform for discussing issues in the watershed.
3. Embed watershed management in the socio-economic development process of the local government.
4. Since watersheds cross political boundaries of barangay and municipal LGUs, form alliances to protect the watershed supported by a sustained public education watershed management program.

Summary Action Plan for Davao Oriental

The Plan of Davao Oriental Province has a time table of three years; 2013 to 2016 with an estimated budget of half a million pesos. The activity components of the plan include:

1. Creating a technical working group by an Executive Order with the purpose of mainstreaming watershed management in the local government units of the province;
2. Establishing the legal basis for constituting a Strengthened Watershed Management, its purpose, its rationale and mechanics through an ordinance;
3. Building alliances;
4. Embedding watershed management in the local government planning and development process;
5. Developing the IRR of the ordinance on Strengthened Watershed Management; and
6. Public Education.

Task 4- Communications and Training Activities

GEM, in collaboration with Geos, Inc., implemented training activities on hazard map/flood map reading and appreciation; GPS utilization for geo-referencing of LGU facilities and sites, and training on disaster preparedness. The two provinces and eight municipalities were provided with hazard susceptibility and flood maps as well as GIS data layers that may be used for planning activities.

Task 5- Communications and Training Activities

GEOS Inc. prepared and submitted the Terms of Reference (TOR) for the acquisition of Light Detection and Ranging (LIDAR) or similar quality data and detailed vulnerability analysis for the province of Davao Oriental.

6.0 Relief Efforts for Zamboanga City

6.1 Background

On Monday, September 9th, 2013, a Philippine navy patrol clashed with approximately 100 heavily armed followers of former Moro National Liberation Front (MNLF) chairman Nur Misuari who were aboard several boats off Rio Hondo, Zamboanga City. The clash killed a member of the Naval Special Forces and wounded several others. About 20 civilians were taken hostage as the rebels entered the city along the coast of Rio Hondo, a Community predominantly occupied by Muslims. The group proceeded to enter Barangay Sta Catalina and used the hostages as human shields. The incident prompted thousands of residents to flee towards downtown Zamboanga City.

According to the MNLF, they just wanted to raise their flag at the Zamboanga City Hall, an act to effectively declare independence from the Philippine government which they felt reneged on a promise to develop an autonomous region for minority Muslims in the south.

The number of evacuees rose from 12,000 to about 67,000 on the 8th day of the stand-off. On September 23rd, more than 100,000 people were displaced, 47,000 of whom were children (UNOCHA Sit Rep No. 3). USAID immediately responded to a request from Zamboanga City Mayor Maria Isabelle "Beng" Climaco for relief goods for the evacuees.

6.2 Relief Operations

On September 10th, at about 6:30pm, USAID tasked GEM to coordinate with JSOTF-P to procure and deliver relief goods to Zamboanga City evacuees. On September 12th, at 11am the first set of relief goods were at the Davao City airport waiting for the PAF C130 to pick them up. At 3pm, the goods were transported to Zamboanga City. JSOTF-P and AFP service members picked up the goods at the airport and delivered them to the Command Center located at the City Council Building in Zamboanga City. At the center, volunteers from the PNP and the other organizations helped unload and sort the goods for immediate delivery to the Evacuation Centers.



(Top Left): USAID repacking area on Day 7 Loading of hygiene kits on this truck headed for evacuation areas in Barangay Tetuan. (Bottom Left-Right): GEM staff helping out with distribution of 700 hygiene kits to Cawa Cawa Boulevard evacuees.

That same day in Davao City, one 10-wheeler truckload of additional relief goods set off for Zamboanga City. The truck arrived in Zamboanga City at 9am on September 14th. Another three 10-wheeler trucks loaded with relief goods departed Davao City on September 14th and arrived in Zamboanga City on September 16th. On September 19th, three more truckloads of relief goods departed Davao and arrived at the Department of Social Welfare and Development's (DSWD) Warehouse in Zamboanga City on September 21st.

A number of relief goods were also procured in Zamboanga City for the evacuees as requested by Councilor Myra Abubakar and DSWD Regional Director Zenaida Arevalo. Below, please find a list of relief goods provided by USAID to the Zamboanga evacuees in coordination with JSOTF-P, AFP, DSWD and the local government.

Relief Goods Delivered to the LGU and DSWD Command Center As of September 21, 2013		
No.	Items	Quantity
1	Alcohol	10,500
2	Basins (medium)	5,000
3	Blankets	26,000
4	Bottled Water (including 15,000 from Mindanao Health)	23,016
5	Bottled Water (1-liter) (from Mindanao Health)	12,000
6	Buckets	17,500
7	Cellophane*	120,000
8	Cooking Pot (medium) – 1/family	5,000
9	Cooking Spoon (sandok) – 1/family	5,000
10	Cup of Noodles*	10,000
11	Diapers	7,500
12	Hand Sanitizers	6,414
13	Latrines (Construction by JSOTF & AFP/Materials from GEM)	80
14	Laundry Soap – 2 bars/family	10,000
15	ORS (from Mindanao Health)	16,000
16	Sando Bag*	40,000
17	Sanitary Napkins	5,760
18	Sardines	10,000
19	Sleeping Pads	27,300
20	Bath Soap	25,796
21	Styrofoam Cups*	10,000
22	Tarpaulin (50 rolls/2500 meters/72"W)*	50
23	Toilet Paper	17,500
24	Toothbrush	27,500
25	Toothpaste	7,500
26	Towels – 2/family	10,000
27	Water Tank 500-gallon w/ faucet: 4*	4
28	Zinc (from Mindanao Health)	7,000

*Procured from a Zamboanga City-based supplier

Other items procured from a Zamboanga City-based supplier		
No.	Items	Quantity
1	Cabbage (kilos)	130
2	Dried Fish (kilos)	170
3	Extra Large Cooking Pots	5
4	Garbage Bags	5000
5	Garlic (kilos)	60
6	LPG Gas Tanks	32
7	Onions (kilos)	50
8	Pot Holders	100
9	Tomatoes (kilos)	60
10	Eggs (30 pcs/tray)	600
11	5-Gallon Water Containers with Faucet	4

USAID also procured materials for JSOTF and the AFP to build 100 latrines.

No.	Location of Latrines/Evacuation Centers	Barangay	No. of Latrines
1	Joaquin Enriquez Memorial Sports Complex (Grandstand)	Baliwasan	34
2	Boalan Elementary School	Boalan	3
3	Divisoria Elementary School	Divisoria	7
4	Lunzurán Barangay Hall	Lunzurán	5
5	Pasonanca Elementary School	Pasonanca	2
6	Talon-Talon National High School	Talon-Talon	3
7	Tetuan Central School	Tetuan	4
8	Zamboanga City National High School	Tetuan	9
9	Zambowood Elementary School	Zambowood	4
10	Divisoria National High School	Divisoria	3
11	Badjao - Boulevard Area	Boulevard	6
12	Sta Maria Central School	Sta Maria	12
13	Baliwasan Central School	Baliwasan	4
14	Talon Talon Elementary School	Talon Talon	4
Total # of Latrines			100

On September 21st, JSOTF-P and GEM staff delivered relief goods listed below to the Talon orphans who were relocated to the Our Lady of Ransom Parish in Mercedes, Zamboanga City.

No.	Items	Quantity
1	Eggs (trays)	15
2	Cookies, Presto (packs)	20
3	Diaper, Small, EQ	15
4	Diaper, Medium, EQ	20

No.	Items	Quantity
5	Diaper, Large, EQ	15
6	Thermos Vacuum Pot (pc)	10
7	Biscuits, La Pacita Holiday Mix, 2.5kgs (cans)	10
8	Tetra Pack Juice, Zest-O Orange, 10pcs/box	10
9	Baby Wet Wipes, Baby Fits, 80 sheets alcohol free	80
10	Adult Diaper (10pcs/pack)	30
11	Bath Soap (Johnsons), 135g	20
12	Rice (50kg/sack)	25
13	Baby Shampoo (bottles)	20
14	Laundry Bar Soap (pc)	30
15	Bath Towels (pc)	50

7.0 Administrative Report

7.1 Financial Status of the Contract

Contract Period : January 1, 2008 through December 31, 2013
 Reporting Period : January 1, 2008 through September 30, 2013

The GEM 3 Budget ¹

BUDGET BREAKDOWN	
Total Contract Budget (US\$)	105,318,185
Total Obligation	105,067,098
Total Expenditures to Date	102,990,458
Expenses as % of Budget	97.79%
Expenses as % of Obligation	98.02%

CONTRACT DATA	
Expenses (July 1, 2013 – September 30, 2013)	2,403,840
Cumulative Expenses to Date	102,990,458
Remaining Unexpended Balance (Budget)	2,327,727
Remaining Unexpended Balance(Obligation)	2,076,640

BREAKDOWN BY CLIN								
	CLIN 1A Non 1207 Infra	CLIN 1B 1207 Infra	CLIN 1C 1210 Infra	CLIN 2 Business Dev	CLIN 3 Workforce Prep	CLIN 4 Gov Activities	CLIN 5 Other Activities	TOTAL
Obligated	47,001,697	10,000,000	8,865,000	12,847,309	13,490,345	4,991,445	7,871,302	105,067,098
Expenses (Jan. 1, 2008 – September 30, 2013)	47,001,697	10,000,000	8,865,000	12,847,263	13,490,345	4,991,309	5,794,844	102,990,458
Expenses as % of Obligation	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	73.62%	98.02%
Remaining Unexpended Balance (Obligation)	-	-	-	46	-	136	2,076,458	2,076,640

¹ Details of expenditures are reported monthly to USAID under a separate submission and cover titled *Invoice*.

7.2 Contracts

As of September 30, 2013

A. INFRASTRUCTURE (PABLO INFRASTRUCTURE PROJECTS)

I. Completed Procurement for Construction Materials and Labor Services of Eight (8) Pablo Infrastructure Projects (PIPs)

- PIP-01 Carmen Trading Center (Bagsakan) Construction (Brgy. Carmen, Boston, Davao Oriental)
- PIP-02 Poblacion Compostela Trading Center Construction (Brgy. Poblacion, Compostela, Compostela Valley)
- PIP-03 Poblacion Baganga Market Building Repair (Brgy. Poblacion, Baganga, Davao Oriental)
- PIP-04 Aginaldo Trading Center Construction (Brgy. Aginaldo, Laak, Compostela Valley)
- PIP-06 Sitio Mahayahay Overflow Bridge Repair (Brgy. Baylo, Monkayo, Compostela Valley)
- PIP-07 Purok Duranta Overflow Bridge Repair (Brgy. Union, Monkayo, Compostela Valley)
- PIP-08 Sitio Santol Overflow Bridge Repair (Brgy. Salvacion, Monkayo, Compostela Valley)
- PIP-09 Ngan Overflow (Spillway) Structure Rehabilitation (Brgy. Ngan, Compostela, Compostela Valley)

II. Ongoing Procurement for Construction Materials of Five (5) Pablo Infrastructure Projects (PIPs)

- PIP-05 San Jose Footbridge Construction (Brgy. San Jose, Boston, Davao Oriental)
- PIP-10 Lebanon-San Jose Barangay Bridge Construction (Brgy. Poblacion (San Jose), Montevista, Compostela Valley)
- PIP-11 Alegria Barngay Bridge Construction (Brgy. Alegria, Cateel, Davao Oriental)
- PIP-12 Panag Overflow Bridge Rehabilitation (Brgy. Panag, New Bataan, Compostela Valley)
- PIP-14 Mamunga Bridge Rehabilitation (Brgy. Mamunga, Monkayo, Compostela Valley)

III. Projects Under Fixed-Price Subcontract – Ongoing Construction

- | | <u>Subcontractor</u> |
|---|----------------------------------|
| • PIP-13 Magangit-Batinao Bridge Rehabilitation | Lyra Mae Construction |
| • PIP-15 Poblacion Compostela Bridge Rehabilitation | Majda Construction & Development |

B. VULNERABILITY ASSESSMENT

Completed procurement for the following supplies and services:

- Hiring of Project Implementation Specialist for the Vulnerability Assessment (VA) Tasks from July 29 up to October 15, 2013 or upon completion of tasks.
- Awarded a firm fixed-price subcontract to GEOs Inc. for the implementation of Vulnerability Assessment tasks from August 1 to September 30, 2013: (Task 1) Provincial Conferences in Davao Oriental and Compostela Valley; (Task 4) Communications and Training Activities

and (Task 5) Preparation of the Terms of Reference (TOR) for Light Detection and Ranging (LIDAR) Data Acquisition and Detailed VA for Davao Oriental.

- Awarded a firm fixed-price subcontract to Kahublagan Sang Panimalay Foundation, Inc. for the implementation of Vulnerability Rapid Assessment Task 3 Mobilizing for Watershed Management from August 1 to September 30, 2013.
- Hiring of Natural Resources Management Expert, GIS and Remote Sensing Expert and Research Associate for the implementation of Vulnerability Assessment Task 2 Adaptation Capacity Assessment and Long-Term Planning from August 20 to September 30, 2013.

C. AGRICULTURE / AQUACULTURE

Completed procurement for the following supplies and services:

- Hiring of Resource Person and Workshop Facilitator (fixed-price) on Vegetable Production Programming and Marketing Training-Workshop on July 19, 2013 in Nabunturan, Compostela Valley.
- Venue and facilities for the conduct of techno-transfer training on Alternative Commercial Crops in Boston (July 9, 2013), Cateel (July 10, 2013) and Baganga (July 11, 2013) Davao Oriental.
- Venue and facilities for the Crop Diversification Study Consultative Meeting in Mati Davao Oriental on July 12, 2013.
- Supply and delivery of 15,000 hatchery bred tiger prawn (*P. Monodon*) fry in Cateel, Davao Oriental on July 18, 2013.
- Supply and delivery of 9,000 hatchery-bred grouper fingerlings in Compostela and Davao Oriental provinces from July 15 to 16, 2013.
- Supply and delivery of aqua feeds for grouper, shrimps and tilapia (grouper grower feeds, grouper finisher, tilapia premium extruded feeds, *P. Vannamei* grower) in Compostela Valley and Davao Oriental provinces on July 9, 2013 (1st batch) and on August 7 to 8, 2013 (2nd batch).

D. GEM 3 MAGAZINE

Completed procurement for the following supplies and services:

- Hiring of a Proof Reader for the provision of editorial services for the GEM 3 Magazine (7 days intermittent).
- Hiring of a Graphics Artist for the provision of graphic design services and print production management for the GEM 3 Magazine (27 days intermittent).
- Service Provider for the printing of the GEM 3 Magazine. Printing to start end of October 2013 or 1st week of November 2013.

E. EMERGENCY RELIEF ASSISTANCE TO ZAMBOANGA INTERNALLY DISPLACED PERSONS (IDPs)

Completed procurement for the following supplies and services valued at an estimated PhP 16.8M:

- Supply and delivery of construction materials for eighty (80) Latrines (*plywood, lumber, nails, hammer, toilet seat, door hinge, plastic buckets*)
- Service provider for the provision of janitorial service and cleaning of the latrines for 16 days (September 15 to 30, 2013)
- Service provider for the provision of water refill for the four (4) water tanks for 3 days (September 15 to 17, 2013)
- Supply and delivery of various supplies and materials for Zamboanga IDPs (*dried fish, eggs, vegetables, blankets, sleeping pads, alcohol/sanitizer, toothbrush and toothpaste, bath soap, buckets, basins, 500 ml bottled distilled water, cup noodles, styrofoam cups, big cooking pots and pot holders, tarps for make-shift tents, sando bags and cellophane, garbage bag, toilet paper, gas tanks, 2000L water tanks, sardines, sanitary napkins, baby diapers*)
- Service provider for the provision of trucking services for the delivery of various supplies and materials from Davao City to Zamboanga City.
- Supply and delivery of various supplies and materials for Talon Orphanage (*rice, eggs, baby/adult diaper, baby wipes, bath soap, baby shampoo, laundry bar soap, biscuits, cookies, thermos, tetrapack juices and bath towel*)

7.3 Special Activities Fund

From January 1, 2008 to September 30, 2013, **\$8,601,119** of the obligated **\$8,659,934** (net of fee) SAF budget has been approved for **1,827** special activities.

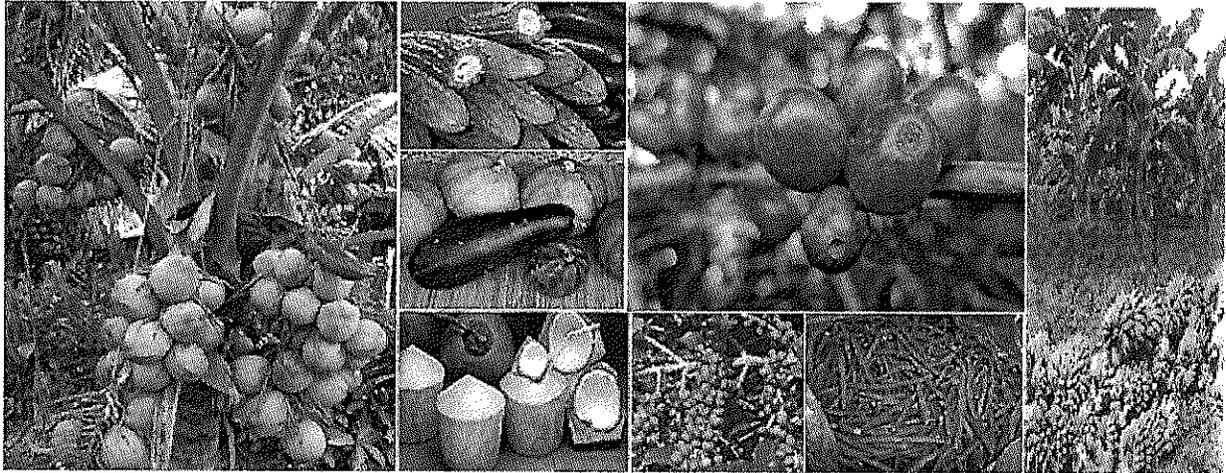
ANNEXES



USAID
FROM THE AMERICAN PEOPLE

Typhoon Pablo Disaster Recovery Assistance Project

Crop Diversification Options for Davao Oriental Focusing on Baganga-Boston-Cateel



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Edited by:
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August 2013

Submitted to:

**United States Agency for
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Office of the Economic Development
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Manila, Philippines

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**CROP DIVERSIFICATION OPTIONS
FOR DAVAO ORIENTAL
FOCUSING ON
BAGANGA-BOSTON-CATEEL
*(MAIN REPORT and ANNEXES)***



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LIST OF ABBREVIATIONS

A & D	Alienable and Disposable
ACDIVoca	Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance
ASEAN	Association of Southeast Asian Nations
BBC	Boston, Baganga, Cateel
CARP	Comprehensive Agrarian Reform Program
CIDAMI	Cacao Industry Development Association of Mindanao, Inc.
DA	Department of Agriculture
DENR	Department of Environment and Natural Resources
DEPED	Department of Education
DILG	Department of Interior and Local Government
DTI	Department of Trade & Industry
FFB	Fresh Fruit Bunch
FIDA	Fiber Industry Development Authority
GEM	Growth with Equity in Mindanao Program
Ha	Hectare
HY-LTC	High Yield Latex-Timber Clones
KFI	Kennemer Foods International
Kg	Kilogram
KPH	Kilometers per Hour
LGU	Local Government Unit
LPM	Large Planting Materials
masl	Meters Above Sea Level
MCDC	Mars Cacao Development Center
MinDA	Mindanao Development Authority
MNF	Multi-Nutrient Fertilization
NSCB	National Statistical Coordination Board
NGA	National Government Agencies
NGO	Non-Government Organizations
NIA	National Irrigation Administration
NR	Natural Rubber
PCA	Philippine Coconut Authority
PDAP	Partnership for Development Assistance in the Philippines
Philrice	Philippine Rice Research Institute
PhP	Philippine Peso
PNPL	Plant Now Pay Later
PNTC	Plant Now Take Care
PTL	Poverty Threshold Level
QPM	Quality Planting Materials
SMFI	San Miguel Foods Inc.
UPLB	University of the Philippines - Los Banos
USAID	United States Agency for International Development
USDA	United States Department of Agriculture

EXECUTIVE SUMMARY

As Typhoon Pablo (international name Bopha) made landfall in Davao Oriental on December 4, 2012, it wrought severe devastation to the province's population centers, infrastructure, agricultural and fishery production areas. The magnitude of the storm and the extent of damage are unprecedented in the history of Mindanao, an island-region that has, until recently, been referred to as typhoon-free.

According to the Climate Change Vulnerability Assessment (June 2013) commissioned by the United States Agency for International Development (USAID), Typhoon Pablo was the most southerly Category 5 typhoon to have occurred to date throughout the world. Changing weather trends point to the distinct possibility of a recurrence of extreme weather events in the region.

To help accelerate the restoration of livelihood while increasing the food sufficiency and climate resilience of communities affected by Typhoon Pablo, USAID is funding agriculture and aquaculture activities through its Typhoon Pablo Disaster Recovery Assistance Project, implemented by the Growth with Equity in Mindanao (GEM 3) Program.

The following report presents the findings of a crop diversification study for the province of Davao Oriental, focusing on the municipalities of Baganga, Boston and Cateel (BBC), which are among the hardest hit areas. Based on an examination of the extent of damage to agricultural crops, the study recommends suitable short and long-term alternative crop options for affected growers and proposes immediate and long-term strategies for introducing these crops in the three municipalities.

With a combined area of 198,172 hectares (ha), BBC represents 38% of the total land area of Davao Oriental (516,445 ha). 214,168 ha or 75% of the province's crop area is planted to coconut. In BBC, the percentage of agricultural land devoted to coconut is even higher at 85%. Other crops such as abaca, rice, corn, banana, fruit trees and vegetable crops are grown in limited scale.

Typhoon Pablo uprooted six million coconut trees or at least 90% of all coconut trees in these three municipalities, while completely destroying other standing crops such as corn, vegetables, bananas and other fruit trees. Total damage covered 62,867 ha of agricultural land, of which 46,407 ha or 74% were planted to coconut. Total damage to all crops is estimated at PhP 5.149 billion. Coconut accounts for 80% or PhP 4.10 billion.

For almost a century, coconut production through monocrop farming has been the main agricultural activity in BBC. The average income of local farmers, with an average

land size of 2.5 ha, is below the poverty threshold level mainly due to the low productivity of old and insufficiently fertilized coconut trees. Intercropping, which could provide alternative crops and additional income, is rarely practiced.

In the official poverty statistics report published by the National Statistical Coordination Board (NSCB) in April 2013, Davao Oriental ranked as the sixth poorest province in the Philippines, with 48% of its population living below the poverty line. Over-dependence on monocrop coconut farming is perceived to be a major contributor to the high poverty incidence in the province.

While Typhoon Pablo swept most of BBC's agricultural production areas, it highlighted the rich agricultural resources and unique agro-climatic endowments in the area that could be harnessed for long-term agricultural rehabilitation and development. Among these natural resources are fertile soils; high rainfall that is evenly distributed throughout the year, except for a three-month heavy rainfall period; abundance of large and relatively untapped areas which are plain and slightly sloping and; vast tracts of land situated below 700 meters above sea level (masl). These unique agronomic conditions provide BBC with enormous opportunities for crop diversification, particularly the introduction of short-term cash crops and long-term high-value commercial crops.

These agro-climatic attributes were considered in the formulation of an appropriate crop diversification strategy for BBC, which identifies the range of suitable crops that could be viably introduced to local farmers. The strategy also took into account other important factors in order to address the immediate needs of affected growers while laying the foundation for BBC's long-term agricultural development requirements.

- In the short-term – recommended crop alternatives should be short-gestating; should provide immediate food supply and/or income; should have existing markets; technology should be acceptable to and can be easily be adopted by farmers.
- In the long-term - recommended crops should provide steady income above poverty threshold levels to help reduce poverty; should have good market potential; should be consistent with planned or existing government programs and; could potentially attract private investments.
- In general, crop alternatives should be adaptable to climate change-induced abnormalities in weather patterns such as higher incidence of typhoons, higher rainfall rates and frequent flooding.

The recent devastation of mono-cropped coconut areas resulting from a severe typhoon that may have been intensified and directed further south due to climate change is

expected to occur more frequently. Dependence on mono-cropping intensifies the effects on rural incomes of both natural phenomena and plant diseases. Diversification helps to reduce the resulting risks to the local economy, while increased incomes improve the resiliency of communities.

RECOMMENDED ALTERNATIVE CROPS

Crops selected for diversification are categorized as short-duration crops and medium- to long-duration crops.

Short-duration crops have a growing period of less than one year. These could adequately meet the immediate sustenance requirements of the local populace and help hasten recovery from the impact of Typhoon Pablo. These include rice, corn, vegetables, cassava and other rootcrops.

- Rice in BBC is predominantly grown in Cateel and Baganga with total area of less than 3,000 ha. There are opportunities to expand existing lowland rice production to about 5,000 ha to support the areas' short and long-term food sufficiency requirements.
- Corn production in BBC has been minimal (below 1,500 ha) in the past few years. White corn production can be intensified and expanded to supplement existing rice production and to help supply the areas' food demand in the immediate term.
- Vegetable production has also been very limited (less than 250 ha). Tropical vegetable production can be expanded in the three areas to supplement existing food supply. Excess vegetable produce can be sold to neighboring demand centers (i.e. Bislig in Surigao del Sur) to generate additional income for growers.
- Cassava may be a new crop to BBC growers but it can be viably introduced in the area. It is easy to grow and maintain and can be planted even in small plots of land and upland areas. It can also be intercropped with remaining coconut trees to provide additional income. Cassava can serve as an alternative food staple, in addition to rice or corn. Good drainage, however, is needed to attain high levels of productivity.
- Other rootcrops such as *ube* (yam), *gabi* (taro) and sweet potato can also be introduced, especially in marginal lands and can be intercropped with existing

coconut trees. These crops can supplement existing food supply and can be easily sold in neighboring markets.

Medium to long-duration crops have gestating periods of more than one year. These crops are expected to provide a steady flow of income over a longer period of time and can potentially generate employment through farm labor and value-added processing activities. These include coconut, rubber, oil palm, coffee, cacao, abaca, other fruits and bamboo.

- Coconut production or rehabilitation of damaged coconut areas still remain the easiest option for many farmers in BBC. For existing or standing coconut crops, rehabilitation should include fertilization using salt, multi-nutrient fertilizer (MNF) and Mykovam, an environment-friendly microbiological application. Intercropping with cash crops such as corn and cassava as well as commercial crops like cardaba banana, coffee or cacao is also recommended to generate additional income.
- For heavily damaged coconut areas, replanting of hybrid coconut seedlings, especially high yielding varieties, is recommended. These hybrid seedlings may be sourced from the Philippine Coconut Authority (PCA) but are in very limited quantities. There is a need, therefore, to propagate these hybrid seedlings through partnerships between local government units (LGUs) and private nursery operators. Planting of special coconut varieties (aromatic) can also be introduced. The sweet and aromatic juice of these special varieties is preferred by niche markets like restaurants, hotels and supermarkets.
- Rubber is a commercial crop that is highly suitable for BBC given its high rainfall conditions. Large tracts of land (below 30% slope) can be planted to rubber. It can replace uprooted coconut trees and can also serve as a reforestation crop for moderately sloping areas.
- Banana, specifically the *cardaba* variety, is another good alternative crop for BBC area. *Cardaba* banana can be a stand-alone crop or an intercrop to coconut. It can supplement rice as staple food, and can be sold in local markets or to traders as raw material for banana chip processing. The crop is easy to grow and maintain.
- Other tropical fruits such as durian, mangosteen, lanzones, rambutan, etc. can also be produced in BBC. These fruit crops are suited to a high rainfall environment and can thrive in both low and high elevations. These can also be intercropped with coconut and other commercial crops. Fruit harvests can be consumed locally while

excess production can be sold to nearby demand centers such as Mati, Tagum and Bislig. High quality planting materials and Good Agricultural Practices (GAP) are needed to ensure productivity and to maintain a level of quality that will be acceptable to major local and export markets.

- Oil Palm can be planted in many areas in BBC and is suited to the areas' agronomic conditions. It is becoming an increasingly important crop in Mindanao due to high demand and income-generating potential. Although a new crop to BBC farmers, oil palm is currently grown in neighboring Agusan and Surigao provinces. Existing palm oil processors in the area are willing to absorb potential oil palm produce from BBC.
- Cacao is another emerging crop in Mindanao which can be grown in BBC. Cacao production in Mindanao is expanding due to increasing demand in the local and export markets. Philippine cacao production has been very limited, supplying less than one fourth of the domestic requirement. It is now being aggressively introduced in other towns in Davao Oriental as an intercrop to coconut. Cacao production can be introduced in BCC with appropriate training for farmers and provision of good quality planting materials.
- Coffee, like cacao, is another viable intercrop to coconut. It can be grown in both low and high elevations, which makes it a good alternative crop in BBC's lowland areas and upland communities. Coffee production in the Philippines has been declining in recent years resulting in the importation of about two thirds of domestic requirements. Coffee can be propagated in BBC with specific varieties targeted for lowland areas as an intercrop to banana or in upland communities as a monocrop or part of a mixed cropping system.
- Abaca is a popular crop among BBC farmers especially those in upland areas. Before Typhoon Pablo, close to 3,000 ha of land were planted to abaca. While much of the production area was completely damaged by the typhoon, abaca still remains to be a viable crop for the BCC area. Rehabilitation of abaca will involve replanting of damaged areas using disease-free planting materials through tissue culture technology. Abaca can be grown as a monocrop or can be intercropped with high-elevation crops and forest trees. It can also co-exist with coconut or rubber and can provide short-term and regular income to local growers.
- Bamboo is multi-purpose crop that can be cultivated in BBC. It can be used as a wind-breaker for standing tree crops to minimize the impact of strong winds that

sweep across the three areas during the months of December to February. Bamboo can also be planted and harvested as propping for the Cavendish banana industry in nearby Compostela Valley Province, and can be used as poles in the construction of fish cages for planned high-value aquaculture production activities. Bamboo can be grown in lowland areas as well as upland communities including marginal lands.

IMMEDIATE IMPLEMENTATION STRATEGIES

To fast-track the introduction of these crops in BBC, the following strategies are proposed:

Short-duration crops for immediate food supply and income. In the immediate term, crop diversification efforts should focus on the introduction of short-term crops to address urgent income and food requirements. Rice, corn, cassava and vegetables are among the easiest and thus, the most viable crops to plant. Existing assistance from government agencies, particularly the Department of Agriculture (DA), non-government organizations (NGOs) and donor institutions are focused on the production of these crops to provide livelihood opportunities to affected growers. The provincial and municipal LGUs in BBC should take advantage and maximize the benefits of these assistance efforts and ensure that they become building blocks for sustained cash crop production.

The LGUs should also develop plans to gain access to high quality seeds for these short-term crops through partnerships with private seed companies (for vegetables) or state universities (for white corn and cassava).

Rehabilitation and replanting of damaged coconut areas. The provincial and municipal LGUs should request or work closely with the Philippine Coconut Authority (PCA) to prioritize the distribution of its limited hybrid seed nuts to BBC. The LGUs, in partnership with the PCA, should also pro-actively work with private nurseries to access available hybrid seedling materials that could be set aside for BBC's coconut replanting efforts. For remaining coconut trees, fertilization using salt, MNF or Mykovam is recommended to growers. Intercropping with cacao, coffee or banana, or short-term cash crops like corn or cassava should also be encouraged to provide additional income.

Access to planting materials of long-term crops such as rubber, cacao, fruit crops, banana, oil palm. The provincial and municipal LGUs should support and collaborate with the DA's on-going distribution of planting materials to growers in BBC. The LGUs should also study and replicate successful experiences of other LGUs such as the Plant Now Pay Later (PNPL) or Plant Now Take Care (PNTC) schemes in North Cotabato and Agusan del Sur. The LGUs should also pro-actively invite private nursery operators to

consider setting up satellite nurseries in BBC to support the planting materials requirements of local growers.

OTHER IMPORTANT STRATEGIES

The following strategies are proposed for the medium term:

The provincial and municipal LGUs should undertake an extensive information campaign and promote the alternative short-, medium- and long-duration crops to local growers through techno-transfer training, establishment of techno-demo sites, cross-visits to other production areas and capability building of local technicians.

The provincial and municipal LGUs should also support existing or potential investors in their on-going or planned agribusiness projects in BBC. These include the Kennemer Group (cacao production and marketing), Puenstespina Group (cacao production and marketing), Dizon Farms (Cavendish banana plantation) and, the Manny Pangilinan-Indofood Group (oil palm plantation).

The provincial and municipal LGUs should also formulate an integrated multi-year crop development project which incorporates the province's existing Rapid Agriculture and Fishery Production Integrated Development (RAFPID) plan as a long-term crop rehabilitation and diversification framework. This project may entail the solicitation of funding commitment from national and government agencies and donor organizations for the identified project components as well as the identification of potential private sector investors in specific agribusiness development projects. To effectively undertake this effort, a full-time professional management team may be needed to implement the various project activities and components in the short and medium term.

Other important infrastructure facilities which were damaged by Typhoon Pablo need to be repaired or upgraded to support on-going and planned agricultural rehabilitation efforts. These include:

- Rehabilitation of Cateel irrigation system
- Completion of the Cateel-Compostela-Montevista Road
- Repair of damaged bridges connecting BBC to Mati
- Rehabilitation of damaged farm support infrastructure such as farm-to-market roads, small irrigation systems, post-harvest facilities, trading centers and markets

- Clearing of debris (especially of uprooted coconut trees) to prepare the areas for rehabilitation or diversification

The following report provides detailed discussions on alternative crop options and recommended strategies for crop diversification.

Chapter 1

INTRODUCTION

On December 4, 2013, Typhoon Pablo (Bopha) made landfall in Davao Oriental Province, taking hundreds of lives, sweeping public and private property and agricultural resources along its path. Three coastal municipalities facing the Pacific Ocean -- Baganga, Boston and Cateel (BBC)--were most severely affected. Strong winds uprooted six million or 90% of tall coconut trees, covering 85% of agricultural cropped areas in BBC. Minor crops such as corn, vegetables, bananas and other fruit trees were completely damaged.

Over three generations of farmers in the BBC area have depended on traditional coconut farming as their main source of subsistence. In recent decades, these farmers' incomes gradually slid below the poverty threshold as trees grew older and less productive. Even before the typhoon, the future already appeared bleak as the World Bank projected that by 2020, the price of coconut oil in the world market will decline. All these considered, there was little hope that their economic condition would improve.

In the face of adversity, government and development organizations have discovered an opportunity to revitalize the livelihood of agricultural communities in BBC. With the aftermath of Typhoon Pablo came the challenge of providing the immediate food requirements and income to the populace in a sustainable manner. This urgent need called for innovation, which resulted in crop diversification program suited to the rich agro-climatic resources of the area. This development is expected to lead to the re-direction of resources towards the cultivation of crops that have high national and global market demand and command higher farm-gate prices.

Apart from the meticulous selection of crops based on a strict set of criteria, the crop diversification study also considers capacity building of local farmers through the introduction of modern production technologies and best practices that can be easily adopted by farmers. Local government units (LGUs), national government line agencies, non-government organizations (NGOs), international donors and others are also implementing parallel efforts.

The crop diversification program is envisioned to be far-reaching. It will help raise and sustain farmers' incomes, and create new economic opportunities which could potentially increase LGU tax revenues, and result in the capability to provide better social services. The program also aims to serve as a model for other coconut-growing communities in the province and its environs.

1.1 Background

In partnership with the Philippine Government, USAID, through its Growth with Equity in Mindanao (GEM) Program, is implementing a multi-component disaster recovery assistance program in Compostela Valley and Davao Oriental, the two provinces most severely affected by Typhoon Pablo. This includes the provision of livelihood technical assistance, training and farm input to affected agri-based growers in the target areas.

One of the priority projects under this effort is the conduct of a rapid crop diversification study for damaged coconut areas in Davao Oriental, particularly in the towns of Cateel, Baganga and Boston. The study will serve as a valuable resource for farmers, LGUs, national government line agencies, and local industry stakeholders for future agri-related developmental planning activities in Typhoon Pablo-affected areas. The study Terms of Reference is provided in the following section.

1.2 Terms of Reference

The Crop Diversification Study seeks to:

- Review and analyze data on the estimated total coconut hectareage destroyed by Typhoon Pablo in the municipalities of Cateel, Baganga and Boston;
- Assess the over-all agro-climatic conditions of the three municipalities, especially in the heavily damaged coconut production areas;
- Examine traditional cropping and inter-cropping patterns and farming practices in these municipalities especially in damaged and existing coconut areas;
- Identify a long-list of suitable short-term (cash) and long-term (commercial) crop alternatives for damaged coconut areas, given prevailing agro-climatic conditions and cropping patterns;
- Assess market opportunities for the list of suitable short and long-term crop alternatives and identify prospective buyers and markets;
- Recommend strategies to promote and fast-track the development of these alternative short- and medium-term crops in the three municipalities.

Chapter 2

DAVAO ORIENTAL: RESOURCES AND ECONOMIC SITUATION

Davao Oriental is strategically located in the eastern most part of Region XI. It is bounded by the Pacific Ocean in the east, Davao province in the west, Agusan del Sur and Surigao del Sur in the north and Davao Gulf and Celebes Sea in the south. The province is divided into two congressional districts. The town of Banaybanay, Gov. Generoso, Lupon, San Isidro and the City of Mati constitute the first district. The second district is made up of the town of Baganga, Boston and Caraga, Cateel, Manay and Taragona as shown in Fig 1. The province has a total land area of 516,446 ha of which 235,680 are classified as agricultural land. A total of 214,168 ha are planted to various crops. Coconut, the main crop, is grown in 160,638 ha representing 75% of the total agricultural land area.

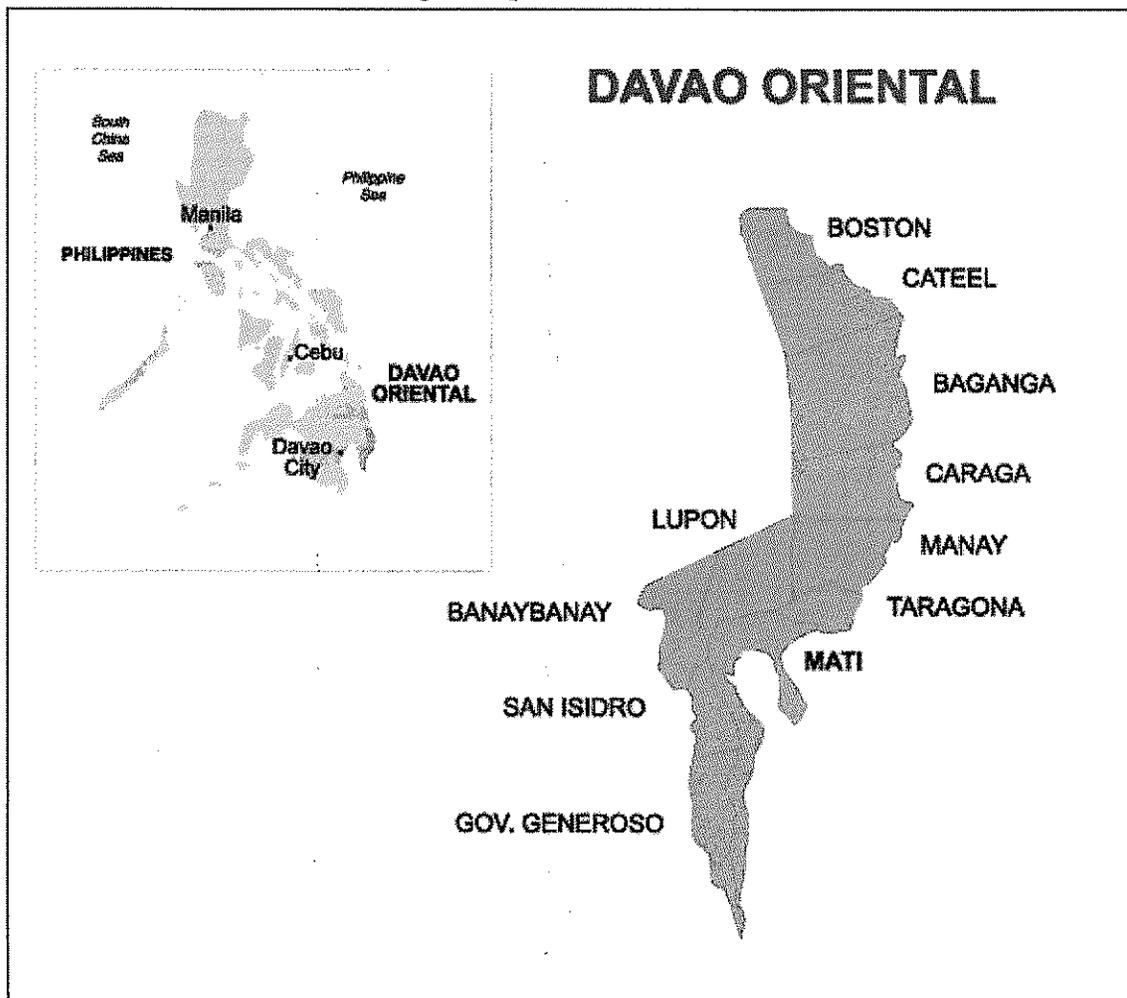
Davao Oriental is the Philippines' leading provincial producer of coconut, the biggest abaca producer in the region, a major producer of banana, a significant contributor to corn and mango production, and a minor producer of rice (Table 1). Table 1 indicates that Davao Oriental is basically a "coconut monocrop province".

Table 1. Utilization of the land resources of Davao Oriental.

DAVAO ORIENTAL			
Particular	Hectares		% Share
Total Land Area	516,446		100
Forest Land		315,600	61
A & D		201,846	39
Agricultural Land	238,680		
A & D		183,999	
Public Land		54,681	
Crop Land	214,168		100
Coconut		160,638	75
Rice		8,191	4
Corn		16,733	8
Abaca		14,350	7
Fruit Trees		20,800	10
Industrial		16,274	7
Vegetable		1,532	1
Fisheries			
Fishpond	760		3
Tilapia		60	
Milkfish		700	

The vast rich soils of the province coupled with evenly distributed rainfall throughout the year (with the exception of high pronounced rainfall from November to March) makes it highly suitable for agricultural production almost year-round. While the area is replete with agricultural resources, these have been underutilized in the socio-economic development of the local population. The National Statistical Coordination Board (NSCB) of the National Economic Development Council (NEDA) reported that Davao Oriental is among the 16 poorest provinces in the Philippines, with a poverty incidence of 48% (December 2012). Overdependence on coconut farming contributes significantly to this high poverty incidence. The low yield and productivity of senile tall coconut trees is mainly responsible for the low income of coconut farms. This clearly emphasizes the need to diversify to other high value crops.

Fig.1 Map of Davao Oriental



Source : Davao Oriental Website

Chapter 3

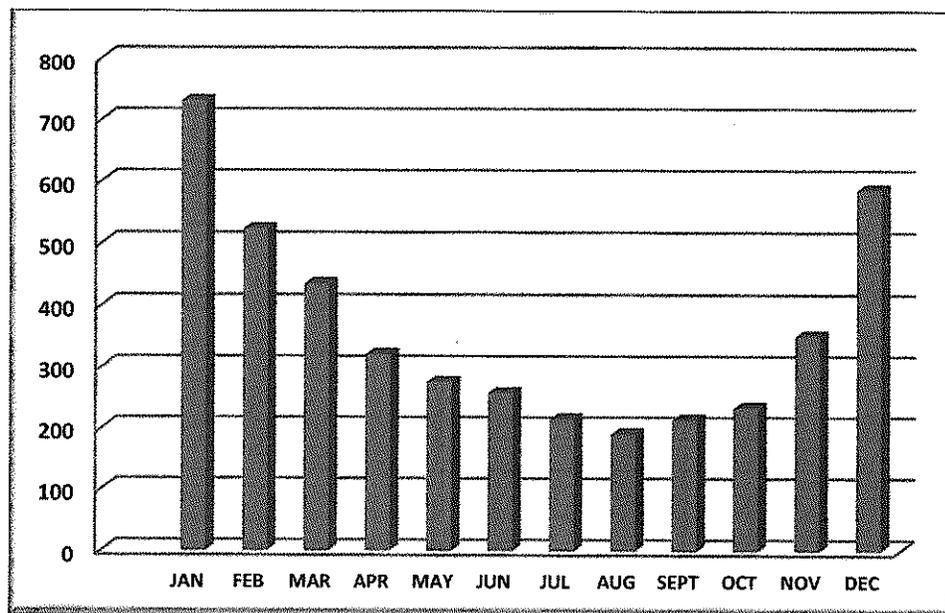
AGRICULTURAL PROFILE OF BAGANGA, BOSTON AND CATEEL (BBC)

3.1 Climate and Soils

The climate in BBC is classified as Type II, characterized by the absence of a dry season and very pronounced rainfall from November to March, with average monthly rainfall of 480.86 mm. As illustrated in Fig 2, May to October is considered the dry period, with an average monthly rainfall of 250.53 mm. The area has an average annual rainfall of 4328.4 mm. The highest recorded daily rainfall is 375.5 mm and the lowest is 93.7 mm. High rainfall which is almost evenly distributed suggests that various crops requiring water year-round are suitable for cultivation. Temperature ranges from a minimum of 22°C and a maximum of 30°C. The average temperature in BBC is 27°C.

The larger portion of soils in BBC is classified as Bolinao clay (52%), followed by Camasa sandy clay (28%) and San Manuel silty clay loam (7%). These soil types are highly suitable for the cultivation of a variety of short-term crops like rice, corn, cassava, banana and many long duration higher value crops such as coffee, cacao, coconut, abaca, rubber, fruit trees, and oil palm, among others.

Fig. 2 The rainfall pattern in the BBC.



3.2 Land Resources

The BBC has a total land area of 198,172 ha, representing approximately 38% of Davao Oriental (Table 2). The land area of BBC represents 38% of the total land area of Davao Oriental. Table 2 shows the importance of BBC in terms of expanse. At 117,710 ha, Baganga occupies the largest area, covering about 23% of the province. Boston has an area of 33,750 ha while Cateel has 46,712 ha.

The topography of BBC consists of various slopes (Table 3) and elevations (Table 4). There are areas below 18° suited for intensive crop cultivation; areas above 18° suitable for tree farming with zero to minor cultivation, forest reserves and parks; a wide portion below 1000 meters above sea level (masl) which is suitable for tropical crops; and a significant portion above 1000 masl which can be devoted to sub-tropical crops particularly vegetables and fruits.

Table 2. Land areas of the municipalities in the BBC.

MUNICIPALITY	LAND AREA (HA)	% of Davao Oriental
1. Baganga	117,710	22.79
2. Boston	33,750	6.54
3. Cateel	46,712	9.04
Sub-Total for BBC	198,172	38.37
Total of Davao Oriental	516,446	100.00

3.2.1 Slope

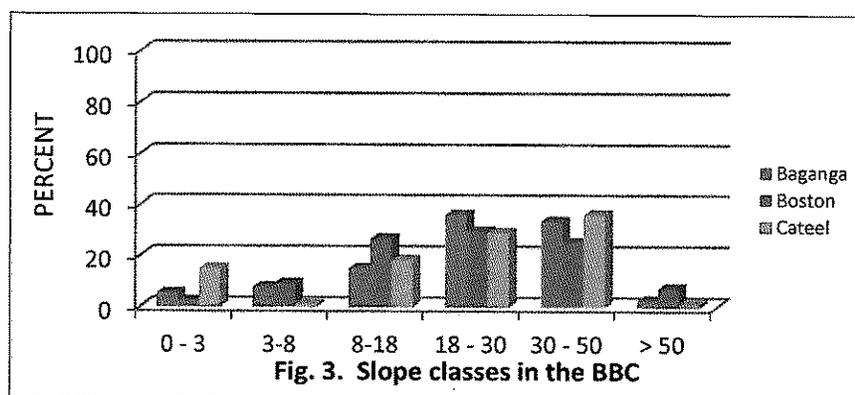
Slope influences the intensity of land cultivation and the extent of mechanization that may be applied in an area. This, in turn, determines the types of crops that may be grown. Intensive land cultivation is generally applied to areas that slope below 18°. Employing this practice in areas that slope above 18° may cause loss of surface soil due to soil erosion and is therefore not recommended. This defines the parameters for the production of crops that necessitate intensive cultivation such as short duration crops like corn, rice, peanut, cassava, banana, root crops and vegetable. The cultivation of lowland rice is limited to areas within 3° slope as this requires diking and storing irrigation water during land preparation and while growing the crop. While long duration crops like banana, fruit trees, oil palm, coconut, rubber, abaca, coffee, cacao, etc. thrive best in areas that slope below 18°, these can also be grown productively in areas that slope above 18° up to 30°, provided minimum to zero tillage is carried out to prevent soil erosion. This means that most long duration crops allow a wider limit than short duration crops.

Areas that slope between 30° to 50° to may be utilized for tree farming e.g., falcata, g'melina, bamboo, mahogany and rubber, particularly latex-timber clones. Crops like abaca and coffee may be integrated between rows of forest trees, to increase farm productivity and income. Areas that slope above 50° are reserved for watersheds, parks and wildlife. These are not suitable for intensive crop diversification.

As shown in Table 3, Baganga has more than 27,000 ha below the 18° slope. Boston has 12,000 ha and Cateel has 10,000 ha. These vast tracts of land may be used for intensive cultivation of short duration crops. The BBC has wide areas that slope between 18 to 30° which are suitable for tree farming.

Table 3. Slope classification in the three municipalities of the BBC.

Slope Classes	MUNICIPALITY					
	Baganga		Boston		Cateel	
	Area	% of Total	Area	% of Total	Area	% of Total
0 – 3°	6,160.02	5.23	761.21	2.26	3,865.87	14.86
3 – 8°	8,980.68	7.63	3,044.86	9.02	228.05	0.88
8 – 18°	17,712.49	15.05	8,965.40	26.56	4,718.65	18.14
18 – 30°	42,451.82	36.07	9,980.37	29.57	7,532.75	28.96
30 – 50°	39,446.71	33.51	8,542.50	25.31	9,380.42	36.06
> 50°	2,956.28	2.51	2,455.66	7.28	284.26	1.09
TOTAL	117,708.00	100.00	33,750.00	100.00	26,010.00	100.00



3.2.2 Elevation

Land elevation limits the extent of crop diversification and the area in which a particular crop may be suitably grown. Most tropical crops thrive best at an elevation of sea level to 700 masl. This includes short duration crops such as rice, corn, peanut, tropical vegetables, banana, abaca, and long duration crops like oil palm, coconut, rubber, coffee, cacao and fruit trees like longan. Cavendish banana, when grown in higher elevations, bear sweeter fruits that may be sold to a more lucrative market segment.

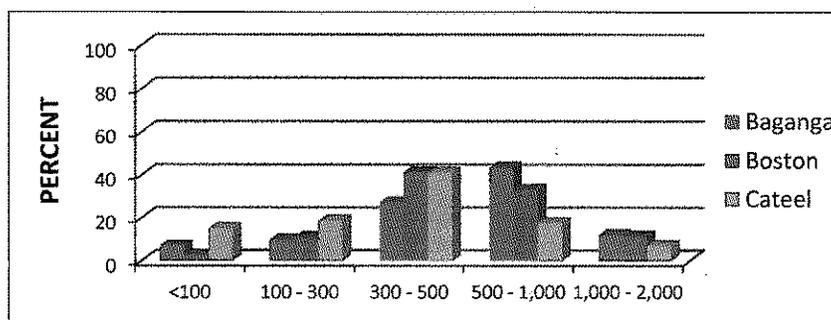
Table 4 presents areas in the BBC that are below 700 masl: Baganga has 70,000 ha or 60% of its total land area, Boston has over 25,000 ha and Cateel has over 20,000 ha. These vast land areas may be used for diversification into a broad range of crops. There is also an opportunity to develop high elevation areas for the cultivation of sub-tropical crops such as fruits, vegetables and specific varieties of rubber, oil palm, coffee and abaca.

Table 4. Elevation classes in the three municipalities of the BBC.

Elevation Classes	MUNICIPALITY					
	Baganga		Boston		Cateel	
	Area	% of Total	Area	% of Total	Area	% of Total
<100	8,191.60	6.96	894.21	2.65	3,948.81	15.18
100 - 300	11,568.98	9.83	3,707.10	10.98	4,886.58	18.79
300 - 500	32,279.31	27.42	13,957.10	41.35	10,745.62	41.31
500 - 1,000	51,255.75	43.54	11,292.17	33.46	4,615.27	17.74
1,000 - 2,000	14,412.36	12.24	3,899.42	11.55	1,813.72	6.97
TOTAL	117,708.00	100.00	33,750.00	100.00	26,010.00	100.00

The three municipalities have wide areas below 500 masl which are suitable for the cultivation of annual crops such as rice, corn, vegetable and long-term crops like banana, coffee, cacao, rubber, oil palm and coconut. Selective crops may be grown in elevations between 500 to 1000 masl. An elevation above 1000 masl provides an opportunity for the production of high value subtropical crops particularly vegetable such as cabbage, potato and subtropical fruits like longan.

Fig. 4. Elevation classes in the BBC



3.3 Human Resources

3.3.1 The People

The BBC has a population of 104,675 representing approximately 25% of the population of Davao Oriental. Table 5 shows the distribution of population in the three municipalities: Baganga (pop. 53,426), Boston (pop. 12,670), and Cateel (pop. 38,579). It is said that inhabitants settled into the area as far back as 300 years ago, during the Spanish colonial period. Migration and intermarriages resulted in a population of sturdy, hardworking, peace loving, law abiding and religious people with a largely Roman Catholic orientation. Today, these communities are dominated by Dabawenios and to a lesser extent, by Mandayas. The BBC is far from the troubled zones of Central Mindanao where a long-standing Muslim rebellion has held the attention of the international press for over four decades.

Table 5. Population, density and household size in the BBC.

Municipality	Population	Density (Pop/km²)	Ave. HH Size
1. Baganga	53,426	48.19	5.06
2. Boston	12,670	33.11	5.08
3. Cateel	38,579	70.88	4.76
Total	104,675		

3.3.2 Farm Size and Tenure

Except for a few areas, most large tracts of cultivated agricultural land are subsidized under the government's Comprehensive Agrarian Reform Program (CARP). Agricultural areas not covered by CARP are either owned or leased on shareholder basis. While the average farmland size in BBC is small (between 2.5 to 3.0 ha), it is still larger than the average farm land size in Mindanao (2.40 ha) and the Philippines (1.95 ha).

3.4 Prevailing Farming System

3.4.1 Dominance of Monocropping

Farming is the main occupation of people in the BBC, with a small percentage engaged in fishing. Monoculture of coconut has dominated the agricultural landscape for centuries. Coconut is grown in 85% of agricultural areas, higher than that of the entire province of Davao Oriental (75%). Coconut is easy to cultivate and has once provided farmers with good income when trees were young and productive. Today, majority of the

trees are old, senile and are becoming increasingly less productive. The lack of initiative to pursue crop diversity and promote productivity in the past may be attributed to several factors: (a) the area, until recently, was isolated from many progressive agricultural communities in Mindanao, (b) the absence of institutions like agricultural schools or corporate farms which can catalyze innovation and increase productivity, and (c) the overall neglect of the national government to improve the coconut industry, resulting in very low productivity and income. Such neglect is affecting farmers in BBC and in all of the 3.56 million ha of coconut plantations throughout the country.

3.4.2 Previous Crop Diversification Efforts

Prior to Typhoon Pablo there were efforts to diversify farming to boost land productivity and income. This included the introduction of crops that could potentially bring greater returns than coconut. Modern farming of high yielding rice and corn, vegetables and root crops was introduced. In recent years, the commercial production of abaca, rubber, coffee and cacao was introduced on a limited scale. Additionally, there had been efforts to integrate high value crops in coconut farms. This included planting between the rows of coconut such crops as *cardaba* banana, upland rice, abaca, coffee and cacao. Moreover, abaca was integrated in the timber farming of *falcata* to increase land productivity.

3.5 Farmers' Income

As discussed in the previous section of this study, the income level of farmers before Typhoon Pablo was marginal. This is generally attributed to the low yield and productivity of coconut, and partly to small farm size. The average copra yield is only 1,200 kg/ha per year. A farmer with 2.5 ha can produce about 3,000 kg/ha per year. At a price of PhP 20 per hectare, his annual income would come down to only PhP 60,000. This assumes that he merely provides farm labor. If he tills his own land, a third of his gross income would have to be spent on harvesting and processing. In both scenarios, his earnings would still fall below the poverty threshold of PhP 72,000/family per year (PhP 93,852 in 2012 per latest data from the National Statistics Coordination Board). The cultivation of crops like abaca, rubber, coffee and cacao could have provided farmers with high potential yield. Even then, because of inadequate adoption of modern farming practices, these only allowed them to generate minimal yield and income.

3.6 The Future of Farming in BBC without Typhoon Pablo

If Typhoon Pablo did not happen, agriculture in the BBC would have remained a coconut monocrop-based farming industry with decreasing crop yield and proportionately diminishing farmers' income. The government has not demonstrated adequate efforts to introduce modern technologies that could increase coconut yield such as fertilization, salt application and replanting unproductive trees with high yielding varieties/hybrids. Under Republic Act (RA) 8048 or *The Coconut Conservation Law*, farmers may cut unproductive tall coconut trees but are required to replace these with coconut seedlings. This was not practiced in the area because of the difficulty of obtaining seed nuts of high yielding varieties or hybrid.

As the yield from old coconut trees continue to decline, the World Bank projects that the price of coconut oil, at the worst case scenario, will decrease along with prices of other tree crops (Table 6). At US\$ 1,200/ton, the current price of coconut oil, which is 60% of its price in 2010, is estimated to dive to US\$ 780/ton by 2020. This means that the economic plight of farmers in BBC will continue to worsen, with the exception of a few who are shifting to higher value crops and/or intensifying cropping systems in coconut plantations. By increasing land productivity through diversification and intensification, farmers will be able to cope with decreasing commodity prices to maintain or increase farm income.

Table 6. World commodity price prospect of tree crops.

(US\$ cents per kilo, except coconut and palm oils, in US\$/ton, all in current US\$)

PRODUCT	2010	2012	2015	2020
Coconut oil	1916	1300	850	780
Palm oil	1171	900	800	715
Rubber, TSR 20	531	300	240	220
Coffee, Arabica	620	450	330	280
Coffee, Robusta	251	200	160	150
Cacao	318	260	220	200

Source: Price Forecast, World Bank, June 2011.

Chapter 4

TYPHOON PABLO: DAMAGE DONE TO CROPS

Super typhoon "Pablo", internationally named "Bopha" hit the eastern municipalities of Davao Oriental on December 4, 2012. Moving at a speed of 175 kph near the center with gustiness of up to 210 kph for six hours, it brought severe devastation to crops and property in Baganga, Boston and Cateel. As shown in Table 7 the estimated cost of damage to crops was placed at PhP 3.66 billion. Coconut trees which provided the bulk of income to the populace for over a century were almost completely wiped out. Other crops were completely damaged. Total damage to crops, livestock, buildings and infrastructures like roads and bridges is estimated at PhP 6.5 billion.

According to the Department of Agriculture (DA) Regional Field Unit-11, total damage from Typhoon Pablo in the Davao Region is estimated at PhP 30 billion; in Compostela Valley Province at PhP 13 billion, largely in banana plantations; in Davao Oriental Province at PhP 10 billion; and in Davao del Norte at PhP 6 billion. Total crop damage per municipality is shown in Table 7.

Table 7. Leading crops of the different BBC municipalities and the extent of damage by Typhoon Pablo.

MUNICIPALITY	CROP	BEFORE PABLO		DAMAGED BY PABLO		
		AREA (HA)	% OF TOTAL CROP LAND	AREA	% of CROP AREA	VALUE PhP '000
Boston	Coconut	4,570	83.00	4,204	92	329,063
	Abaca	737	13.39	737	100	51,557
	Rubber	100	1.82	100	100	4,500
	Banana & fruit trees	500	9.08	500	100	50,000
	Rice	598	10.86	590	99	14,750
	Corn	250	4.54	250	100	5,000
	Vegetables	83	1.51	83	100	5,520
	Sub-Total	6,838		6,464	95	460,390
Baganga	Coconut	36,983	94.14	33,284	90.00	2,662,755
	Abaca	1,279	3.26	1,279	100	89,496
	Rubber	500	1.27	500	100	27,000
	Banana & fruit trees	2,740	6.97	2,740	100	274,000
	Rice	1,220	3.11	600	49	15,000
	Corn	987	2.51	987	100	29,610
	Vegetables	85	0.22	85	100	5,660
	Sub-Total	43,794		39,475	90	3,103,521
Cateel	Coconut	9,695	63.72	8,919	92	1,101,300
	Abaca	869	5.71	869	100	60,851
	Rubber	700	4.60	700	100	31,500
	Banana & fruit trees	3,000	19.72	3,000	100	300,000
	Rice	3,211	21.11	2,860	89	71,500
	Corn	500	100.00	500	100	15,000
	Vegetables	80	0.53	80	100	5,320
	Sub-Total	18,055		16,928	94	1,585,471
TOTAL BBC	All Crops	68,687		62,867	92	5,149,382

OPPORTUNITIES FOR CROP DIVERSIFICATION

5.1 Rationale

The onslaught of Typhoon Pablo created difficulties but more importantly, it also created important crossroads. The most urgent challenge is how to grow crops to produce food in order to support immediate needs. This resulted in the opportunity to formulate a diversified farming system that could help accelerate recovery and address pressing requirements in the short term, and generate higher productivity and income within the medium- to long-term.

Typhoon Pablo damaged most of the standing crops but the rich agricultural resources of BBC remain intact, ready for the cultivation of a variety of high value crops. Coconut alone, the main crop grown prior to Typhoon Pablo, has become an unsustainable means of livelihood. Crop diversification and the intensification of crops that could deliver higher income than coconut may soon materialize. This will lay the foundation for progressive rural communities in BBC, comparable to the transformed prosperous communities in neighboring provinces that have similar or inferior agro-climatic resources. In a post-Typhoon Pablo scenario, the people of BBC can hope for a better farming system and work towards attaining income levels that will lift them out of poverty.

5.2 Criteria for Crop Selection

The crops for diversification and/or integration were carefully selected to help transform the economic condition of agricultural communities in the BBC.

The following criteria were considered:

1. **Crop suitability** – crops are suitable to the agro-climatic endowments of the BBC and adaptable to anticipated changes in weather patterns resulting from climate change.
2. **High productivity and income**– crops to be planted alone or to be integrated with other crops can provide small landholders (with 2.0 to 2.5 ha) with income above the poverty threshold level of PhP 72,000/ha per year.
3. **High market demand**– crops should have good national and international market prospects and can compete under a regional (ASEAN) and global trade regime.
4. **Technology availability** – advanced technologies for high yield, productivity and income are available within the country or are accessible from neighboring countries.

5. **Food security** – crops selected and/or integrated should contribute to the food security of the province and the country.
6. **Short gestation period** – crop selection should include short duration crops to aid the early recovery of affected growers and early maturing tree crops to provide immediate income.
7. **Attractive for investments among farmers and businessmen** – crops should have potential to attract private sector investments.
8. **Farmers receptivity and familiarity** – crops should be familiar to farmers and should address long-standing misconceptions
9. **In harmony with government programs**– crops selected should be consistent with national government programs although the overall welfare of the farmers for high income should take greater precedence.

In general, the proposed crop diversification strategy should also incorporate mitigation measures to minimize the adverse impacts of extreme weather conditions brought about by climate change, such as more frequent incidence of typhoons, higher rainfall rates and greater occurrences of flooding.

5.3 Agro-Climatic Basis of Crop Diversification

The components of the agro-climatic endowment of BBC which could affect the extent and site of crop production are rainfall, slope and elevation. The types of soil have less influence in the overall crop diversification scheme as the three soil types existing in the area allow the cultivation of most, if not all crops, with only slight modifications to improve suitability.

1. **Crops suited to high rainfall** - The abundant rain throughout the year of over 4300 mm is favorable for year-round production of short maturing crops which include tropical vegetables, field legumes, rice and root crops. Crops like soybean which require dry period during harvest may not thrive in this environment. It also favors the production of long duration perennial crops for optimum growth, fruiting and/or production. These include abaca, banana, rubber, oil palm, coconut, fruit trees such as rambutan, lanzones, mangosteen and durian.

The high rainfall during four months each year plus the clay nature of the soil will require interventions like providing the fields with canals for drainage to support the production of such crops as banana, cassava, sweet potato and papaya. Rainguard is needed to allow year-round harvesting of latex of rubber. Plastic roofing may be used for high value vegetable production.

2. Crops unsuitable with high rainfall - High rainfall is unfavorable to the production of crops requiring lower amount of rain like Cavendish and *lakatan* banana as high rainfall favors the multiplication and spread of the diseases like Sigatoka. Other banana varieties like *latundan* and *cardaba* are less affected by the disease and can therefore be commercially grown under this high rainfall situation. The cultivation of corn is limited during the dry period. This eight-month stretch would still allow two croppings per year.

High rainfall is unfavorable to the cultivation of crops which require dry months to generate water stress, which will trigger flowering and/or fruit development following dry months. These include *carabao* mango and pummelo. Introduction of Thailand pummelo, "Vichit" and mango "*nam doc mai*" may solve this problem. While high rainfall has less effect on the fruiting of other fruit tree crops like mangosteen, lanzones, calamansi, however, this may trigger the increased occurrence of diseases which would adversely affect production costs.

3. Slope limits the planting of some crops - Intensive cultivation to grow most crops are limited to 18° slope and lower, except for lowland rice which is limited to the plains or less than 3° slope. Extensive cultivation and planting of crops in areas sloping higher than 18° may encourage soil erosion and is, therefore, not suggested under good agricultural practices.

Some crops which can be grown without land cultivation may be planted in areas that slope above 18°. These crops may also serve as land cover to reduce erosion. Crops under this category include abaca, rubber, coffee and cacao which can be grown up to 30° slope. Areas that slope above 30° should be reserved for forest cover, parks and wildlife.

4. High elevation provides opportunities for the planting of some crops - Most tropical crops are limited for planting below 700 masl. The availability of parcels of land in elevations of over 700 masl provides potentials for the cultivation of high elevation crops like Arabica coffee, subtropical vegetables like cabbage, carrots and fruits trees like longan. This is expected to expand the breadth of farming in the BBC to include the cultivation of crops with high demand in the domestic and export markets.

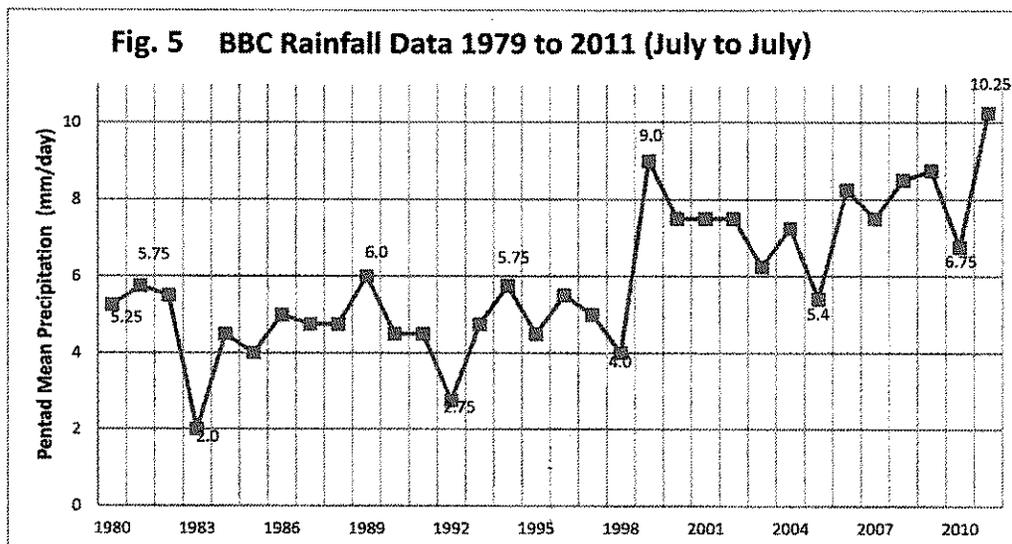
5. Erosion and wind control - High rainfall during the last four months of the year of over 600 mm/month can trigger serious soil erosion in sloping lands, particularly light soils. It can also trigger flooding and degradation of creeks and river banks. This would require the incorporation of crops like bamboo for erosion control, and the protection of creeks and river banks. Fortunately, bamboo is a crop with many uses other than erosion control. It is utilized in the construction of post, bamboo slats for flooring,

bamboo poles in fishponds and outriggers of fishing boats. The shoots are also consumed as vegetable.

The presence of moderate to strong winds during certain parts of the year would require the extensive planting of wind-break plants like bamboo, eucalyptus and other tree-break species in some areas.

5.4 Climate change mitigation and adaptation measures applied in crop diversification

Significant changes in weather patterns resulting from climate change have been observed in the BBC area recently which could affect prevailing agronomic conditions for growing of crops. An examination of rainfall data in the BBC showed that the amount of rainfall has been increasing during the past decade. As shown in Fig. 5, the mean rainfall rate during the period 1979 to 1998 (20 years) ranged from 5mm to 7 mm. During the succeeding 12 year period, however, from 1999 to 2011, the mean rainfall rate rose significantly to 6.5 to 8mm. This rainfall trend showed greater amounts of rainfall and increased in number of rainy days during the past few years.



These new weather patterns highlight the need for crops which are well suited for high precipitation and have good water holding and storing capability to abate soil erosion and help prevent siltation of rivers and waterways. Bamboo and other fast growing timber

species such as Eucalyptus are crops that can be propagated to control erosion, help mitigate overflowing of major rivers and waterway and serve as wind breaks for other commercial crops.

Other crops that can thrive under a high-rainfall environment are fruit trees like banana, durian, mangosteen and commercial crops such as rubber and cacao. With good drainage, rootcrops such as cassava and sweet potato can also be grown under these conditions and can serve as effective cover crops to prevent water logging during periods of heavy rain.

Crop diversification, through the introduction of a wider variety of crops suitable to the area's agro-climatic conditions and adaptable to changing weather conditions, helps improve the over-all resiliency of communities to climate-induced weather abnormalities by providing multiple sources of income and reducing over-dependence on traditional cropping systems.

The recent devastation of mono-cropped coconut areas resulting from a severe typhoon that may have been intensified and directed further south due to climate change is expected to occur more frequently. Dependence on mono-cropping intensifies the effects on rural incomes of both natural phenomena and plant diseases.

5.5 Selected Crops for Diversification

Having considered the unique and diversified agro-climatic conditions of the BBC and the criteria for diversification, the list of crops for diversification are provided in Table 8. These crops are divided into three groups, according to their maturity period: short-, medium- and long-term duration. Short duration crops which mature in less than nine months are expected to hasten recovery, provide sustainable food supply and early income. These may also be used for intercropping in the planting of medium- and long-term duration crops. Long duration crops are expected to potentially provide higher income in the long-term and generate productivity levels higher than before the typhoon.

To some degree, these recommendations have similarities to the recommendation in the Davao Oriental Rapid Agriculture and Fisheries Production Integrated Development (RAFPID) framework (Table 9) except that the former is expanded based on the number of crops. The advantages and disadvantages of these crops are shown in Table 10 (short duration crops) and Table 11 (long duration crops).

Table 8. Basket of crops carefully selected for diversification of the BBC.

SHORT DURATION (less than 9 months)	MEDIUM DURATION (up to two years)	LONG DURATION (over two years)
Rice Corn Cassava Vegetables Root crops (sweet potato, <i>ube, gabi</i>)	Papaya Pineapple Banana <ul style="list-style-type: none"> ▪ <i>Cardava</i> ▪ <i>Lakatan</i> ▪ <i>Bungulan</i> ▪ Cavendish Abaca Sugarcane (for specialty sugar)	Coconut <ul style="list-style-type: none"> ▪ Copra ▪ Special purposes Oil palm Rubber Cacao Coffee Fruit trees (Durian, Mango, Rambutan, Mangosteen, Guava, Avocado) Calamansi Bamboo

Prior to this survey and recommendation, the provincial staff of Davao Oriental prepared the Rapid Agricultural and Fishery Production Integrated Development (RAFPID). All the crops proposed under the RAFPID are captured in the crops selected for diversification.

Table 9. Proposed area under the Rapid Agri and Fishery Production and Income Development (RAFPID) Framework of Davao Oriental

COMMODITY	LOCATION/AREA			TOTAL
	Cateel	Baganga	Boston	
Oil Palm	4,615	51,255	11,292	67,162
Coconut	10,745	32,279	13,957	56,981
Rice	2,500	1,250	-	3,750
Cacao/Coffee	4,886	11,568	3,707	20,161
Rubber/Abaca	1,813	14,412	3,876	20,101
Sugarcane/Pineapple/ Bamboo	4,886	11,568	3,701	20,155
TOTAL (Hectares)	29,445	122,332	36,533	188,310

Source: Provincial Development Planning Office of Davao Oriental.

Table 10. Selected short duration crops, their advantages and limitations.

CROP	ADVANTAGES	LIMITATIONS	IMPACT^{1/}
1. Rice	<ul style="list-style-type: none"> ▪ Source of staple food and cash 	<ul style="list-style-type: none"> ▪ Low to medium income; require good irrigation 	Medium
2. Corn	<ul style="list-style-type: none"> ▪ Source of staple food and feeds ▪ Can be intercropped with coconut and rubber and other crops 	<ul style="list-style-type: none"> ▪ Low to medium income ▪ Require government support for good seeds and/or input provision 	Medium
3. Cassava	<ul style="list-style-type: none"> ▪ Source of staple food and cash ▪ Can be intercropped with coconut 	<ul style="list-style-type: none"> ▪ Demo on crop production and food preparation is important ▪ Require chipping machine and drying facilities for commercial used 	Medium
4. Sweet potato	<ul style="list-style-type: none"> ▪ Source of staple food, feed and cash 	<ul style="list-style-type: none"> ▪ Limited market which can be developed 	Medium
5. <i>Gabi</i>	<ul style="list-style-type: none"> ▪ Source of staple food, vegetables and cash 	<ul style="list-style-type: none"> ▪ Limited market 	Medium
6. <i>Ube</i>	<ul style="list-style-type: none"> ▪ Source of food and cash 	<ul style="list-style-type: none"> ▪ Limited market 	Medium
7. Vegetable (Lowland)	<ul style="list-style-type: none"> ▪ Source of food and cash 	<ul style="list-style-type: none"> ▪ Perishable 	High
8. Vegetable (Upland)	<ul style="list-style-type: none"> ▪ Provide food and income 	<ul style="list-style-type: none"> ▪ Perishable 	High

Table 11. Selected long duration crops, their advantages and limitations.

CROP	ADVANTAGES	LIMITATIONS	IMPACT^{1/}
1. Coconut	<ul style="list-style-type: none"> ▪ Low investment ▪ Diversified income ▪ Potential for crop/livestock integration 	<ul style="list-style-type: none"> ▪ Long maturity period ▪ Low income unless modern farming practices is allocated 	Medium
2. Oil palm	<ul style="list-style-type: none"> ▪ Early income ▪ High income for farmers ▪ Potential for crop intensification 	<ul style="list-style-type: none"> ▪ High investment on seedlings ▪ Requires good extension services 	High
3. Rubber	<ul style="list-style-type: none"> ▪ Early and high income ▪ Potential for crop intensification 	<ul style="list-style-type: none"> ▪ High investment on seedlings ▪ Require technology training dissemination 	Very high
4. Coffee	<ul style="list-style-type: none"> ▪ Early income ▪ Can be intercropped with coconut and many other tree crops 	<ul style="list-style-type: none"> ▪ Require technology training ▪ Quality seedlings needed 	High
5. Cacao	<ul style="list-style-type: none"> ▪ Early and high income ▪ Can be intercropped with coconut 	<ul style="list-style-type: none"> ▪ Require quality seedlings, pest and disease control ▪ Access to fermentation technology is necessary 	High

CROP	ADVANTAGES	LIMITATIONS	IMPACT/¹
6. Banana a. <i>Cardaba</i> b. <i>Latundan</i> c. <i>Lakatan</i>	<ul style="list-style-type: none"> ▪ Can be intercropped with coconut and rubber ▪ Medium high income ▪ Provide staple food 	<ul style="list-style-type: none"> ▪ Medium to high investment ▪ Requires good pest and disease control ▪ High investment 	High
7. Abaca	<ul style="list-style-type: none"> ▪ Can be intercropped with coconut and or falcata 	<ul style="list-style-type: none"> ▪ Quality seedlings is needed ▪ Require good disease control management 	High
8. Fruit trees (durian, rambutan, etc)	<ul style="list-style-type: none"> ▪ High to farm income ▪ Supplement nutrition 	<ul style="list-style-type: none"> ▪ Require good production and post-production training 	High
9. Bamboo	<ul style="list-style-type: none"> ▪ Good for erosion/flood control and aqua poles ▪ Easy to plant 	<ul style="list-style-type: none"> ▪ Training on production technology is needed 	High

^{1/} To generate rural employment.

Chapter 6

UNIQUE FEATURES OF SELECTED CROPS

6.1 Short Duration Crops to Meet Immediate Food Supply Needs

6.1.1 Vegetable Crops

Diversified short term crops are suitable for cultivation in every farm. A production area of 1500 to 2000 square meters per family is enough to meet the immediate need for sustainable food supply. Produce from these crops shall support daily food needs while excess production can be sold to the community. The selection of these crops to meet food needs take into consideration the components of balanced nutrition or the daily requirements for energy, protein, vitamins and minerals.

Crops which are included as sources of energy and could also help reduce dependence on rice, include cassava, sweet potato, banana (*cardaba* and *latundan*), *gabi*, etc. Sources of protein include various types of beans (string beans, peanut and others). Sources of vitamins and minerals include lowland vegetables (e.g., squash, okra, *ampalaya*, eggplant, *kangkong*, *pechay*, etc.) The relative cost of establishing any of these short duration crops for food is presented in Table 12.

Table 12. Short- to medium-term crops: investment cost, duration to maturity and projected income.

CROP	INVESTMENT COST (PhP)	DURATION TO MATURITY (MONTH)	EST. INCOME (PhP)
1. HYV Rice	12,000	4	15,000-20,000
1. HYV Corn	16,000	4	12,000-16,000
2. Cassava	14,000	6	18,000-24,000
3. Vegetables	18,000	2	16,000-34,000
4. Papaya	16,000	6	10,000-12,000
5. Pineapple	30,000	12	18,000-25,000
6. Abaca	25,000	10	12,000-16,000

An important strategy in introducing small-scale vegetable farming is making vegetable seeds readily available to farmers. Farmers could also be provided with farm demos in strategic locations to showcase appropriate farming practices. This will help ensure food sufficiency at the village level.

6.1.2 Rice

Rice is the country's main staple crop. Demand has steadily grown by 1.8% per year in the last ten years, to about 120 kg per capita. The main driver is population, which has been growing by an average of 2% per year. Rice is regarded as a political crop, and this receives the bulk of support from the government.

Being a political crop, rice farming captures the largest portion of government funds for agriculture. Farms are provided with good irrigation, seed and fertilizer subsidies. In recent years the income of farmers derived from rice farming have fallen below the poverty threshold level. The BBC has a limited area of less than 5,000 ha devoted to irrigated lowland rice production. Among those damaged by Typhoon Pablo was the irrigation infrastructure in Cateel. Lowland rice cultivation can be expanded to the plains previously planted to coconut but damaged by the typhoon. Expanding rice production in these areas can help ensure food sufficiency in the short term.

Due to the high priority on lowland rice, irrigation facilities damaged by the typhoon should be prioritized for repair and expansion. Farmers should also be organized to access more inputs such as seeds and fertilizer from the government. Post-harvest facilities, particularly solar driers and warehouses, should also be provided. With these support infrastructure facilities, rice production in the BBC may be expanded to 10,000 ha or more.

6.1.3 Corn

BBC has wide areas suitable for corn production. These include flat lowland areas and lands with slopes below 18°. Support from the government is needed to develop and expand corn farming in the BBC. This includes the construction of farm to market roads, assistance inland preparation, and provision of good-quality seeds and fertilizer. Post-production facilities like mechanical and/or solar dryers should also be established in strategic sites to service identified production areas.

6.1.4 Cassava

The cultivation of cassava in BBC has not been significant. The crop, however, offers opportunities to these three municipalities, considering the wide areas which are highly suited to this crop. Cassava is also easy to grow, matures in six to eight months and has potentials for income as staple food or raw material for feeds and other industrial products.

This crop is grown for multiple uses - food, feeds and biofuel. Cassava (*kamoteng-kahoy*) is the third largest source of carbohydrates in the world next to wheat and rice. Among crop plants, the cassava plant provides the highest yield of food energy and is a

staple food for more than one billion people in 105 countries. It is the staple food, preferred over rice by a number of tribes in Mindanao. Cassava root is very rich in starch and contains significant amounts of calcium, dietary fiber, iron, manganese, phosphorus, potassium, vitamin B6 and vitamin C.

Cassava is usually grown as a monocrop in many areas in Mindanao. It can, however, be intercropped with coconut, oil palm and rubber during the early stages of these tree crops. Moreover, cassava can be used as a nursery crop of cacao. The key to productive cassava production is the selection of recommended varieties and the use of recommended cultural management practices. Another positive aspect of cassava production is the simple set of procedures involved e.g., preparation of planting materials, planting, cultivation, harvesting, chipping, drying and storage (Fig. 6).

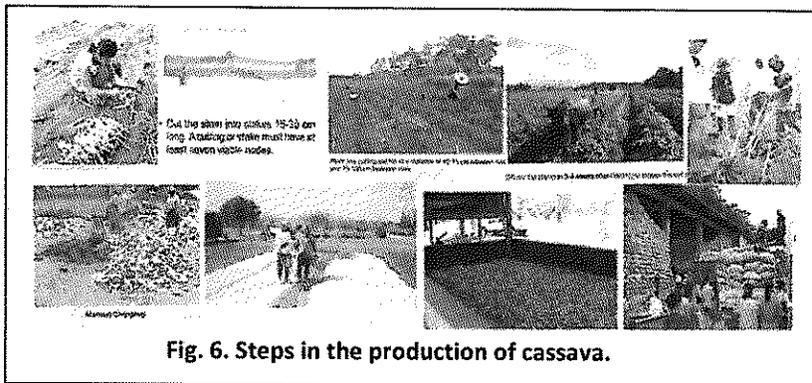


Fig. 6. Steps in the production of cassava.

Cassava can play an important role in meeting the immediate food supply needs of residents in the BBC area. As a staple food crop, cassava matures in as early as six months, just two months longer than rice and corn. Unlike rice

and corn, cassava is much easier to grow and can be produced year-round. Various preparations of cassava for human consumption are shown in Fig. 6a. See Annex A for more information on Cassava production and application.

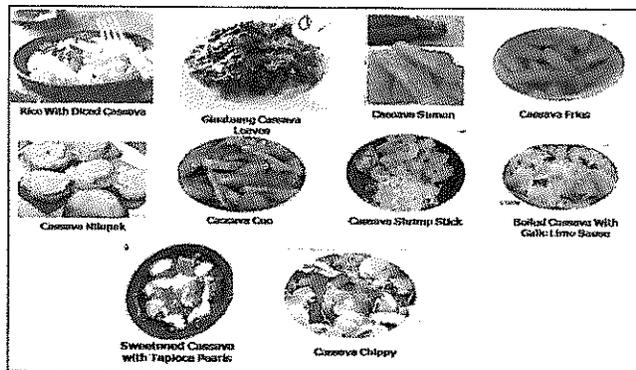


Fig. 6a. Various preparation of cassava as human food.

Other than vegetables, rice, corn and cassava, banana particularly the *cardaba* and *latundan* varieties can be used to supplement rice. Banana can be eaten raw. Moreover, there are several food preparation options for *cardaba*- boiled, sweetened, barbecue and others. This makes banana a potential crop to address immediate food supply needs.

6.2 Crops with Current High Demand to Provide High Income

A careful evaluation of crops suitable to the agro-climatic conditions of BBC shows several long-duration crops with great potential to augment the income of farmers. Moreover, these crops also show added productivity when intercropped with short-term crops. These crops, when grown alone or mixed with other crops, can potentially provide farmers with returns that are higher than the government's poverty threshold level of PhP 70,000 per year.

Table 13. Investment cost, duration to maturity and projected income of selected long duration crops.

CROP	INVESTMENT COST (PhP)		DURATION TO MATURITY (Yrs)	NET INCOME RANGE AT MATURITY (PhP/YR)
	ESTABLISHMENT	FIRST THREE YRS		
1a. Coconut ^{1/} for copra	30,000	125,000	4.5 - 6.0	25,000 - 40,000
1b. Coconut for special use ^{2/}	90,000		3.0 - 4.0	90,000 - 150,000
1. Oil palm	35,460	110,000	2.2 - 3.0	80,000 - 140,000
2. Natural Rubber	32,450	77,500	4.5 - 6.0	60,000 - 160,000
3. Banana (<i>Cardaba</i>)	35,000	80,000	1.5 - 2.0	45,000 - 60,000
5. Cacao	40,000	95,000	3.0 - 3.5	35,000 - 80,000
6. Coffee ^{1/}	40,000	95,000	2.5 - 3.5	20,000 - 40,000
7. Abaca ^{3/}	40,000	75,000	3.0 - 4.0	40,000 - 60,000
4.0 Fruit trees ^{4/}	35,000	80,000	3.0 - 4.0	40,000 - 80,000

^{1/} Using modern farming practices.

^{2/} Coconut for young fruits, sweet juice, sweet aromatic juice and coco sugar.

^{3/} Recommended to be intercropped with other HY crops for added farm productivity and income.

^{4/} Include durian, mangosteen, lanzones, rambutan, etc.

The agro-climatic requirements of these crops and where they are suited in the BBC are shown in Table 14.

Table 14. The agro-climatic suitability of crops with current high income.

CROPS	AGRO-CLIMATIC REQUIREMENTS	WHERE TO PLANT IN BBC
1. Coconut	Drained plains to sloping field; slope of 25° and below, elevation of 700 masl and below; preferably not above 30° slope.	From coastal drained plains to hilly fields of not more than 700 masl.
2. Oil palm	Deep moderately to highly fertile soil, plains to slope of not more than 18° in slope,; rainfall of not less than 1800 mm evenly distributed/year.	From plains up to 18° slope below 600 masl. BBC have more than 50,000 ha under this category.

CROPS	AGRO-CLIMATIC REQUIREMENTS	WHERE TO PLANT IN BBC
3. Rubber	Plains to sloping fields and mountain moderately highly fertile soil up to 700 masl with no extensive mist formation; annual rainfall of 1400 and above.	From plains to hilly (less than 25° slope). Fields for reforestation of not more than 700 masl.
4. Banana	Drained plains to hilly (18° slope) of not more than 800 masl, rainfall of not more than 2000 mm, evenly distributed.	From plains to hilly (< 25° slope) areas; elevation of not more than 700 masl.
5. Cacao	Rainfall of 1250 to 3000 evenly distributed; altitude = 300 - 1200 masl need shade for first four year old reduce sunlight; 75% of sunlight - reduce 25% as it mature. Both crops and shade can be planted at 3 x 6 m.	Flat plains to hilly areas as intercrop to coconut and other tree crops at low elevation, or as monocrop in high elevation.
6. Coffee	Well-drained soil, high organic soil, high and well-distributed rainfall, daily sunshine of six hours and above, planting of mist and moderate wind.	From plains to hilly land of over 700 masl as intercrop to coconut, falcata, rubber and other timber plantations. Arabica at 800 masl and above.
7. Abaca	Well-drained soil high in organic soils; well distributed rainfall and no strong winds; otherwise wind-breaker trees shall be provided.	From 300 to 1000 masl; in low to moderately high elevation as intercrop to coconut, rubber, falcate and other crops
8. Fruit trees	From plain to sloping field of not more than 18° well-drain and fertile soil	From plains to 700 masl

6.2.1 COCONUT USING MODERN FARMING PRACTICES

6.2.1.1 The Demand

Before Typhoon Pablo, coconut provided BBC farmers with low yield, productivity and income. It was primarily due to a few of factors - lack of government support and poor farming practices. Majority of the coconut trees were old and unfertilized, and provided very low productivity.

Coconut has immense national and international market due to its multiple uses. Its main product, coconut oil (CNO), is used in food preparation as vegetable oil, industrial materials, and biofuel. Fresh nuts are raw materials for desiccated coconut, coconut milk and coconut water. By-products include geo-textiles, soil conditioner, medium for vegetable/cutflower production and charcoal which have a growing market.

Philippine statistics indicate that the average yield of coconut in the country is only 1,200 kg of copra/ha per year. In the BBC, average yield is marginally highest at 1,250 kg/ha per year (Bureau of Agricultural Statistics (BAS), 2012). Considering the coconut farm size of smallholders in the country of 2.5 ha and the price of copra of PhP 20/kg, the income of a coconut farmer is only PhP 60,000/farm per year - below the poverty threshold level of PhP 72,000/ha per year. Hence, poverty is common in areas where coconut is grown as a monocrop. Few coconut farmers integrate other crops like *cardaba* banana, lanzones, cacao and mangosteen to supplement the low income from coconut.

6.2.1.2 Modern Production Practices

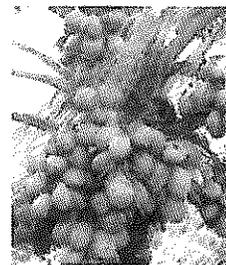
Many innovative practices can increase coconut yield and/or productivity to three or more times than the current yield level in the country. This will enable farmers to earn income above the poverty threshold level. Among these are the application of Mykovam, salt, multi-nutrient fertilization (MNF), and the replanting of old unproductive trees with hybrid coconut varieties. Mykovam is an environment-friendly microbial application discovered at the University of the Philippines, Los Banos (UPLB). It allows coconut trees to generate parts of their nutrient needs from the air through microorganisms. These are techniques that are applicable in BBC but have not been promoted aggressively.

a. Salt application. Most farmers do not fertilize their coconut trees. Consequently the yield of good varieties stagnate at 10 kg of copra/tree or 1,230 kg/ha per year at a population of 123 plants/ha. According to Philippine Coconut Authority (PCA) researchers Magat and Canja (2009), the application of salt at the rate of three kg/tree in year one, two kg/tree in year two and one kg/tree in year three and onward, increases the yield of coconut from 10 kg/tree per year to 12.5 kg/tree in year one and 15 kg/tree in year two and onward. The increase in yield provides the farmer an additional net income of PhP 12,000/ha per year, after deducting the cost of salt application.

b. Multi-nutrient fertilization (MNF). Magat and Canja (2009) noted that the yield of coconut without MNF stagnate to 100 kg of copra/tree per year. The application of MNF or 14-5-20 of NPK plus chloride, sulfur and boron at the rate of three kg in year one, two kg in year two, and one kg in year three and onward increases the yield/tree of 15 kg or copra in year one, 20 kg in year two and 25 kg in year three and onward. This provides the farmer an increase net income of PhP26,400/ha in year 2 and PhP 50,200/ha in year 3 and onward.

c. Planting /Replanting of hybrid coconut seedlings. More than 50% of coconut trees in the Philippines including Davao Oriental are old and senile. This is the major reason behind the low yield of only 1200 kg/ha per year. One way to increase the yield is to replant old trees with high yielding varieties. The PCA has developed 15 high yielding hybrids of coconut under the World Bank-financed loan implemented in the 1980-1990s. Hybrid plants become productive early, about four years after planting compared to seven years for the tall selections. Hybrids also generate yields of 150 to 200 nuts/tree per year versus the traditional varieties which produce only 60 nuts/tree per year. Unfortunately, the PCA has abandoned hybrid seed production, citing the high cost of seed production as the reason. The difference in the cost of production of hybrid seeds and traditional seeds is only P20.00 but the benefits are tremendous – three times more yield for 30 years. Malaysia found out that while the cost of producing hybrid seeds is high, the high yield of the hybrid plants more than justifies the investment for the production of hybrid seed nuts (Fig. 7). Malaysia is currently producing hybrid seed nuts using the parent materials and technology developed by PCA as a tool to help increase the yield and income of smallholders in their country. Hybrid seeds are distributed to smallholders on a plant-now-pay later basis. In view of this Malaysian experience, the PCA is now considering the revival of the hybrid seed production. It is recommended that BBC be selected as a pilot area.

Coconut for copra



Using HYVs or hybrid and adequate nutrition = the keys to high productivity of 6 or more tons of copra/ha per year.



Fig. 7. A productive coconut tree planted from a hybrid seed nut.

d. Planting of special coconut varieties for high income. While coconut is grown largely for copra, cultivation of special coconut varieties can double the income of smallholder coconut growers as in the case of Thailand. The special coconut varieties occupy almost 100,000 ha in Thailand. Malaysia has followed by distributing 50,000 seed nuts annually to farmers. These special coconut varieties include the following:

- *NamWam.* A selection of dwarf variety producing small nuts with sweet water and with tender meat. This selection is commercialized to cater to the tourism industry.
- *Nam Hom.* Produces sweet and aromatic juice and tender meat. It is commercially grown for both the domestic and export markets in Thailand and has reached Europe and USA as health food.

- *Maphrass Tan*. A group of coconut selections with soft and long inflorescence high sap yield and high concentration of sugar. It is used in commercial coco sugar production. This is being used in Thailand's special food industry.
- *Maphran/Kathi*. A coconut selection where all nuts produce the *macapuno* type and is commercially grown for confectionaries.
- *Nam Hom x Maphran/Kathi hybrid*. A high yield producing aromatic *macapuno* which became very popular but expensive in Thailand's supermarkets. It is now being exported to many countries.

Special coconut - high market demand for tourists, domestic and export markets - high price and income to farmers.

Adequate nutrition = high yield of +100 nuts/tree per year in Kabacan, Cotabato.



Special coconut - tender meat, sweet aromatic juice; sweet juice and coconut sugar - BBC should set the foundation of the crop with high tourist demand

Fig. 8.A Prolific sweet and aromatic juice coconut; preparation for local and global export market.

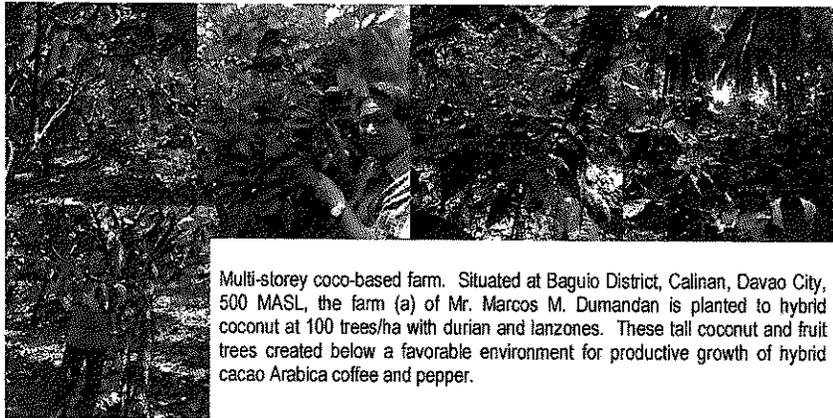
Since *Nam Wan*, *Nam Hom* and *Maphrass Tan* are available in the Philippines, they may be multiplied and grown in the BBC in preparation for the positioning of Davao Oriental as a major tourist destination, for the domestic and export markets (Fig. 8).

e. Intercropping of coconut. Another strategy to increase the productivity of coconut farms is to intercrop with other high value crops. The productivity of the intercrop depends on the kind of crop, the age, population density of both coconut and the intercrop and the level of cultural management being carried out.

Crops like cacao, banana and fruit trees such as lanzones and mangosteen perform well as intercrops when coconut is grown at a population of 70 to 80 plants/ha. Higher coconut density may become too shady for these crops.

The application of modern farming practices to increase the yield and productivity of coconut can provide farmers in the BBC with higher income. Empowering farmers to use these practices may require a multi-agency approach involving the national government, LGUs and NGOs.

Fig. 8a. Multiple storey coconut farm with intercrops (Fruit Trees, Coffee, Cacao & Coffee)



Multi-storey coco-based farm. Situated at Baguio District, Calinan, Davao City, 500 MASL, the farm (a) of Mr. Marcos M. Dumandan is planted to hybrid coconut at 100 trees/ha with durian and lanzones. These tall coconut and fruit trees created below a favorable environment for productive growth of hybrid cacao Arabica coffee and pepper.

6.2.2 OIL PALM

6.2.2.1 High demand – globally and domestically

Oil palm is a tree from which palm oil is derived as its main product. This is primarily used as vegetable oil and is highly demanded in both the global and domestic markets for various reasons as shown in Figures 9, 10 and 11.

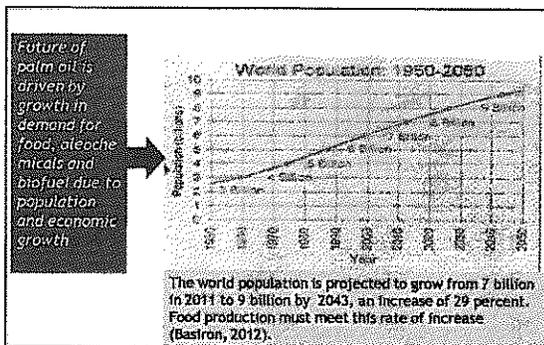


Fig. 9. The high and increasing demand of palm oil due to increasing population.

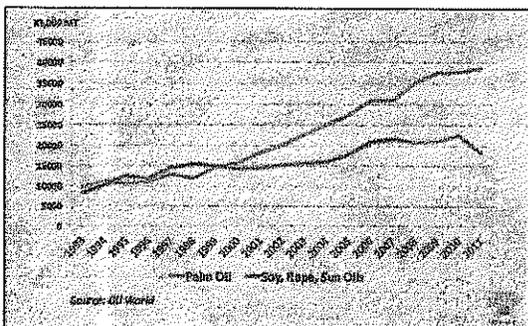


Fig. 11. The high and increasing demand of palm oil due to increasing dependence as vegetable oil, replacing other vegetable oils.

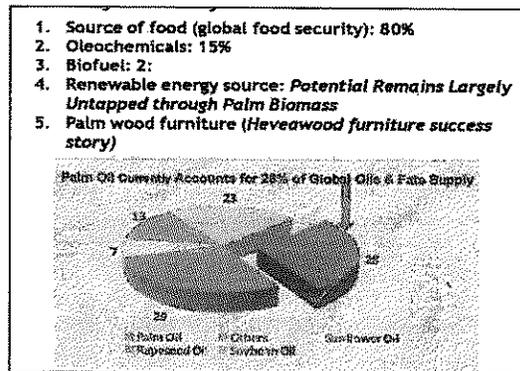


Fig. 10. The high and increasing demand of palm oil due to the discovery of many uses.

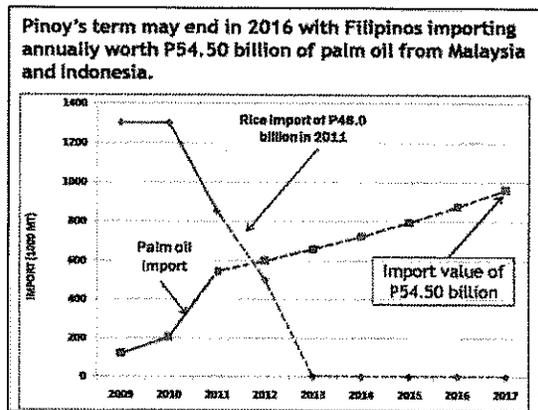


Fig. 12. Philippine importation of palm oil and rice since 2009 and projected till 2017.

Oil palm became the most important vegetable oil globally with consumption doubling in the last 30 years, and projected to double in the next 10 years. China and India are the largest consumers of palm oil importing 40% of global production.

Domestically, there is increasing demand for palm oil as vegetable oil. Since 2009, the Philippines' importation of oil palm has increased. In 2012, the Philippines imported from Malaysia 500,720 MT of palm oil valued at PhP 27.52 billion. This is expected to double to PhP 54.5 billion by 2017.

6.2.2.2 Becoming an Important Crop in Mindanao

Due to high demand for palm oil, a once neglected product in the country, the oil palm tree is becoming an important crop in the Philippines which many farmers would like to plant. Oil palm is highly competitive and provides one of the highest incomes compared to other vegetable oil crops (Table 15).

Table 15. Percent share of palm oil compared to other vegetable oil of the world.

Crops	Oil Yield/ha	% Share of World Production
1. Palm Oil	6.20	35
2. Soybean	0.40	27
1. Rapeseed	1.50	15
2. Sunflower	1.20	8
3. Others (coconut 3%)	-	15
TOTAL		100

Moreover, oil palm is one of the easiest crops to plant; easier than planting and maintaining coconut or fruit trees. Oil palm can be successfully planted in fields which are difficult to farm with traditional Philippine crops including reforestation crops. It has exhibited high productivity even in occasionally flooded fields, reclaimed marshlands, cogonal or grass and brushlands, second growth forest lands and left-over timber farms. It provides farmers with regular bi-weekly income from the 3rd to the 25th year. The features of oil palm trees compared with coconut are shown in Table 16. The oil palm tree matures early, has high vegetable oil yield and can provide farmers with four times more income than coconut. Moreover, the post-harvest handling of oil palm fruits, known as fresh fruit bunch (FFB) is easier than coconut. All that farmers need to do is to harvest and bring the FFB to milling plants where they are paid the price of the FFB. In the case of coconut, farmers need to go through a tedious process of copra meat extracting and drying, which is laboriously expensive and difficult during rainy days.

Table 16. Comparative growth and productivity of coconut and oil palm.

PARAMETERS	COCONUT	OIL PALM
1. Duration to first fruit harvest (yr)	5.5	2.2
2. Duration to maximum productivity (yr)	7.5	5.0
3. Oil yield (t/ha)	1.2	4.5
4. Est. Farmers net income PhP/ha per year	>18,000	>80,000
5. Productive life-span (yr)	>25	>25
6. Area planted in the Philippines	3,560,000	73,460

Both Coconut and Oil Palm are covered by the mandate of PCA under the law (PD 232).

Small landholders with 2-3 ha who apply the standard production technology can generate a fairly decent income of at least P 7,000 per month as shown in Table 17. With this income, a small-hold farmer crosses the government's poverty threshold level of P70,000 annually.

Table 17. Projected income of oil palm farming among smallholders at 6 to 25 years at a price of PhP 6.00/kg of FFB.

PARAMETERS	PRODUCTION LEVEL		
	HIGH	MEDIUM	LOW
Production of FFB (t/ha/yr)	35	25	20
Price /ton (PhP)	6,000	6,000	6,000
Gross Income	210,000	150,000	120,000
Less Expenses	42,000	35,000	32,000
Net Income:			
Yearly (PhP)	168,000	115,000	88,000
Monthly (PhP)	14,000	9,583	7,333

Table 18. Projected income of oil palm farmer at a price of PhP 3.50/kg of FFB.

PARAMETERS	PRODUCTION LEVEL		
	HIGH	MEDIUM	LOW
Production of FFB (t/ha/yr)	35	25	20
Price /ton (PhP)	3,500	3,500	3,500
Gross Income	122,500	87,500	70,000
Less Expenses*	34,000	25,000	8,000
Net Income:			
Yearly (PhP)	88,500	62,500	52,000
Monthly (PhP)	7,375	5,208	4,333

* Assuming no land rental and interest on loan.

At present, the Philippines has only 73,000 ha planted to oil palm compared to over five million ha in Malaysia, ten million ha in Indonesia and almost one million ha in Thailand. Small landholders in these countries obtain high income to overcome poverty, create prosperous rural communities, send their children to college and construct good houses as shown in Fig. 13. Indonesia is now ahead of the Philippines in overcoming poverty using oil palm farming as one its key agribusiness strategies.



Fig. 13. Typical house of small landholders in Indonesia before and after engaging in oil palm farming. From: *Janurianto, A. 2011. Paper presented during the International Conference and Exhibition of Palm oil, Jakarta, Indonesia, May 11 to 13, 2011.

6.2.2.3 Wide Area Suited at BBC

BBC has wide areas suitable for oil palm farming. The suitable areas are limited only by elevation and slope but not by rainfall and soil. Oil palm is productive in plains where evenly distributed rainfall is 1,800 mm and above. It can also thrive in deep and moderate fertile soils from sea level of up to 600 masl. Oil palm performs better than coconut in swampy but drainable lands and in cogonal fields. It performs best in flat lands or plains, although high yield is obtained in slightly sloping land of 18° slope and lower.

6.2.2.4 Investment Consideration

The cost of investment in oil palm farming is at PhP 127,000/ha covering the cost of land preparation, planting and maintenance for three years. Return on investment is achieved in seven years. Among smallholders whose farms need no extensive land preparation for plantings, associated expenses may just be the purchase of planting materials. At current prices, this is approximately PhP 28,000/ha. Farmers can also use the areas between rows of oil palm for the production of various food and cash crops while waiting for the oil palm trees to mature. Half of the oil palm plantations in the world are grown by small-holder farmers.

6.2.3 NATURAL RUBBER

Currently, natural rubber (NR) enjoys high demand and high prices in both domestic and world market. The demand for NR is projected by Rubber Asia to reach 36 million tons by 2020 (Fig. 14). Smit (2005) projected an increase in demand for traditional rubber consuming countries such as the United States, Japan and the BRICs(Brazil, Russia, India and China) (Fig. 15).

The high demand for natural rubber is expected to provide farmers with high income. More than 90% of the rubber plantations in the world are in the hands of smallholders, providing them with revenues above poverty threshold levels.

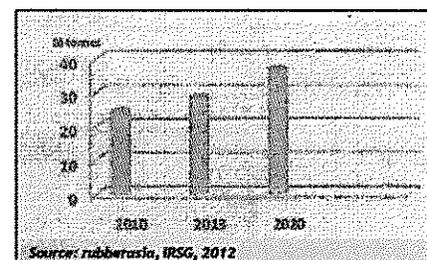


Fig. 14. Past, present and projected demand of NR.

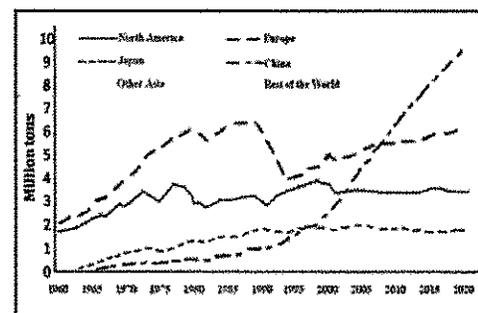


Fig. 15. Past, present and projected consumption of rubber in major

6.2.3.1 Problem of expansion besets rubber producing countries in Asia but not in the Philippines

The five leading countries in NR production shown below can no longer substantially expand their NR production to meet global demand due to the shortage of land and/or manpower for harvesting rubber latex known as tapping (Table 19). Indonesia has available wide areas that are suitable for NR production and an abundance of labor but its farmers prefer to plant oil palm. Vietnam will reduce its area from 850,000 ha to 800,000 ha to give way to the establishment of rubber-based industrial zones. Malaysia is limiting its rubber production area to 1,200,000 ha due to labor shortage.

The Philippines has a unique opportunity. It has more than one million ha of vacant grass and brushlands suitable for rubber cultivation. It has an ample supply of labor as it currently has one of the highest unemployment rates in the ASEAN region. In BBC, the impact of Typhoon Pablo resulted in wide open areas suitable for rubber farming. This can provide high farm income of three to four times the income from coconut in the pre-Typhoon Pablo scenario.

Table 19. Area and production of rubber among the five leading producers and the Philippines (compiled by Pamplona, 2012).

COUNTRY	AREA('000 ha)	PRODUCTION ('000 MT)
1. Thailand	2,434	3,056
2. Indonesia	3,414	2,755
3. Malaysia	1,248	1,200
4. Vietnam	850	930
5. India	635	920
6. Philippines	165	153

6.2.3.2 Recent major technological breakthroughs in rubber

There are new technologies in rubber production which can push the income of farmers much higher and make rubber farming very competitive. Among these technologies are:

a. Discovery of high yielding – latex-timber clones (HY-LTC) hybrids. These hybrid varieties increase yield by two to three times over the yield of traditional clones – RRIM 600 (Table 20). Other than providing high latex yield, the trees provide substantial lumber when they are no longer productive. These clones are now available in the country and are currently being subjected to performance trials in Cotabato and Agusan del Sur and are reportedly showing very promising results.

Table 20. Comparative latex and timber yields of a traditional clone, RRIM 600 and some HY-LTC recommended by the Malaysian Rubber Board for planting (2012 to 2020).

CLONE	DRY RUBBER YIELD (kg/ha/yr)	WOOD VOLUME YIELD AT 14 YEARS OLD(M ² /tree)
1. RRIM 600	1,344	0.43
2. PB 350	1,862	1.20
3. RRIM 2023	2,822	0.81
4. RRIM 2025	2,700	1.87
5. RRIM 2027	3,036	1.30
6. RRIM 3001	>3,000	0.84

b. Component technologies – for shorter immaturity period from 7 to 4 years or less.

- This means earlier and higher income for farmers and investors as shown in Table 21.
- The component technologies for early maturity include using HY-LTC, quality planting materials (QPM), employing good cultural management practices, and providing plants with adequate fertilization (Fig. 16).

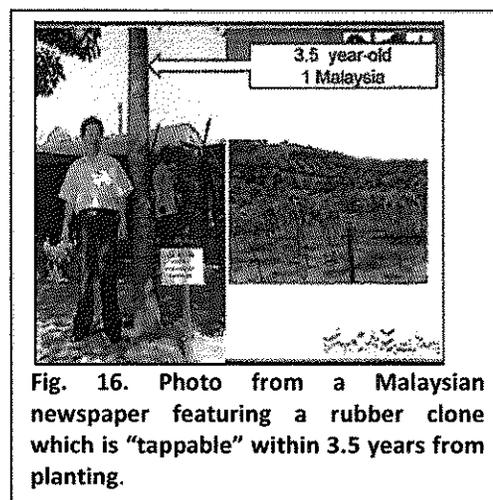


Fig. 16. Photo from a Malaysian newspaper featuring a rubber clone which is “tappable” within 3.5 years from planting.

Table 21. Yield and income from a hectare of adequately managed rubber farm using component technologies for early maturity and high yield.

YEARS AFTER PLANTING	DRY RUBBER YIELD (kg/ha per year)	ESTIMATED GROSS ANNUAL INCOME (PhP)
1 – 4	-	-
5	1,200	96,000
6	1,300	104,000
7	1,500	120,000
8	2,400	192,000
8 to 25	3,000	240,000

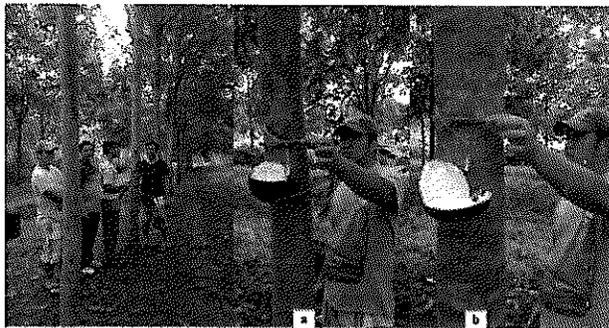


Fig. 17. Commercial trial of latex-timber clones in Carmen, Cotabato.

6.2.3.3 Improved intercropping scheme. This allows farmers to produce staple/cash crops between the rubber rows without affecting the growth and productivity of rubber trees. As demonstrated in Fig.18 – rubber trees can be intercropped with corn (*left*), banana (*right*) and many other crops.



Fig. 18. Some crops which can be intercropped profitably between the rows of rubber.

6.2.3.4 Component technologies for wind fastness. The component technologies developed in the plains of Vietnam include the use of suitable clones, use of plants with well-developed root system, basal fertilization of rock phosphate, planting in silt-pit bed, pruning and guying.

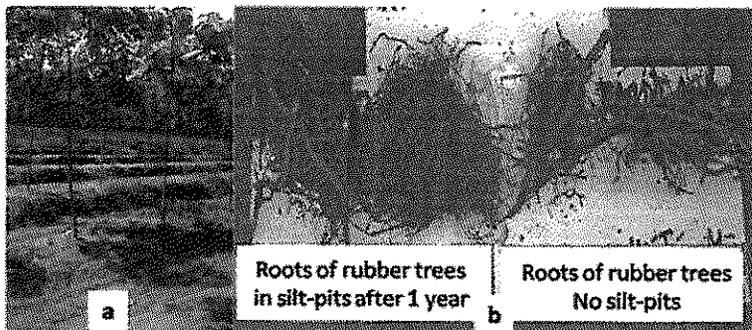


Fig. 19. Providing silt-pit in rubber farms promotes extensive and deeper rooting and the rapid growth of sturdy plants which are resistant to strong winds.

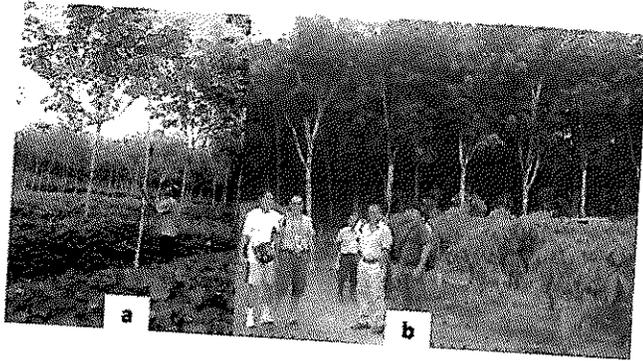


Fig. 20. Formative pruning is carried out at immaturity stage and regular top pruning at maturity stage as a mitigation measure against strong winds.

6.2.3.5 All-Weather tapping technology thru rainguard. This allows all-weather tapping, even on rainy days, increasing yield by as much as 20% (Fig. 21). This technology will be useful in BBC given its high annual rainfall of 4,300 mm/year.



Fig. 21. Rainguard allows all-weather tapping of trees.

6.2.3.6 Competitive advantages of rubber

Rubber provides higher income than most crops. Income from two to three ha can provide a farmer money enough to buy nutritious food for his family, build a good concrete house, buy basic household needs, like a TV and refrigerator, a four-wheel vehicle and support the cost of the education of his children in college (Fig 22). Rubber provides high timber yield at the end of its life-span. A rubber plantation with HY-LTC can generate as much as 600 cu. m/ha of good timber in 14 to 20 years with a market value of at least PhP500,000. It is also labor intensive (Fig. 23), needing one farm laborer for every two hectares. Jobs are also created in nursery, primary processing and manufacturing (Fig. 24). Rubber has shown its capacity to overcome poverty and bring about prosperity.

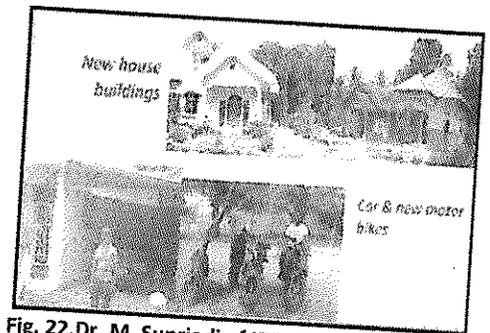


Fig. 22. Dr. M. Supriadi of IRR presented during the IRTEC '12 – some evidences of how rubber farming improved the lives of small landholders in Indonesia – farmers constructing new concrete houses, owning cars, motorcycles and sending their children to college.



Fig. 23. Job Generation at rubber farms. As a reforestation crop, rubber provides employment from (a) land preparation, (b) planting and cutting of trees (c) for rubber wood. The biggest employment comes from rubber latex extraction when the trees are at 5 to 25 years old.

Fig. 24. In Vietnam, upstream and downstream rubber industries provide jobs to thousands of women.



Other manufacturing jobs for the Vietnamese women in the VRI are in the manufacture of:

- Foam mattress
- Shoes/boots
- Sport balls
- Contraceptives
- Etc.

6.2.3.7 Financial requirement and farming techniques

The cost of establishing a hectare of rubber plantation during the first year in grassland and fields previously grown to upland crops is PhP 32,450. About PhP 20,000 of this amount goes to the purchase of good-quality planting materials. The maintenance cost from the first to the sixth year averages PhP 14,000 per year for a total of PhP 116,450.

In situations where a farmer plants rubber in an area planted to corn, banana and other crops, his major expenses in shifting to rubber farming would only be the cost of planting materials, estimated at P20,000/ha.

6.2.3.8 Where to plant in BBC

The largest portion of the BBC's total available agricultural land is most suitable for rubber cultivation. It is not limited by the agro-climatic parameters in BBC, soils and rainfall. It can be planted at not more than 700 masl. It can be planted at high slope. It can also be used for agro-reforestation in sloping areas. In places of moderately fertile soil or even in eroded soils not suitable for other commercial crops, rubber can still deliver high yield provided it is adequately fertilized.

6.2.3.9 A possible model for the BBC: The Makilala rubber expansion program

Makilala is an upland municipality in North Cotabato with a highly rugged terrain at the foothills of Mt. Apo along the North Cotabato border. In this town, most farmers are tilling crops in grasslands and brushlands. The rich volcanic soil, however, enabled a few enterprising farmers to plant rubber. To help farmers improve their income, the Makilala local government implemented an integrated rubber development project which sought to transform at least 10,000 ha of rugged grass and brushlands into rubber plantations by planting five million rubber trees. To implement the project, the local government allocated PhP 25 million for the purchase of approximately one million rubber seedlings for distribution to interested small landholders with ready areas for planting.

6.2.3.10 Financial Risk Analysis

As an international commodity, the price of rubber is affected by the world economy and changing world prices. Evolving rates may lead to lower values than what is quoted in this study. The use of inferior production technology can also result yield that is lower than the level this study has projected.

6.2.4 BANANA

Banana is the country's most important fruit crop in terms of area, production output and exports. It is the country's second biggest agricultural export after coconut oil. The bulk of the country's banana exports are produced in the Davao Region including Davao Oriental.

The common varieties of banana include cavendish for export market, *saba* or *cardaba* as supplemental staple food or raw material for banana chips. Other varieties such as *lakatan*, *latundan* and *seniorita* are also becoming prominent due to their high demand in the local market.

Banana can be raised as a monocrop and as a component of intercropping system. Monocropping is generally practiced in large-scale when the primary purpose is the production of high quality fruit for export. Intercropping is practiced in small farms where household labor and other resources are utilized. An example is the intercropping of banana between the rows of coconut trees planted at a distance of 3.5 x 7.0 m. Banana is also used as a nurse crop of coffee, cacao and fruit crops like durian and mangosteen.

Banana is a potential alternative crop in the BBC since it is easy to grow and has a short gestation period. It also commands high demand as food and as raw material for banana chips for export. The agro-climatic condition of the BBC is highly suitable for *cardaba* production. It can be grown in plains with good drainage and even in hilly areas sloping below 20°. It is planted using suckers, corms or tissue culture plantlets. Tissue cultured planting materials are recommended as they are free from pests and diseases like corn borer, nematode, and viral diseases such as Bunchy top and fusarium wilt.

Introduction of cavendish banana in BBC may face some challenges due to the high rainfall in the area which is highly favorable to the spread of Sigatoka disease. Other varieties such as *lakatan* or *latundan* may be less susceptible to this disease and can be propagated in the area.

6.2.5 CACAO

6.2.5.1 Demand

Cacao has a high demand in both the domestic and global markets. It is projected that by 2020, there will be a 1,000,000 MT shortage of cacao. The Philippines may overcome this shortage by expanding



Fig. 25. A highly productive cacao tree from an outstanding variety.

existing local cacao production. The Philippines consumes about 30,000 to 40,000 tons of beans which is about eight times the local production of 10,000 tons. The Philippine is a minor producer of cacao in spite of wide areas suitable for the production of this crop.

6.2.5.2 Production

The technology in cacao production is well-developed. The occurrence of pests and diseases make the cacao production more challenging than other crops. The crop is largely intercropped with coconut. In 2009, the Philippines harvested an area of 9,500 ha compared to Malaysia's 21,000 ha; Papua New Guinea's 128,000 ha and Indonesia's one million ha. There is a big potential for the Philippines to expand its existing cacao production. Among the strategies to increase cacao production is to promote the intercropping of cacao in coconut areas. The coconut-cacao crop mix is presently being done in many areas in Mindanao including the western part of Davao Oriental. This intercropping system is also viable in the BBC.

The key to success in cacao production is the use of good quality and disease-free planting materials. Budded hybrid such as UF 18, BR 25, PB 123, K2 and K9 are recommended. These are readily available in commercial nurseries. Proper shading at the time of planting and the immature stage of the plant is necessary. It is important that before planting materials are secured, the field for planting is prepared and the shade plants established six months ahead. The shade plants include cassava, *madre de cacao*, banana and coconut. Recommended plant density is 1,000 plants when intercropped with coconut, and 1,600 as monocrop. Many asexually propagated cacao are available in commercial nurseries in Davao City.

The trees mature in two years but with limited yield of up to four years. The pods are harvested, opened and placed in fermentation boxes. The key to a quality bean is fermentation. Fermented and dried beans are sold to traders.

6.2.5.3 Investment consideration

The initial investment cost is about PhP 35,000/ha. Yield at four years and beyond can average three to four tons of wet beans/ha. At existing prices, this can generate a gross income of PhP 100,000/ha and a net income of PhP 35,000/ha.

6.2.5.4 Financial risk analysis

Low yield can result from low level of fertilization and occurrence of pests and diseases. To overcome these risks, good-quality planting materials should be provided to growers with corresponding technical assistance in basic farm management, pest and

disease management, post-harvest handling and proper harvesting techniques.

6.2.6 COFFEE

This crop is grown worldwide by small landholders, providing moderately high income with relatively short gestation period. The major varieties include robusta, arabica, excelsa and liberica. The first two account for the bulk of production, contributing 70% and 20% respectively, of the Philippines' output. It has wide range of adaptability including high elevation of over 1000 masl.

National production is low, much below the local requirement, thereby making the country a net importer of coffee. The national yield of almost a ton of green beans/ha per year is below the normal yield potential of the crop and can be improved by using high yielding varieties and adoption of modern production practices. Robusta is mainly grown in lowland areas while Arabica -- which produces an aromatic coffee that commands a premium price -- is suited to higher elevations.

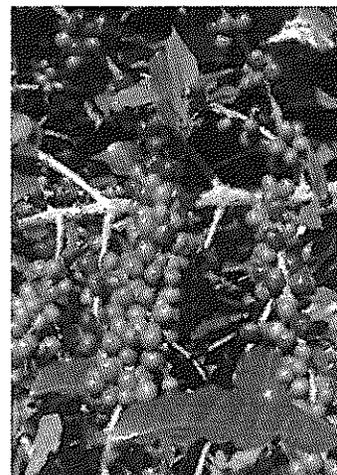


Fig 26.A prolific Arabica coffee suitable for cultivation in higher elevation.

The Philippines, once a major exporter of coffee, is now a major importer of this commodity which has a huge demand in the export market. In 2010, the Philippines consumed 65,000 tons of coffee beans of which only 20,000 was sourced locally. Half of this volume came from Mindanao. Nestle promotes the planting of coffee through a buy-back scheme. The company also provides training for farmers and technicians, and sells good-quality and reasonably-priced seedlings to coffee growers.

6.2.6.1 Production

The production technology of coffee is well-developed. The crop is commonly grown as a monocrop in the lowlands or as intercrop to coconut, rubber, banana in the highlands. Two years after planting, the first harvest occurs at minimal yields and increases to higher yields in four to five years. Yields can vary from 500 to 2,000 kg/ha with an average of 1,000 kg/ha per year.

6.2.6.2 Investment consideration

The investment cost is about P50,000/ha. This covers the cost of seedlings and land

preparation. The use of quality planting materials is one of the keys to higher productivity.

6.2.6.3 Financial risk analysis

Major risks to profitability include the use of low quality planting materials, low seedling survival and low fertilization. To overcome these risks, propagation of good quality planting materials from accredited nurseries and provision of techno-training to growers on basic farm management and pest and disease management should be undertaken.

6.2.7 ABACA

It is one of the crops introduced in the BBC before Typhoon Pablo which farmers found easy and profitable to grow. Based on interviews with farmers, many are interested to plant this crop or expand existing abaca production sites.

According to provincial agricultural data (2012), at least 3,000 ha were planted to abaca in the BBC just before Typhoon Pablo

hit the area. Pre-Typhoon Pablo total abaca production hectarage in the three BBC municipalities are: 1,279 ha in Baganga, 737 ha in Boston, and 869 ha in Cateel.

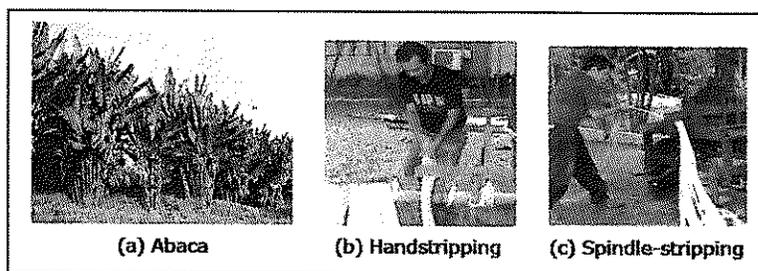


Fig. 27. (a) A healthy and productive abaca plantation, (b) the stripping of abaca manually and (c) the use of machine.

All these municipalities have vast potential areas for the expansion of abaca cultivation as a monocrop or as an intercrop to other crops, including falcata. Abaca can also be intercropped with coconut, rubber and other tree crops. Shading at planting is important to prevent excessive heat as the crop cannot tolerate high light intensity during its early establishment stage. Partial shade to reduce sunlight is needed at the maturity stage. This makes abaca a perfect intercrop to increase land productivity and add to the income generated from tree crops such as coconut, rubber, falcata, fruit trees and others.

The key to successful abaca production for sustainable high yield is the use of disease-free planting materials. Cultural practices should also include efforts to control the disease particularly bunchy top and abaca mosaic (Fig. 27).

The Fiber Industry Development Authority (FIDA) is recommending a distance of 2.5 x 2.5 m in planting using either sucker, corm or tissue culture seedlings for a population of 1,600 hills/ha. Lower population is expected when abaca is intercropped with tree crops like coconut, rubber and falcata. The first harvest is expected at six to seven months after planting. Thereafter, harvesting is carried out at least twice a year. Value-adding offers much potential to increase income from abaca farming. Farm or village-level value-added processing can be done to produce handicraft, ropes, specialty paper and furniture (Fig.28).

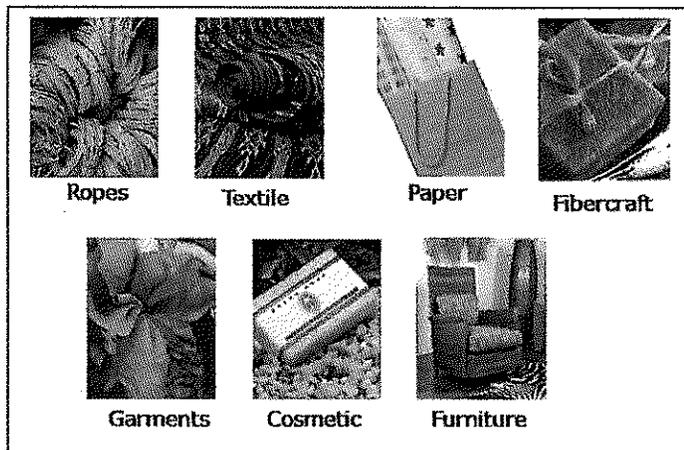


Fig. 28. Some commercial uses of abaca.

6.2.8 BAMBOO

Bamboo is a special crop for a special purpose. It can be used as a wind-breaker and can reduce soil erosion when planted in hilly areas and along river banks. It can be produced as slats with many building applications for poles, for propping banana and for aquaculture. The shoots can also be consumed as vegetable.

There are different species of bamboo with may be commercialized in the BBC. Emphasis should be placed on:

- *Giant bamboo*. This grows to a height of 20 m, internodes of 20-40 cm and a diameter of 12-19 cm. Poles from this species are being used as posts, bridges, scaffolding, fish cages, etc. Slats are suitable for housing needs, furniture, and other aquaculture and agriculture applications.
- *Kawayan tinik*. Grows to about 25 m, diameter of 10-20 cm and intercrop of 40-60 cm. It is used in house construction, for fencing and in aquaculture.
- *Boho*. Grows to a height of 20 m, internodes of 1440 cm and 8-10 cm in diameter. Its commercial uses include utilization as propping poles in banana plantations.

The most common method of propagating bamboo is by nodal cuttings for which a simple nursery facility such as shade, plastic bags and source of water are needed. Otherwise, planting materials are available in commercial nurseries from PhP 20-30 per

seedling. Bamboo can be grown in difference elevations, from sea level to 1500 masl, in well drained, seed loam to clay loam soil. It is planted at a distance of 7 x7 m. Bamboo stems mature within three to five years.

The cost of establishment could range from PhP 18,000 – PhP 25,500. The estimated annual gross income from a plantation of 1,500 to 2,000 poles ranges from PhP 75,000 to PhP 225,000. This is based on the assumption of 150 plants or mat/ha. Aside from its high income potential, bamboo is commonly planted as a boundary crop along the river, curbs or hilly areas that are prone to erosion.

6.2.9 Other Crops.

Aside from these major long-duration crops, there are other crops that are also suitable for cultivation in BBC. These include other fruit trees such as durian, lanzones, mangosteen and rambutan which can provide potentially high income as these have high demand in the local and regional markets. These crops are discussed in detail in *Annex B*.

6.3 Risk factors involving production of medium to long-duration crops

While market opportunities are abundant, the production of these medium to long-duration crop alternatives can be affected by a number of internal and external risk factors, which may affect overall income and profitability. Some of these risk factors include:

6.3.1 Market – Most of these crops are globally-traded commodities and local production competes with similar products from other countries. Thus, market prices are subject to a wide range of influences, including prevailing global demand-supply situations.

6.3.2 Pests and diseases – Pest and disease infestation, if not controlled properly, could significantly affect production levels. For example coco-scale insects (*Aspidiotus destructor sign.*) are damaging coco trees in South Luzon Region. Sigatoka and fusarium viruses are destroying banana farms in Compostela Valley, Davao Norte and Caraga Region.

6.3.3 Climate and weather – Typhoon Pablo may have changed the rainfall pattern in the BBC and could affect crop establishment, production and management. Climate changed-induced weather extremes could also substantially alter farm productivity levels.

6.3.4 Political and social – Strong local political will is needed to counteract aggressive lobbying from militant organizations. For instance, anti-oil palm lobby groups are actively disrupting plantation expansion in other regions.

6.3.5 Technology – Traditional farming practices in coconut production (e.g., use of inferior planting materials, no fertilization) are not applicable and should not be applied to these high-value crops. Application of appropriate technologies are required for these crops (i.e. oil palm, rubber, banana, cacao, coffee, abaca) to achieve high productivity levels and compete in the global marketplace.

6.4 Crop Suitability by Municipality

6.4.1 Baganga has wide plain areas below 3° slope previously planted to coconut with an estimated total area of 6,000 ha. These areas are best suited for many crops like lowland rice, corn, cassava, oil palm, bananas and vegetables. It also has wide areas (about 8,980 ha) within 3 to 8° slope which are suited for many crops like corn, cassava, oil palm, rubber, coconut and pineapple. The municipality has 17,712 ha between 8 to 18° slope suitable for cultivation of tree crops like rubber, coffee, cacao, coconut, oil palm, abaca, fruit trees, etc. The wide areas of 42,457 ha are between 18 to 33° slope and are suited to crops which would require zero or minimum tillage. These include rubber for agro-reforestation, abaca, fruit trees such as mangosteen, durian, lanzones and coconut. It is not suitable for intensive cultivation of corn, upland rice and oil palm.

6.4.2 Boston has a small area of plain (761 ha) suited for lowland rice. It has more than 10,000 ha between 3-18° slope that are highly suitable for cassava, banana, oil palm, rubber, abaca, banana and fruit trees. The municipality has a wide area of 8,695 ha between 8 to 18° slope which are suited to coconut, oil palm, rubber, coffee, cacao, and fruit trees. Areas from 18 to 30° slope can be planted, under zero or minimum tillage, to coffee, cacao, fruit trees and rubber. It is not suited to oil palm.

6.4.3 Cateel has wide plain of 4,000 ha between 0 to 3° slope suitable for lowland rice, corn, oil palm, banana, cassava and fruit trees. The area of almost 5,000 ha found between the 8 to 18° slope are suitable for such crops as corn, cassava, coconut, oil palm, rubber, banana, coffee and cacao. Some of the wide areas between 30 to 50° slope may be selectively grown to zero tillage cultivation of rubber for agro-reforestation, coffee, coconut, abaca and some fruit trees. It is not suited to oil palm and coconut.

The following table (Table 22) is a quick reference for crop suitability in the BBC.

Table 22. Suitable Crops per Municipality

Gestation/Elev	Boston	Baganga	Cateel
Short term, -up to 1000 MASL	Rice, corn, tropical vegetables, root crops, legumes	Rice, corn, tropical vegetables, root crops, legumes	Rice, corn, tropical vegetables (including chili), root crops, legumes
- above 1000 MASL	Subtropical vegetables	Subtropical vegetables	
Long term, -up to 1000 MASL	Coconut, rubber, oil palm, cacao, fruit trees, abaca, banana	Coconut, rubber, oil palm, cacao, fruit trees, abaca, banana, pineapple	Coconut, rubber, oil palm, cacao, fruit trees, abaca, banana
-above 1000 MASL	Arabica coffee, abaca, forest trees, sweet banana	Arabica coffee, abaca, forest trees, sweet banana	Arabica coffee, abaca, forest trees, sweet banana

MARKET OPPORTUNITIES

As discussed in the earlier sections of this study, the impact of recommended short- and long-term crops in addressing immediate food requirements and farmers' incomes have been evaluated. This section presents a rapid scan of existing market conditions for these crops in the BBC as well as neighboring demand centers in adjacent regions. It also provides an overview of market opportunities in selected local (within Mindanao) and export markets.

7.1. Over-all market conditions for each suitable crop

7.1.1 Short-duration crops (below 9 months)

7.1.1.1 Rice. Being the main staple food in the country, there will always be a high demand for good quality rice to help supply the requirements of the province and neighboring areas such as Bislig in Surigao del Sur. A number of municipalities in the western part of Davao Oriental notably Banay-banay and Lupon are widely known as the major sources of rice in the province, which are being marketed in the region as the Banay-banay variety. Consumers are generally unaware that BBC has larger tracts devoted to rice production than Lupon and Banay-banay combined. Upland rice production through an upland variety called *Peria* can be expanded and promoted to niche markets in the Davao Region. With the increasing popularity of health products, this upland unpolished rice variety can be marketed as such.

7.1.1.2 Corn. BBC has traditionally produced yellow corn in limited scale and is practically devoid of white corn. Open pollinated white corn can be introduced in the area to supplement short-term food requirements. With expanded production, white corn can be sold in neighboring Bislig and other areas in Surigao del Sur and Agusan Norte.

7.1.1.3 Cassava. Cassava can be grown to augment short-term food requirements. Other varieties can also be introduced for different markets or uses. Cassava as raw material for feeds and alcohol can be explored under direct marketing tie-ups with feedmillers and consolidators.

7.1.1.4 Vegetables. Prior to Typhoon Pablo, vegetable production in the BBC was limited and a lot of the area's vegetables were sourced from Mati, Compostela Valley or Davao Norte. Shortly after the typhoon, vegetable production was introduced in the BBC as a short-term food sufficiency initiative. In the short-term, existing vegetable production in the area will supply its own requirements. Excess

production can be sold to neighboring areas such as Bislig and other towns in Surigao del Sur.

7.1.1.5 Others (Gabi/Taro, Ube/Purple Yam, Citronella, Chili). In the short-term, these crops particularly *gabi* and *ube* can supplement as staple food. Expanded production of these crops can be pursued with excess production meant for neighboring markets. Other crops such as chili can be sold as niche products to regional buyers and consolidators. Processed chili powder from Cateel was introduced in a recent food fair in Manila.

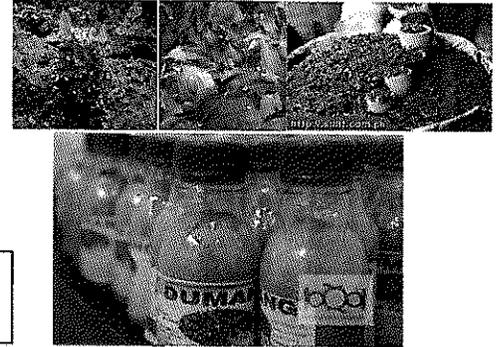


Fig. 29 Chili plant, fruits and finished product

7.1.2 Long-duration crops

7.1.2.1 Bananas. *Cardaba* and *latundan* are the leading banana varieties grown in the area. In the immediate term, production of these varieties can supply local demand. With good-quality and sustainable volume, these fruits can be marketed in nearby demand areas like Mati and Bislig. Excess supply of *cardaba* banana can also be sold to banana chip processors in Mati and San Isidro towns.

7.1.2.2 Other Fruits (Durian, Mangosteen, Rambutan, Lanzones) When commercially produced in the area, these can substitute procurements from the region, and even supply the table fruit requirements of Mati, Bislig in Surigao del Sur and Nabunturan in Compostela Valley and other neighboring towns.

7.1.2.3 Sugarcane. High-quality muscovado sugar is highly coveted in the local and export markets for its health benefits. A group in Sultan Kudarat Province (Sultan Kudarat Muscovado Farmers and Millers Corporation or SKMFMC) currently produces muscovado sugar which it sells in the domestic and international markets.

7.1.2.4 Coconut. Called the tree of life, this palm contributes the widest range of end products, from fruits, sap, water, leaves, midribs, husk, shell, and trunk: fresh fruit, juice, toddy, sugar, cream/milk, vegetable, feeds, health drink, copra, oil, food wraps, brooms, head gear, buttons, kitchen utensils, charcoal, activated carbon for filters, lumber, etc. Scientific studies reveal that with appropriate cultural practices, yields could be increased significantly. Planting the variety for a specified end product is also significant in attaining efficiency in harvesting, processing and product quality. A variety may be good for copra and oil production, but may not be suitable for fresh fruits, sugar production or toddy. The domestic and international markets for majority of the products are highly lucrative, but demands careful consideration for planning and implementation. *See Annex C* for list of products derived from coconut tree.

7.1.2.5 Oil Palm. According to the RAFFID report, close to 70,000 ha are highly suitable for cultivation of oil palm in the BBC cluster. The group of prominent businessman Manuel Pangilinan in partnership with Indonesia's Indofood conglomerate has made initial discussions with the provincial government, and has scanned the area for a possible large scale oil palm plantation investment project. Plans include establishment of plantation and processing plants. In the neighboring province of Agusan del Sur, Agumil Corporation and Filipinas Palm Oil Plantation (FPOP) have been developing plantations and putting up processing plants in the Visayas and Mindanao the past two decades. In 2012, the Philippines imported 500,720 tons of palm oil valued at PhP 27.5 billion. This is projected to reach 1 million tons or PhP 54.5 billion by 2017. Domestic needs alone clearly indicate the huge market for oil palm.

7.1.2.6 Coffee. The Philippines, once an exporter of coffee, is now a major importer of this commodity which has a high demand in the export market. In 2010, the Philippines consumed 65,000 tons of beans, of which only 20,000 was sourced locally with half coming from Mindanao. Nestle, which imports 60% of its requirements encourages the planting of coffee with a buy-back assurance. It also provides training and seedlings to coffee growers.

7.1.2.7 Cacao. Currently, cacao has high demand both in the domestic and global markets. The Philippines consumes about 30,000 to 40,000 tons of beans, about eight times the local production of 5,000 to 10,000 tons. Among the key buyers in Mindanao are Nestle Philippines, Commonwealth Foods, Kennermer Foods and US-based Mars Chocolate, one of the world's leading chocolate manufacturers.

Mars is sourcing a substantial part of its cacao requirement from the Philippines and has existing supply agreements with members of Davao City-based Cacao Industry Development Association of Mindanao, Inc. (CIDAMI) which was established with the support of the U.S. Department of Agriculture (USDA). CIDAMI's membership is composed of farmers, cooperatives, marketers, traders, entrepreneurs and nursery operators. Mars Chocolate established the Mars Cacao Development Center (MCDC) in Davao City and provides training on production of planting materials, nursery management, field cultural practices, and post-harvest processing in order to produce cacao beans that meet its strict quality standards.

Dutch company Kennermer Foods International (KFI) also supplies cacao beans to Mars Chocolate and is also keen on developing the cacao industry in Mindanao. Kennermer has partnered with TVI Resource Development Philippines Inc. (TVIRD) for the establishment of a joint agri-enterprise for cacao production in Zamboanga del Norte. KFI president Simon Bakker recently expressed the company's long-term commitment to develop the cacao industry in the Davao Region through contract growing arrangements with interested growers.

Kennermer Foods, in partnership with the Department of Agriculture (DA) and the local government of Davao Oriental is helping rehabilitate cacao-producing areas damaged

by Typhoon Pablo. The company has reportedly budgeted PhP 5.3 million for this project.

Davao-based agribusiness firm Puestespina Farms is also supporting cacao production in the province by providing good-quality planting materials and establishing market linkages with local growers.

7.1.2.8 Natural Rubber. There is currently high demand of natural rubber (NR) consequently high price in both the domestic and world markets. The demand for NR is projected by Rubber Asia at 36 million tons by 2020 with higher demand projected in the traditional rubber consuming countries such as USA and Japan and emerging markets in the BRICs- Brazil, Russia, India and China.

Thailand, Indonesia, Malaysia, Vietnam and India, the five leading countries in NR production, can no longer substantially expand their NR production to meet global demand due to the shortage of area and/or manpower for harvesting rubber latex, or tapping, except for Indonesia, which still has wide areas suitable for NR production and abundant availability of labor. This presents a unique opportunity for the Philippines which has more than one million hectares of idle grass and brushlands suitable for rubber cultivation, ample supply of labor but has one of the highest unemployment rates in the ASEAN. The BBC in particular has wide open land suitable for rubber farming. This is expected to promote high farm income of four times the income from coconut before Typhoon Pablo.

7.1.2.9 Abaca. There are 14 fiber processors spread across Mindanao. One of the biggest processors is the Davao Rope Factory based in Agdao, Davao City. Local fiber trading is aggressively carried out by three grading/baling establishments, six buying stations and 153 abaca traders. All these industry participants are registered, licensed and monitored by the Fiber Industry Development Authority (FIDA). Philippine abaca is exported to major markets such as the United States, United Kingdom, Germany, Canada, Netherlands, France, Japan, India, Malaysia, China, Taiwan and others. Abaca production in Davao Oriental is currently sold to local traders in Davao City. Mindanao hosts the biggest pulping plant in the world, the Newtech Pulp Inc. located in Balo-i, Lanao del Norte with a rated capacity of 75 MT a day. Local production cannot fully supply all of this plant's raw materials and the company imports abaca fiber from Ecuador at an annual average of 400 MT.

7.1.2.10 Bamboo is highly valued for its wide applications in agriculture, construction, furniture and aquaculture. A Japanese firm is setting up a bamboo processing facility in North Cotabato to produce tiles, boards and other building materials. Already, the local business chamber is spearheading the production of planting materials to supply the plant's poles requirement. Bamboo is also preferred for propping poles in banana plantations and fish cages. Both activities are currently programmed for the BBC. Typhoon Pablo has demonstrated another need for bamboo in the BBC- wind breaks. Further studies should review the varieties and planting methods appropriate for this application.

7.2 Indicative markets

Short-duration food crops will mostly be for local consumption, especially initial harvests. As production volumes increase, these can be consolidated and traded to neighboring municipalities and regional urban centers. Large processors of cassava are expected to have their own post-harvest facilities in the area. For fruit trees, fresh produce are expected to be consumed locally, replacing in-shipments from Davao, Mati and Bislig. Investors in rubber, cacao and coffee will be interested to establish post-harvest facilities, even processing plants in BBC. Oil palm fresh fruit harvests will initially be processed in existing mills in Agusan. As the area planted reaches 3,500 hectares, processors will seriously consider setting up milling operations in BBC. The recent declaration to develop Davao Oriental as tourist destination opens vast opportunities for special coconut varieties. As for traditional varieties, the local copra market for processors within the Davao Region remains viable. Competitiveness can be maintained through increase in yield and improved post-harvest facilities. Specific markets and indicative buyers for each crop are discussed further in *Annexes D and E*.

Chapter 8

PROMOTING CROP DIVERSIFICATION AND MODERN FARMING PRACTICES

8.1 Information Dissemination for a Paradigm Shift

Typhoon Pablo has shed light on many new opportunities that are now bringing hope for better socio-economic conditions in the BBC for the following reasons:

1. The rich agro-climatic resources are still intact and provide a platform for crop diversification and integration for high yield, productivity and income.
2. The uprooting of damaged coconut trees facilitates crop diversification to include crops with higher potential income than coconut such as oil palm, banana, coffee, cacao and rubber.
3. In case a farmer decides to plant coconut, higher yielding varieties or hybrids should be recommended.
4. Crop diversification through intercropping could enhance land efficiency, productivity, income and food security when staple food crops such as corn, cassava, vegetables are integrated with coconut, oil palm, rubber and other tree crops.

Greater opportunities are open for BBC farmers to complement crop diversification with modern farming practices for much higher yield, productivity and income. Experiences in advanced agricultural countries and other regions of the Philippines shows that crop diversification coupled with the application of modern agricultural practices maximize the benefits of crops with high potential yields.

To apply modern agricultural practices, there is a need to prepare the mindset of farmers towards entrepreneurship development and technical skills training and in the long-term, possible facilitation for financial assistance. There is a need to correct and overcome serious misconceptions about agriculture that is prevailing among farmers and technicians in the BBC:

1. That fertilization and/or salt application of coconut trees will make the plant dependent on these inputs and the coco plants will no longer be productive than before once the input application is stopped. Plants require proper nutrition for higher crop yields and productivity. In most cases, the benefits of high yielding varieties or hybrids can only be maximized with adequate nutrition.
2. That oil palm and other commercial crops make the soil infertile in the long run. This is not true as application of adequate fertilization in oil palm and other

crops like corn and banana for decades did not reduce soil fertility. High rates of fertilization of cavendish banana in Davao del Sur of over 42 bags/ha per year made the soil fertile for the sustainable production of this crop. Adequate fertilization and irrigation of coconut hybrids in Brazil resulted in very high productivity of 400 nuts/year compared to only 60 nuts/year in the BBC.

Therefore, it is very important that farmers and local technicians in the BBC have the correct understanding of the growth behavior, nutritional and climatic requirements, and the practices needed for high productivity farming activities.

8.2 Scheme for Introducing the Alternative Crops for Diversification

Seeds of most vegetable crops, rice, corn and banana can be accessed through the DA's regular seed distribution program. It is important that local technicians gain access to these inputs and provide intensive training to farmers on proper farming practices for these crops. The succeeding discussions focus on four major long-duration crops proposed for the diversification program: Coconut, Oil Palm, Natural Rubber, and Cacao.

8.2.1 COCONUT

8.2.1.1 Coconut for copra

Information through its Regional Manager indicates that the Philippine Coconut Authority (PCA) shall make available to Davao Oriental 10,000 seed nuts within 2013. These are seed nuts of tall coconut for copra which becomes productive in seven years. No early maturing varieties or hybrids are available with PCA. Starting 2014 and onward, PCA has programmed 20,000 nuts for Davao Oriental, the bulk of which will be for BBC. The current program of PCA is no different from the program before Typhoon Pablo.



Fig. 30. Seedlings of coconut hybrid for distribution to small landholders in Malaysia.

The BBC LGUs should convince PCA that starting 2014, it should supply farmers with high yielding and early maturing varieties like the *Tacunan Green Dwarf* which matures in 3.5 years and produces yields of two to four times higher than the traditional variety (Fig. 29). PCA needs to revive the production and distribution of these hybrid seed nuts by reinstating hybrid seed nut production activities in its stations in Zamboanga City and Carmen, Cotabato.

The LGUs may also consider generating funds to purchase hybrid seed nuts to augment the limited supply of PCA. Hybrid seed nut production from private farms such as Hijo Plantation and Ayala seed farm may be contracted for this purpose.

8.2.1.2 Coconut for special purposes

It is suggested that each of the three municipalities endeavor to secure and establish a parent seed farm of coconut for special purposes. These include coconut for aromatic sweet juice with tender meat and for coconut sugar production. The tender meat sweet juice coconut is available at PCA in Zamboanga City and some farm private growers in Central Mindanao. The sweet juice coconut and the coconut for sugar production may be purchased from private nurseries. These will lay the foundation for the production of special coconut varieties that can cater to the expected high demand of tourists and health conscious individuals. Each municipality may begin with a seed nut garden of one hectare for each of three kinds of special coconut varieties.

8.2.1.3 Promoting high coconut yield and income

In addition to the planting of early maturing, high yielding coconut hybrid, two complimentary strategies should be promoted to attain high coconut yield. These are applications of salt and multi-nutrient fertilizer (MNF). In some discussion with technicians and farmers, there appears to be a misconception on the use of salt and MNF. Technicians and farmers believe that the application of these inputs will make the coconut dependent on their application so that when application of these inputs is stopped, the tree will no longer produce nuts. This misconception should be overcome through information dissemination, establishment of production demo in government land or farmers' model farm in strategic areas. Localized and annual field day should be carried out to view the demo. The PCA and or the LGUs should spearhead the demo. Farmers in the community and surrounding barangay should hold annual farmers' harvest festivals to view the positive effects of proper input application. Prizes and awards should be given to best performing adopters.

Strategies to allow farmers to readily access inputs like salt and MNF should be put in place by the LGUs. Local technicians also need to monitor whether these farmers are applying the correct and right amount of inputs.

Integration of other crops with coconut should be promoted through techno-training and techno-demo activities. These include intercropping of high value

crops such as cacao, coffee, cassava, banana, as well as cash crops like corn, cassava and vegetables.

8.2.2 OIL PALM

8.2.2.1 Adoption of the Central Mindanao LGU Model. The successful promotion of the cultivation of oil palm by LGUs in Central Mindanao may serve as model for the province of Davao Oriental, the BBC in particular, in promoting oil palm farming.

The LGUs in Central Mindanao which include many municipal governments and the provincial governments of Cotabato, Maguindanao and Sultan Kudarat successfully promoted the expansion of oil palm production among smallholders. The LGUs assisted small landholders to plant their idle lands or convert low income crops to oil palm through a plant-now-pay later program. This was part of the LGUs' strategy to help small farmers shift from traditional farming to high-value crop production.

Funds to purchase F1 hybrid oil palm seedlings were sourced from the LGU budget allocation, grants from DA and other government agencies including the Priority Development Assistance Fund (PDAF) of congressmen and others. Seedlings were purchased from accredited nursery operators who were also required to provide pre-planting training to farmers. Only farmers who underwent proper training and prepared his area for planting were given seedlings.

8.2.2.2 The Case of North Cotabato LGU Oil Palm Expansion. The province has been successfully conducting its oil palm seedling distribution program for eight years. In 2012 it budgeted P30 M to buy 140,000 OP seedlings and distributed these to small landholders who planted in over 1,000 ha. Other municipal LGUs replicated this approach and distributed seedlings to smallhold farmers covering a total area of 2,500 ha.

A Provincial Palm Oil Technical Working Group was organized to advise the provincial government on the technical aspects of oil palm farming. Incentives were also provided to successful farmers. The provincial LGU also facilitated marketing arrangements with existing palm oil mills in Sultan Kudarat and Maguindanao.

With the continuing expansion of production areas in the province, a local entrepreneur partnered with a Thai investor (Univanich Group) to put up a milling plant in Carmen town. The plant, which will be operational by next year, is

expected to provide hundreds of jobs and generate more economic activities in the province.

8.2.2.3 Readily available Market for Would-be Oil Palm Growers in BBC.

In a meeting with Mr. S.K. Tan, Chief Executive Officer of Filipinas Palm Oil Plantation (FPOP) in Rosario, Agusan del Sur, he expressed that the company welcomes prospects of buying and milling of FFBs from BBC in the next four to six years. Currently, Filipinas oil is replanting many old oil palm trees and in the process, the company's milling capacity is low allowing the buying and milling of FFBs from other sources such as the BBC. Agumil Plantation in nearby Trento town in Agusan del Sur will operate on wider capacity for the next ten years. Another Canadian group of investors is reportedly putting up an oil palm plantation and an oil mill in La Paz, Agusan del Sur. This may likewise be a potential market for prospective oil palm growers in the BBC.

8.2.3 NATURAL RUBBER

The excellent agro-climatic conditions of the BBC coupled with a focused strategy for high rubber yield and productivity can bring high income to farmers and create prosperous communities in the area. The successful strategies in Malaysia, Indonesia, Thailand and Vietnam in promoting highly-productive rubber production could serve as models that could be replicated in the BBC:

1. Procurement of quality high yielding planting materials – the hybrid-latex timber clones;
2. Training and dissemination for adoption of superior production management techniques – this include planting in properly drained fields, adequate weeding, pruning, correct tapping techniques, proper collection of latex and primary processing;
3. Training of farmers and technicians in crop integration particularly at the immature stage to provide the farmers with income during the immature stage and added income during the mature stage;
4. Training of tappers to ensure proper tapping for high latex yield and for long years of the productive life-span of the rubber trees.

8.2.3.1 Securing Good-Quality Planting Materials. It is recommended that procurement of quality planting materials of high yielding clones like PB 260, USM 1 and the Malaysian recommended clones (PB 350, RRIM 2025, RRIM 3001) be done in nurseries with scion groves of these clones.

8.2.3.2 Training of Would-be Nursery Operators. The LGU should source and allocate funds to train nursery operators who should be encouraged to put up rubber nurseries in the different communities of BBC. The training should give emphasis on the knowledge and skills in producing quality seedlings, budding and after care of budded plants.

8.2.3.3 Training of Farmers on Production Management and Latex Harvesting. The training should equip the farmers and tappers with applicable knowledge and skills in production management particularly latex harvesting or tapping and primary processing.

8.2.4 CACAO

The ideal site for cacao production is an area with well-drained soil. The soil and rainfall conditions in the BBC are favorable for cacao production. Most cacao growing areas are located in sites within 300 masl, although cacao production can be found in higher elevations.

Farmers should be trained on the proper management of the crop particularly on the aspects of adequate fertilization, pest and disease control. Proper post-harvest handling is also needed to produce good-quality beans which are required in the market.

8.3 Strategies for Accessing Good Quality Planting Materials

An important element to effectively promote any crop diversification effort is the introduction of good quality planting materials for the recommended alternative crops. The following table presents appropriate strategies to help ensure that good quality planting materials for each crop are successfully obtained for distribution to growers.

CROP	STRATEGIES
a. Coconut	<ul style="list-style-type: none"> - Procure seed nuts from Philippine Coconut Authority (PCA) - Contract private coconut seed nut farms to produce hybrid planting materials (e.g. Hijo and Ayala farms) - Put up BBC (LGU) coconut nurseries in strategic areas - Procure seed nuts of special coconut varieties and establish LGU seed nut farm in BBC - Link with private seed nut farms re: seed-nut production for BBC -

CROP	STRATEGIES
b. Oil Palm	<ul style="list-style-type: none"> - Buy from private/accredited commercial nurseries in Central Mindanao/or Agusan and distribute to farmers thru Plant Now Pay Later (PNPL) schemes - Encourage private nursery operators to establish satellite facilities at BBC for easier access to seedlings and technical support - Encourage private investors to carry out out-growership with technical support and buy back production
c. Rubber Coffee Cacao Fruit trees	<ul style="list-style-type: none"> - Buy from private accredited commercial nursery and distribute through PNPL schemes - Establish LGU (Municipal/Barangay) nurseries with corresponding budwood gardens nursery - Encourage private commercial nurseries to establish satellite nurseries in BBC.
d. Banana Pineapple Abaca	<ul style="list-style-type: none"> - Procure from private nurseries or existing plantations - Request FIDA to provide abaca planting materials - Establish LGU (Municipal/Barangay) nurseries
e. Short duration grains, root crops and vegetable	<ul style="list-style-type: none"> - Source out from DA, state universities and other government agencies - Establish of LGU nurseries for specific crops - Buy from and/or establish partnerships with private input suppliers

Chapter 9

CONCLUSIONS AND RECOMMENDATIONS:

As discussed in the previous sections of this study, Typhoon Pablo completely devastated BBC's agricultural production areas and cut off most of the areas' main source of livelihood - monocrop coconut farming. In the aftermath of the typhoon, the residents and LGUs of the BBC were confronted with two difficult challenges - (1) in the short term, the need to provide food and immediate income for early post-disaster recovery; (2) in the medium- to long-term, the need to rehabilitate damaged production areas and restore sources of income by introducing alternative crops. This paper examines various options to address these major challenges and recommends a holistic crop diversification approach that meets the immediate needs of affected growers and builds a platform for the long-term rehabilitation and development of the BBC's agricultural sector.

Given this crop diversification framework, the following important strategies are strongly recommended:

- (1) In the immediate term, crop diversification efforts should focus on introducing short-term food crops to address urgent food supply and income requirements. Rice, corn, cassava and vegetables are the easiest and most viable crops to plant. Provincial and municipal LGUs should, therefore, work closely with and maximize existing government, foreign donor and NGO initiatives to initiate production of these food crops to provide livelihood to affected growers.
- (2) To rehabilitate damaged coconut areas, LGUs are encouraged to work closely with the PCA to prioritize the distribution of high-yielding or hybrid seed nuts for coconut replanting. Since hybrid seed nuts are in limited quantities, the LGUs in partnership with the PCA, should explore innovative options to access more of these improved coconut varieties through tie-ups with private seed farms.
- (3) For remaining coconut trees, fertilization using salt and multi-nutrient fertilizer (MNF) and/or Mykovam should be promoted to growers. Intercropping existing coconut trees with short-term crops such as corn, vegetables or cassava as well as other commercial crops like cacao, coffee and banana should be introduced to provide growers with additional income.

- (4) Alternative commercial crops such as rubber, oil palm, *cardaba* banana, other fruit trees, abaca should be introduced to growers. To effectively introduce these alternative crops, access to good-quality planting materials should be made available to growers through the establishment of LGU nurseries or partnerships with private nursery operators or tissue-culture laboratories.
- (5) The provincial and municipal LGUs should undertake an extensive information dissemination campaign to promote these alternative crops to growers. This campaign includes conduct of technology transfer training, establishment of techno-demo sites in strategic areas, cross-visits by growers to other production sites and capability building of local technicians.
- (6) LGUs should also support existing and prospective private investors undertaking or planning major agribusiness projects in the BBC. Existing investors include the Kennemer Group and Puentespina Farms (cacao) and Dizon Farms (banana) while prospective investors include the Manuel Pangilinan-Indofood Group (oil palm). LGUs could assist these private investors in identifying potential production sites and prospective contract growers or suppliers.
- (7) The provincial and municipal LGUs should also formulate an integrated multi-year-crop development program building on Davao Oriental's Rapid Agriculture & Fishery Production Integrated Development (RAFPID) Framework as a long-term rehabilitation and diversification framework. This would entail soliciting funding commitments from national government agencies such as the Departments of Agriculture (DA) and Agrarian Reform (DAR) and possible funding and technical assistance from international donor agencies and NGOs.

The crop diversification program should also be presented to the private sector for possible support and to attract potential investments. For effective implementation, a full-time professional management team may have to be organized to undertake the various components of the program.

- (8) Other important recommendations include:
 - a. Completion of the Cateel-Compostela-Montevista national road (approx. 65 kms) and improvement of the peace and order situation along the route to provide faster transport access between the BBC and the Davao Region;

- b. Immediate repair of damaged bridges connecting BBC to Mati to facilitate normal transportation access within the province;
- c. Complete rehabilitation of the Cateel Irrigation System to support rice production and expansion;
- d. Rehabilitation of damaged farm support infrastructure such as farm to market road, small irrigation system, post-harvest facilities and trading centers and markets;
- e. Continuous clearing of debris, especially of damaged and fallen coconut trees to prepare land for agricultural production as well as provide materials for housing (re)construction;

Production of Cassava for Food and Industrial Uses

1.1. The Uses and Demand

This crop is grown for multiple uses - food, feeds and biofuel. Cassava (*kamoteng-kahoy* in Tagalog) is the third largest source of carbohydrates in the world next to wheat and rice. Among crop plants, the cassava plant provides the highest yield of food energy and is a staple food for more than one billion people in 105 countries. It is the staple food, preferred over rice by a number of tribes in Mindanao. Cassava root is very rich in starch and contains significant amounts of calcium, dietary fiber, iron, manganese, phosphorus, potassium, vitamin B6 and vitamin C.

A recent study conducted in the Philippine (one of the countries where cassava is an important crop) looked into the effect of root crops and legumes in lowering cholesterol levels among humans with moderately-raised cholesterol levels. The study showed that cassava significantly decreased low density lipoprotein (LDL) cholesterol (considered as "bad" cholesterol), and may help lower triglyceride levels due to its high total dietary fiber content. Other studies show that cassava may help support the nervous system and help alleviate stress, anxiety and irritable bowel syndrome.

Besides as food, cassava also has many benefits as a drug, such as for rheumatism, headache, fever, wounds, diarrhea, intestinal worms, dysentery, night blindness, *beri-beri*, and can also increase stamina. Overcoming arthritis can be done by eating the cassava or rub it on the pain area.

Cassava is included as the country's major crops under the Agri-Pinoy Corn Program and is also identified under the DA's Food Staple Sufficiency Program as an alternative for rice to minimize rice importation.

1.2. The Production Techniques

Cassava can be grown as a monocrop. It can, however, be intercropped with coconut, oil palm and rubber during the early stages of these tree crops. Moreover, cassava can be used as a nursery crop of cacao. The key to a productive cassava production is the selection of recommended varieties and using the recommended cultural management practices. Some of the activities in cassava farming are shown in Fig. 5 of the main report such as preparation of planting materials, planting, cultivation, harvesting, chipping, drying and storage.

1.3. Contract Farming

San Miguel Foods, Inc. (SMFI), through its Agribusiness Group, is partnering with growers of cassava to support their feed mill facilities nationwide. A contract grower can be an individual

entrepreneur, a corporation or farmers; cooperative that has the capacity to consolidate at least 20 hectares for cassava production. SMFI provides guaranteed market so long as all terms and conditions are mutually agreed by the parties.

Cassava shall play prominently in this strategy of growing crops to meet the immediate needs of the calamity victims. Cassava crops for human food mature as early as six months or just two months longer than rice and corn, but unlike rice and corn, supply from the cassava farms maybe programmed for availability the whole-year-round.

On many aspects it is easier to grow than either rice and corn, and can be successfully intercropped with other crops like coconut, rubber and oil palm. It can also provide more stable supply of food than rice and corn. Other positive aspects include the simple procedures for planting to harvesting and processing (Fig. 5) There are also varied preparations for human food as shown in Fig. 6.

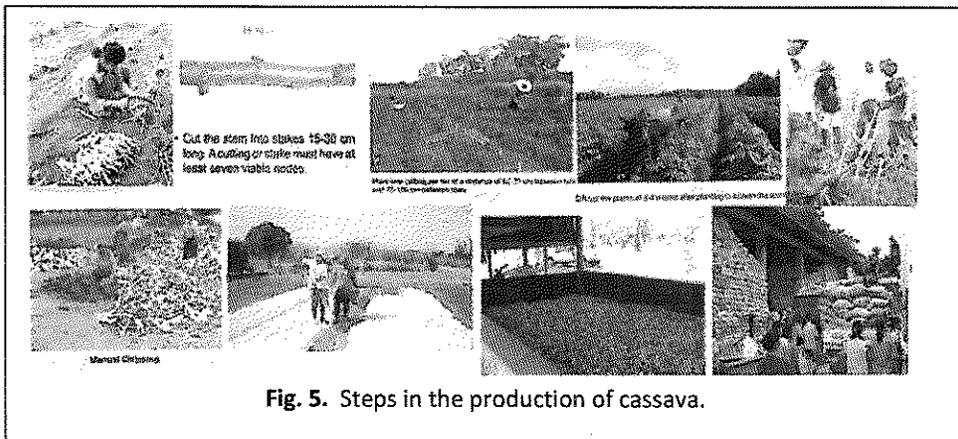
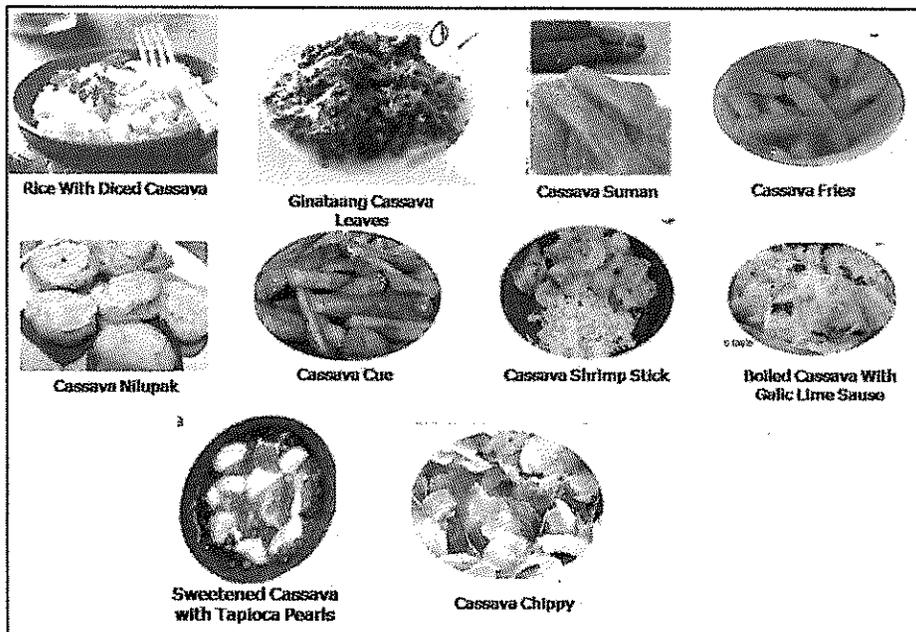


Fig. 5. Steps in the production of cassava.

Fig. 6. Various preparation of cassava as human food.



OTHER CROPS WITH HIGH INCOME POTENTIAL

Fruit trees like papaya, pineapple, durian, mangosteen, lanzones and rambutan, can provide potential high income as these are high demand in the markets. The features of these crops are as follows:

1. PAPAYA

Papaya (*Carica papaya* Linn.), originated from tropical America and is considered as one of the most important fruit crops in the Philippines because of its great economic potential. The fruit is cylindrically long, pear shaped or round; it is orange to orange-red, sweet and juicy when ripe. Unripe papaya makes for a good concoction of vegetable stew, salad or pickle. The fruit is rich in Vitamins A and C, iron, calcium, protein, carbohydrates and phosphorous. Papaya produces latex which contains papain – an enzyme that breaks protein. Papain has been commonly used for food, pharmaceutical and cosmetic industries. Papain is used for cleansing lotions, facial creams and toothpastes.

1.1. Varieties

There are different varieties of papaya recommended for commercial production - 'Solo', 'Cavite Special', 'Sinta', 'Red Lady' and 'Know-You No. 1'.

1.2. Adaptation

Papaya thrives best in areas with dry climate (25-30°C) with annual rainfall of 1,200 mm to 1,500 mm distributed throughout the year. It can be grown in areas of high rainfall like BBC provided there is good drainage. Normally, it is a crop for low to medium elevations (from sea level to 900 MASL) with humid to fairly humid conditions. It requires ample sunshine and protection from strong winds.

Papaya is adapted to a wide range of soils but it grows best in well-drained light textured soils with pH range from 5 – 6.5. Good drainage is important as water logging kills plants. Sticky and calcareous soils are not good as rain water, may accumulate in the soil even only for a few hours. In this case, raised beds and drainage ditch are recommended.

1.3. Cultural requirements

Papaya requires well-prepared soil; raised bed under high rainfall, fertilization, weed control and control of pests and diseases. The use of quality seeds and control of pests and diseases are keys to successful papaya cultivation.

1.4. Harvesting and post harvest management

Papaya generally starts to flower after five months from seedling and the first harvest is obtained 4 to 5 months later. When intended for vegetable, papaya can be harvested when fruit is at color break to $\frac{1}{4}$ ripe. For shipping to distant market the fruits should be harvested when the apical end starts turning yellow and the latex is no longer milky. Do not allow fruits to ripen on the plant and they should not be dropped to the ground to avoid possible injuries. Use step ladder or plumber helper with long bamboo pole to pick the fruits if the tree grows taller.

To harvest, twist the fruit until its stalk snaps off the plant or cut the stalk with sharp knife.

The productive lifespan of papaya gradually ends on the 3rd or 4th year. As the tree matures, production also slackens. The yield of well-managed papaya plantation is 35 to 40 tons per hectare.

1.5. Packing

A good method of packing is to place the fruits in single layer in a rectangular wood container lined with dried banana leaves or shredded newsprint to protect the fruit against the normal hazards of transport and handling.

1.6. Sorting

Ripe papayas may be stored at 8.3°C and partially ripe ones at 11.9°C. At these temperatures, the fruit can be kept for 3 weeks. To avoid chilling injury which is manifested by impaired ripening, do not store less mature fruit below 7.1°C.

2. PINEAPPLE

One of the most common fruits around the world with Southeast Asia dominating the world production. The Philippines is one of the leading pineapple producers. It has contributed from the world's pineapple production – 18,260.95 MT from a production area of 90,000 ha. It is also the top exporter of juice concentrate and pineapple juice. The main area of production includes the SOCKSARGEN, North Mindanao and Calabarzon.

2.1. Varieties

Commercial varieties that can be found in the market are Smooth Cayenne or Hawaiian, Queen or African Queen or Formosa, Native Philippine Red or Red Spanish, and Cabezona.

2.2. Adaptation

Pineapple grows from the planting materials (crown or stem shoots) supplied by the plant itself. It grows over a wide range of soils and climatic conditions but grows best in areas with 24-30°C temperature. The best soil for planting pineapple is sandy loam with high organic content and 4.5 – 5.5 pH range.

2.3. Cultural requirements

Pineapple requires good drainage in the area since it does not like too much water. Fertilizer should be applied when planting and every 2 to 3 months thereafter. Flower induction is a very important operation in pineapple production since it allows the programming in volume and time of harvest. The flower inducer must be applied during the evening time when temperature reaches 25 to 27°C, and stomata are open. Weeds are critical and must be eliminated as often as possible through herbicides – the usual weed control.

2.4. Uses of pineapple

Pineapples are primarily use for human consumption. It can be consumed as fresh fruits, beverage, and as desserts like candies and other processed products. Pineapples are also used in clothing industries as fiber source. It has fine fibers and flexible sheets of paper. The bromelin, which can be extracted from the stems are used for medicinal purposes and meat tenderizer. Also, the by-product can be used as food for livestock.

3. DURIAN

The durian (*Duriozibethinus Murray*), a native of the rainforests of Malaysia and Indonesia, is a tall tree reaching as high as 40m in the jungle rainforest or in semi-orchard. Seed trees may take 8-10 years to fruit. Grafted durian grows to 15 - 20m tall and fruits in 5 to 6 years. The fruit is green to brown in color, pendulous, round to oblong in shape and is completely covered with strong sharp thorns. It is a capsule which splits into five parts when ripe and each segment contains brown seeds covered with thick, firm, creamy, yellow pulp with a strong and very distinctive aroma. Apart from being consumed fresh it can be processed into jams, pastillas, blends/flavorings for ice creams, cakes, rolls and tarts and is being processed into chips. The edible parts of the fruit is also frozen or chilled and packed into polystyrene trays.

3.1. Variety

There are many kinds of durian varieties available in the country – Chanee, Monthong, Kradumtong from Thailand; MDUR 88, D24 and D197 from Malaysia. These varieties are highly suitable in the Philippines, Mindanao in particular.

3.2. Adaptation

Durian requires a moist environment with an even distribution of rainfall. It thrives best on deep, well-drained sandy loam or clay loam soils rich in organic matter and with pH of 5.6 to 6.5. Since it could not tolerate low temperatures it is restricted to areas below 800 masl.

3.3. Cultural requirements

The durian trees grows rapidly by providing adequate fertilization, sufficient irrigation and drainage system, effective control of pests and diseases, pollination, flower and fruit thinning, propping of fruits and timely harvesting. It can also be intercropped with *lakatan* banana to provide income to farmers for the first 2 to 3 years while waiting for durian to mature.

3.4. Harvesting and post-harvest management

The maturity of the fruits suitable for harvesting is determined by a combination of indices. These include number of days from flowering, the stiffness of the durian fruit stem and spines, and the hollow sound produced when tapped. Fruits of 85% maturity and above are harvested within the day of packaging. Percent fruit maturity is usually a function of time from harvesting to ripening. Harvested fruits are not allowed to touch the ground which may result to disease infection. A pair of worker carries the operation: one climbs the tree looking for mature fruits and the other one catches the fruits using a jute sack. The fruits are placed in baskets made of bamboo or plastic.

3.5. Sorting

This is done by separating the immature, damaged, overripe and those containing defects or deformed like those with less than 3.5 lobes which are not well shaped. Fruits with damage spines are also separated.

3.6. Transporting to packing house

Selected fruits are usually loaded in a vehicle using jute sacks to separate various layers of fruits before transporting to packing house for tagging, fungicide treatment, drying and cleaning, and weighing before the fruits are brought to the market.

4. MANGOSTEEN

Mangosteen (*Garcinia mangostana* Linn.), dubbed as "queen of tropical fruits" has great demand both in the domestic and export markets. It is well-liked both as fresh and processed products in the forms of canned, jams, pastillas, candies, etc. Mangosteen is a medium-sized tree, growing to a maximum height of 8 to 10 meters tall. It is an environment-friendly fruit because it requires less pesticide for high productivity. One problem of mangosteen cultivation is its slow growth and the long period of field immaturity. However, some cultural management techniques are now available to accelerate the growth and shorten the immature period of mangosteen. Many

farmers have found that when mangosteen is provided with adequate irrigation and nutrition, fruiting comes in 4 to 5 years after field planting, under the assumption that large planting materials of 5 to 7 ft tall are used at field planting.

4.1. Adaptation

Mangosteen grows in a wide variety of soil types provided that water is available. It grows best in slightly heavy to light, deep, and moist but well-drained soil that is slightly acidic and is rich in organic matter. Sandy soil with moderate fertility can also be used when provided with adequate organic fertilizer and irrigation water. It also thrives well in places with warm and humid climate at elevation of up to 1000 MASL.

4.2. Cultural requirements

The planting of large planting materials (LPM) with a height of 100 to 150 cm (or 2 to 3 years old plants) is ideal for field establishment. A good drainage system is very important and should be constructed prior to planting. Removal of burn and dead stumps of wood is recommended to avoid root rot disease that may infect mangosteen upon establishment. A good fertilization program consisting of inorganic and organic fertilizers is important during the immature and mature stage. Fertilization with good drainage promotes faster growth of the tree during immature stage. Application of appropriate amount and timing of fertilizer after harvest and fruit setting would result to high yield.

4.3. Intercropping system

Mangosteen may be planted as intercrop under tall coconut trees and other fruit crops where and when space is available. As observed in the Philippines coconut has little or no adverse effect on the productivity of mangosteen. Mangosteen trees benefit from the partial shade provided by coconuts during its immature stage. Intercropping mangosteen under tall coconut trees offers tremendous potential for increasing the low income of coconut farmers.

4.4. Induction of flowering and fruiting

Mangosteen can be induced to flower during off-season depending on the plant vigor and climate. Proper pruning, adequate nutrition and irrigation are needed to keep the trees vigorous, and regularly produce new flushes of leaves. It is in these flushes that flower will appear when there is a dry period of 3 or more weeks followed by heavy rain or application of water through surface irrigation.

4.5. Harvesting and postharvest management

With proper care and management, mangosteen bears fruit in five to six years after field planting. Trees established using LPM reach fruit bearing stage in four years. The time of fruiting in a year may vary from place to place. In the Philippines the main season is from July to

September. There are 2 to 3 harvestings that may occur in a year. Mindanao mangosteen has been observed to bear fruits twice a year, one heavy fruiting during the main season and light fruiting during the off season. Maturity of fruits within the season can spread over a period of 6 to 12 weeks.

There is a color harvesting index developed by Malaysia for mangosteen. Harvesting is done by priming every 2 to 3 days. Fruits which have turned purplish violet or approximately 113-119 days from flower set are harvested. The fruits are handpicked to avoid falling to the ground which can damage the pericarp. Impact damage due to dropping of fruits can drastically reduce quality.

4.6. Sorting

Newly harvested fruits vary in size, shape, extent of blemishes, insect damage and decay. Thus, fruits have to be sorted to remove those with poor quality as buyers demand high quality fresh fruits in return for the high prices they pay for it. Irregularly shaped fruits damaged by insects and those exhibiting even minor symptoms of decay should be removed.

4.7. Packaging and storing

After sorting, the fruits may be carefully placed in well-ventilated room or packed in wooden boxes of 20 to 25 kg capacity. When stored at room temperature of 25 to 35°C, the fruits have a shelf life of 5 to 7 days. At low temperature storage of 13°C, the fruits may remain fresh for two weeks. Moreover, the fruits may be kept for four weeks at 13°C by coating or waxing the whole fruit.

5. LANZONES

Lanzones (*Lansium domesticum* Corr.), is grown throughout the entire Southeast Asian region, ranging from Southern India to the Philippines. It is a seasonal crop so it produces fruits only in late September through early November. The tree is erect, short-trunked, slender or spreading; reaching 35 to 50 ft (10.5 to 15 m) in height, with red-brown or yellow-brown, furrowed bark.

Lanzones fruits are ovoid, roundish orbs around five centimeters in diameter, usually found in clusters of two to thirty fruits along the branches and trunk. Each round fruit is covered by yellowish, thick, leathery skin. The flesh is slightly acidic in taste, although ripe specimens are sweeter. The sweet juicy flesh contains sucrose, fructose, and glucose. They are usually eaten fresh, but may be canned in syrup. Seedless sections can be dried like raisins, which are done in the Philippines. Lanzones is rich in carbohydrate, calcium, phosphorous, thiamine, riboflavin, niacin and vitamin C.

5.1. Variety

There are few varieties of lanzones grown in the Philippines like Paete, Jolo, and Camiguin. Recently, new varieties were introduced in the market – the sweet and aromatic Longkong and Duku.

5.2. Adaptation

Lanzones thrives best in lowland tropical climate from sea level up to 600 MASL. Over 600 MASL was observed to prolong the juvenile period of the tree and tends to produce bigger and more seeds than those in the low elevation. It requires an annual rainfall of 2,000 to 4,000 mm/year with a dry period of at least 2 months. The crop requires partial shading even at maturity at low elevations.

5.3. Cultural requirements

Lanzones is best established by using large-sized planting materials of 1 to 1.5 m tall taken from a reliable nursery. A package of technology for the production of lanzones is available – fertilization, pruning, irrigation and drainage system, control of pests and diseases, harvesting and post harvest management, sorting, and packaging. Lanzones is very responsive to fertilization. Adequate inorganic, organic and foliar fertilizer is needed during immature and fruiting stage. The size of the fruits and total yield is much dependent on the available moisture in the soil. Irrigation is needed during the fruiting season to increase yield and promote production of large-sized quality fruits.

For off-season production, irrigation is needed to saturate the trees with water after a dry period of 3 weeks.

5.4. Harvesting and postharvest management

With proper cultural management, lanzones starts to bear fruits in five to seven years after planting. It is recommended that during the first year of fruiting only 5 kg of fruits/tree should be allowed to develop. The fruiting rate may be regulated up from 15 to 135 kg/tree for a six to 12-year old tree. Harvesting is done when 90% or more of the fruits in the cluster reach maturity. The fruits are fully ripe when they turn from brown to yellow. Harvesting is done in the afternoon with the use of a knife when the flow of latex is minimal.

Uneven maturity among fruits in the same bunch is a problem for duku. Duku fruits may be harvested when more than 75% of the fruits in the bunch reach maturity. It is recommended that duku fruits be harvested individually to maintain high quality

5.5 Sorting

Sorting is done in the afternoon until evening to be ready for market the next morning. Fruits are never harvested and packed wet as they may predispose the fruits to discoloration.

5.6. Packing

Newly harvested fruits are packed in containers of 20 to 80 kg capacity to prevent bruising. Different packing materials are being used in various places. These include weaved coconut leaves, wooden crate, well-ventilated basket and plastic crate.

6. RAMBUTAN

Rambutan is a popular garden fruit tree and propagated commercially in small orchards. It is one of the bests known fruits of Southeast Asia and is also widely cultivated elsewhere in the tropics. The fruit are usually sold fresh, used in making jams and jellies, or canned. Evergreen rambutan trees with their abundant colored fruit make beautiful landscape specimens.

The fruit is a round to oval drupe 3–6 cm (rarely to 8 cm) tall and 3-4 cm broad, borne in a loose pendant cluster of 10-20 together. The leathery skin is reddish (rarely orange or yellow), and covered with fleshy pliable spines, hence the name rambutan, derived from the Malay word *rambut* which means hairs. The fruit flesh is translucent, whitish or very pale pink, with a sweet, mildly acidic flavor.

1.1. Variety

Plant only grafted rambutan from a superior variety. Among the superior varieties are from Thailand (Rongrein and gulahbato), Malaysia (R162 and R5), Singapore (Jitlee), Super Red, Malaysian Jade, Sakay Selection and some others. R5 is particularly superior in a number of ways. It was the first prize winner in the 1996 Fruit Search competition. It produces big fruits that are intense red, hence attractive to customers. The white flesh is thick, sweet, smooth in texture and separates readily from its seed.

1.2. Adaptation

Rambutan grows best in deep, well-drained sandy loam or clay loam soils with high organic matter. The soil pH preferably ranges from 4.5 to 6.5. It favors hot regions with temperature of 22°C to 30°C with rainfall evenly distributed throughout the year. It grows well at an altitude of up to 500 meters.

1.3. Cultural requirements

Provide shade to the newly planted rambutan seedlings for a period of two weeks to a few months depending on weather condition to enable the plant to recover from transplanting shock and to shade it from strong sunlight. Apply basally, 60 grams (6 tbsp) of complete fertilizer (14-14-14) or based on soil analysis and cover with thin layer of soil. The rate of application increases as the tree grows bigger. Ring weed quarterly or as the need arise.

1.4. Harvesting and postharvest management

Harvest rambutan fruits when skin is pinkish red. Rambutan fruits do not ripen at the same time even within a bunch and this necessitates harvesting by priming.

Harvesting is done using secateurs or a long pole with a hook on one end. Avoid making damage to the branches while harvesting as these are the sources of scion.

Harvesting schedules in a moderately-sized orchard (200-300 trees) are three times a week during the height of the season.

1.5. Storing and packaging

The fruits should be kept under shade. Fruits are graded based on size and degree of ripeness. Then they are washed and dried before packing. Fruits of good quality are selected and packed by placing them in a ventilated box or case of 60 cm x 28 cm x 28cm.

ANNEX C**Coconut Products and Potential Markets in the BBC**

Coconut tree part	Farm Level Products	End Products	BBC Market
Mature fresh nuts	Copra	Oil, bio-fuel, Agri-aqua feeds ingredient	Traders & processors, for domestic and export
	Cleaned nuts	Coconut cream, milk	Traders & processors, for domestic and export
		Desiccated meat	Traders & processors, for domestic and export
		Coconut water	Traders & processors, for domestic and export
	Husk	Fiber, peat for geo-textiles, soil conditioner, planting medium	Nursery operators, Processors, for domestic and export
	Shell, charcoal	Activated carbon Fashion & handicrafts	Processors, for domestic and export
Mature young nuts	Fresh buko	Fresh buko, Buko juice, dessert ingredients	Local, regional, export
Inflorescence	Sap	Toddy, vinegar, sugar	Processors, for domestic and export
Midribs	Brooms, handicrafts	Brooms, handicrafts	Domestic market
Trunk of senile and fallen trees	Lumber	Lumber, furniture	Construction and processors

Indicative Markets for Short and Long Duration Crops in the BBC**Indicative markets****SHORT-DURATION CROPS**

Crops	Products	Target Market
Vegetables - lowland	Fresh produce	For local markets, surplus for adjacent municipalities, Bislig, and Mati
Vegetables - high elevation & higher value	Fresh produce	Initially for local markets. With production scheduling and market development, could supplant suppliers from Davao City and Maragusan.
Niche vegetables - Ampalaya (bitter gourd) - Malungay	- Dried chips - Dried leaves	Nutraceuticals, herbal products
Rice		For local consumption initially, partly to replace supplies from relief agencies. As surplus is attained, this may be marketed to neighboring municipalities and cities.
Corn		Initial production for local consumption as supplement for rice. Excess production of yellow variety will be for feed millers. Special sweet and gelatinous variety could be shipped out to urban areas in the region.
Citronella	Essential oil	Manufacturers of soaps and detergents, insect repellents
Root crops - cassava	Food Dried chips	Local markets Feeds processors; distilleries

LONG-DURATION CROPS

Crops	Product	Target Market
Coconut - mature whole nuts	<ul style="list-style-type: none"> - Copra - Fiber - Peat - Charcoal - Whole nuts, dehusked 	<ul style="list-style-type: none"> - Consolidators, Oil mills - Geo-textile processors, Horticulture suppliers - Horticulture suppliers - Makers of activated carbon - Processors of desiccated coconut and nut water - Processors coconut cream / milk
Coconut - young nuts	<ul style="list-style-type: none"> - Whole nuts 	<ul style="list-style-type: none"> - Fresh produce exporters, Beverage processors, food manufacturers - Tourist destinations
Coconut standing crops	Sap from inflorescence	Makers of coco sugar and beverages
Oil Palm	<ul style="list-style-type: none"> - Fresh fruit bunch - Crude Palm Oil - Palm kernel Oil 	<ul style="list-style-type: none"> - Oil mills - Oil refineries - Oil refineries
Rubber	<ul style="list-style-type: none"> - Latex - Cup lumps, coagulum - Dried sheets - Timber from old trees 	<ul style="list-style-type: none"> - Village level primary processors; manufacturers - Consolidators, crumb rubber producers - Consolidators, exporters, processors - Wood processors

ANNEX E**List of indicative buyers**

Products	Consolidators	Processors	Exporters
Fresh Vegetables (sweet pepper, carrots)	- Dynamic Vegetable Growers Association (Tagum) - Limbahan Farmers Cooperative (Lupon) - Maharlika Farmers Cooperative (Digos) - Marahan Farmers Association (Davao City) - Vegetable Industry Council of Southern Mindanao (VICSMIN), Inc. - Vicsmin Davao Oriental Chapter (Mati)	Century Canning	
Dried Ampalaya		Herbcare	Herbcare
Citronella Oil		- Unilever - Alabaster Miracle Oil	- Manila Herbal and Essential Products Co. Inc. - Alabaster Miracle Oil - DokAlternatibo
Cassava		San Miguel Foods, Inc.	
Fresh Bananas, pineapple			Unifrutti Services, Inc.; Lapanday Fruits; Nader & Ebrahim s/o Hassan Phils., Inc.; Stanfilco, a division of Dole Phil; Marsman Agrarian Reform Beneficiaries Coop
Muscovado sugar	Sultan Kudarat	Sultan Kudarat	Alter Trade Group,

	Muscovado Farmers and Millers Corp.	Muscovado Farmers and Millers Corp.	Inc.
Bananas - organically grown			Alter Trade Group, Inc.
Banana Flour	Dynasty Banana Flour Trading	Wood Processors	
First Fried Banana chips	Ruben See		- Ruben See - Prime Xynergies Food Corporation
Dried Cacao beans	Puentespina Farms; Kennemer Foods Inc.	Puentespina Farms; Kennemer Foods, Inc.	Puentespina Farms; Kennemer Foods, Inc.
Coconuts- mature, whole	Ayala Agri. Venture	Franklin Baker Company Phils.	
Coconuts - copra	Legaspi Oil; Cargill Philippines; International Copra Export Corp.	Legaspi Oil; Cargill Philippines; International Copra Export Corp.	Legaspi Oil; Cargill Philippines; International Copra Export Corp.
Coco coir and peat	Growrite Substrates Philippines, Inc.	Growrite Substrates Philippines, Inc.	- Mati Peat Top Corp. -KAKOFINCO/COCO Fiber Industry - Oz Wisphill Trading Corporation
Coco sugar	Alter Trade Group		- Alter Trade Group - John Paul Coco Sugar
Rubber		- Bukidnon: Valencia Rubbertex, Inc. - Cotabato-based buyers: Standeco, Sto. Nino, Pioneer, Davco, Mori, Farma, MJ/San Nicolas	- Yokohama Tires Company, Inc. (in Clark SEZ) - Valencia Rubbertex, Inc. (rubber boots to Japan)
Abaca pulp		Newtech Pulp Incorporated located in Balo-i, Lanao del Norte,	Newtech Pulp Incorporated located in Balo-i, Lanao del Norte,



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USAID's Growth with Equity in Mindanao Program

High-Value Aquaculture (HVA) Industry Development Plan DAVAO ORIENTAL 2013-2020

Prepared By:

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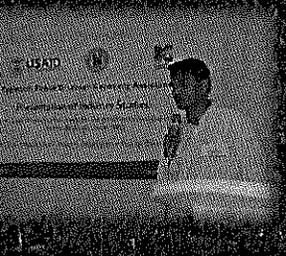
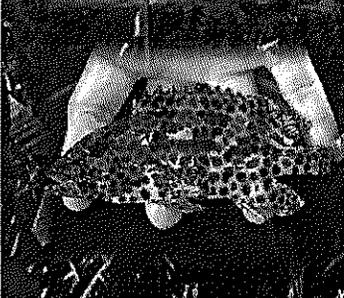
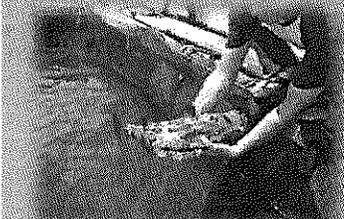
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Submitted to:

**United States Agency for International Development
(USAID)/ Philippines**
Office of Economic Development and Governance
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Davao Oriental
2013-2020**

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Growth with Equity in Mindanao Program
August 2013

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**High-Value Aquaculture (HVA) Industry Development Plan
Davao Oriental, 2013-2020**

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Executive Summary

This High-Value Aquaculture (HVA) Industry Development Plan is provided by the United States Agency for International Development (USAID) to the province of Davao Oriental as part of a larger disaster recovery assistance project implemented in areas most severely affected by Typhoon Bopha (Pablo).

As a comprehensive guide for the development of an HVA industry, this compendium will be a vital tool for the provincial and municipal governments to guide planning exercises, industry policy formulation, and discussions with shareholders, agencies, banks, and investors.

It may also serve as a valuable resource for existing and potential growers and aquaculturists as it contains a wealth of technical information on the actual production of target species in the various aspects of HVA production. All the fundamental elements required to "start the business" – from seedstock sourcing, grow-out procedures, up to harvest and marketing – are detailed in this compendium.

While this plan seeks to help accelerate the restoration of livelihood and the re-development of the coastal and fisheries sector, it also aims to strengthen the climate change resilience of communities. To this end, this document defines a way forward through an alternative and more lucrative non-traditional economic activity that employs sustainable and climate-adaptive techniques. Introducing this technology to marginalized fisherfolk may also help augment their income and thus address poverty in coastal areas.

The plan initially provides a brief evaluation of Davao Oriental's marine and coastal resources, as well as existing fisheries and aquaculture production, and concludes that high-value aquaculture is feasible in the province. It then gives a comprehensive description of high-value aquaculture and its target commodity for promotion, namely, marine grouper, which is shown to be a highly valued commodity that can bring better returns to growers compared to traditional aquaculture commodities, like milkfish and tilapia.

The industry plan for Davao Oriental is divided into three phases: short-term (1 year); medium-term (2-3 years); and long-term (5-6 years).

In each phase, specific activities are proposed, starting with development of grow-out capabilities in the first year, in which the provincial government is responsible for promoting this new industry among local growers. It may, however, take off from initial activities implemented by USAID in introducing grouper farming among select fisherfolk associations.

After its initial year of production, these plans forecasts intensification and expansion of grow-out capabilities and, consequently, yield in its medium-term phase. Simultaneously, this phase shall lay the foundation for a "full-cycle" industry through the development of nursery capabilities and set the groundwork for the eventual establishment of a hatchery.

The third phase is envisioned to have a private sector-driven business environment for high-value aquaculture, particularly in exponentially increasing grow-out capability and evolution of ancillary industries, including tourism-related enterprises that will capitalize on a flourishing aquaculture business. This stage also includes hatchery development as a major investment to be undertaken by the province.

In each phase of the overall plan, financial analyses are provided, including investment requirements and profitability estimates, as well as specific activities and implementing mechanisms (see Table below).

Summary of Major Activities, Investment Requirements, and Revenue in HVA Industry Plan.

Phase	Duration (years)	Major Activities	Investment Requirements (Php)	Projected Revenue (Php)
Short-term	1	1) Establishment of 10 4-compartment grouper cage modules	3.17 Million	3.27 Million
		2) Est. Fish Consolidation Station		
		3) Est. Live fish transport system		
Medium-term	2-3	1) Est. 10 8-compartment grouper modules	6.28 Million	6.33 Million
		2) Est. Grouper Nursery		
		3) Initiate Broodstock Collection and Development		
		4) Initiate an Applied Research Program		
		5) HVA Training Programs and Est. Aquaculture Courses		
Long-term	5-6	1) Legislation, est. of mariculture zones/parks 10 municipalities	3.02 Million	
		2) Est. and operation of at least 460 fish grow-out cage modules		
		3) Est. grouper hatchery		
		4) Est. ancillary businesses – private sector-led		

Executive Summary

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		2) Est. Fish Consolidation Station		
		3) Est. Live fish transport system		
Medium-term	2-3	1) Est. 10 8-compartment grouper modules	6.28 Million	6.33 Million
		2) Est. Grouper Nursery		
		3) Initiate Broodstock Collection and Development		
		4) Initiate an Applied Research Program		
		5) HVA Training Programs and Est. Aquaculture Courses		
Long-term	5-6	1) Legislation, est. of mariculture zones/parks 10 municipalities	3.02 Million	
		2) Est. and operation of at least 460 fish grow-out cage modules		
		3) Est. grouper hatchery		
		4) Est. ancillary businesses – private sector-led		

I. Introduction

The following document is a business plan for the development of the High-Value Aquaculture (HVA) Industry in Davao Oriental and neighboring provinces. It was prepared with technical assistance from the United States Agency of International Development's (USAID) Growth with Equity in Mindanao (GEM) Program and has been submitted to the provincial government of Davao Oriental.

Essentially a roadmap, this may be used by the provincial government as a guide for the development of its HVA Industry; in identifying specific projects or related business prospects for further research; and providing a logical framework to pursue business strategies over the succeeding years. It may also serve as a basis for discussion with third parties, such as shareholders, agencies, banks, and investors.

This presents a comprehensive guide for existing and potential growers and aquaculturists as it contains technical information on the actual production of target species, sources of production inputs and materials, market information and market linkages, financial analyses, and other basic practical information essential to the operation of an aquaculture business enterprise. It is important to note that due to the limitations set by the nature of this plan, it focuses on the more basic aspects of HVA production.

This compendium contains information on all the fundamental elements needed to "start the business" and provides a map for further development.

To maximize its potential usefulness to different sectors and at varying levels, this plan may be distributed and circulated within municipal and barangay levels (if appropriate). Policy makers and executives in local government will find it as useful in development planning, as will business entities interested in investing in HVA, and fisherfolk communities and individuals seeking to engage in more lucrative and non-traditional livelihood.

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II. Background and Rationale

The American people, through the **United States Agency for International Development (USAID)**, have provided economic and humanitarian assistance worldwide for over 50 years. In the Philippines, USAID works in partnership with the national government in creating a more stable, prosperous and well-governed country through programs that foster sustainable and inclusive growth, strengthen governance and combat corruption, improve access to water, energy, health and education services, increase environmental resilience and natural resource management capabilities.

Over the past five years, the U.S. Government has provided a total of US\$ 51.6 million for disaster response activities, including assistance in improving mechanisms to effectively adapt and respond to natural disasters.



Cateel, Davao Oriental in the aftermath of Typhoon Pablo, December 30, 2012

On December 4, 2012, **Typhoon Bopha (Pablo)** made landfall in the southern Philippines island of Mindanao, bringing heavy rains and sustained winds of up to 175 kph, as well as flooding and landslides to areas along its path. The storm moved west-northwestward across the country, primarily affecting Compostela Valley, Davao Oriental, and Negros Oriental provinces. The U.S. Government has provided a total of P683,844,658 (US\$16.7 million) to support emergency assistance to individuals affected by Typhoon Pablo. This funding is helping to address the humanitarian needs

of affected populations, and includes support for emergency shelter, logistics, and water, sanitation, and hygiene activities, as well as the provision of emergency relief commodities and rice.¹

In January 2013, USAID, through GEM, conducted a rapid evaluation of Typhoon Pablo's impact on affected provinces, including damage to agriculture and fisheries. During the course of the evaluation, Davao Oriental Provincial Governor Corazon Malanyaon requested the evaluation team to identify potential alternative industries in agriculture and fisheries that could be promoted in the province. For the fisheries sector, she particularly cited the high poverty incidence among coastal and fishing communities. She underscored that even prior to the onslaught of the typhoon, local research showed that poverty incidence in the province was highest among municipal fisherfolk. Thus, among the LGU's priorities is to address poverty in the municipal fisheries sub-sector by providing alternative economic opportunities that would either supplement incomes from the seasonal nature of fishing or redirect them towards more economically sustainable livelihood.²

Marine and coastal resources play very significant roles in the residents' livelihood and survival. A survey conducted by the United Nations - World Food Program in the affected provinces of Davao Oriental and Compostela Valley (March 2013) revealed that fishing accounted for roughly 17% of the people's source of livelihood. About a quarter of survey respondents said that their production system is based on the sea. This practice is most prevalent in the Boston-Cateel-Baganga area (40.8%), 16% mentioned that their fish production is largely dependent on ponds. This is can be found least in the Boston-Cateel-Baganga area (8.5 percent).

This industry plan was among the recommendations of the USAID-GEM rapid assessment report, based on findings and consultations, and as a direct result of the provincial government's request. Subsequently, a technical assistance package to complete this industry plan was provided by USAID through the Typhoon Pablo recovery assistance project being implemented by GEM, which also involves livelihood restoration activities in support of the coastal and fisheries sector. Drawing from its long and successful experience in Mindanao, particularly, in Western Mindanao and the Sulu Archipelago, USAID-GEM's technical assistance on aquaculture has HVA development at its core, which will not only provide for the economic rehabilitation and recovery from the onslaught of Typhoon Pablo, but will also offer the alternative non-traditional and more lucrative industry being sought by the local leadership.

¹ <http://philippines.usaid.gov/programs/humanitarian-assistance>

² The Louis Berger Group, Inc. Rapid Assessment for Typhoon Pablo Recovery Assistance.

III. Davao Oriental's Battle Cry: Build Back Better!

USAID-GEM's technical assistance on HVA development is consistent with the provincial government's rehabilitation framework, "Building Back Better" or *BBB*, as it transitions its relief and recovery efforts into reconstruction and development.

Under Governor Corazon N. Malanyaon's leadership, relief operations and international donor assistance are seamlessly transitioned to development and reconstruction efforts through the province's **Way Forward Plan**, covering three stages of commitment that promise to address the short- and long-term needs of typhoon survivors.

The plan also integrates all sectors of development, consisting of agriculture, economic and industry, health, education, and environment, among many others, as well as the moral and value recovery of the people. The concept of "Building Back Better" likewise takes climate change into consideration and incorporates it to medium and long-term plans.

"The Building Back Better phase is perhaps is the most difficult stage, but certainly the most challenging one."

"We have chosen this as our buzzword to describe our dream of making the three hardest hit towns better than what it had been before, where beauty is restored and enhanced, hearts are transformed and lives are improved."

*Hon. Corazon N. Malanyaon
Governor, Davao Oriental*



Gov. Malanyaon with Gawad Kalinga volunteers and residents of Cateel (Photo by Lester Berganio)
Source: CNN, <http://ireport.cnn.com/docs/DOC-948438>

Since the inception of the GEM-3 Program in January 2008, the Agribusiness component of GEM has achieved the following:

▣ Provided marketing assistance to Mindanao food suppliers that has increased annual international exports and domestic out-shipments of selected commodities by \$58 million, with an additional \$93 million under negotiation.

▣ Helped increase weekly domestic out-shipment of vegetables to Luzon and Visayan markets by 113 MT (126%), and weekly deliveries of selected fruits by 423 MT (41%).

▣ Helping 7,550 former MNLF combatants in 150 communities in the Sulu Archipelago and Central Mindanao double their incomes by growing high-value agricultural and aquaculture products.

▣ Provided 44 pre- and post-harvest equipment/facilities benefitting 3,500 families of predominately former MNLF communities and operational training to 750 members, and has initiated work on an additional 6 facilities.

▣ Catalyzed and assisted the establishment of a private-operated multi species fish hatchery in Tawi-Tawi that has created employment for more than 1,200 small out-growers.

▣ Assisted 10 companies prepare for, and receive HACCP certification, access new markets, and achieve a combined total of \$8.5 million in new sales within the first twenty-one months following certification.

▣ Organized 350 events, workshops and training activities attended by a total of nearly 20,000 persons.

www.mindanao.org

USAID's GEM Program

The Growth with Equity in Mindanao (GEM) Program is one of USAID's longest and most successful programs in the Philippines. It has two related principal objectives: 1) accelerate economic growth in Mindanao and help assure that as many people as possible participate in and benefit from the growth; and, 2) help bring about and consolidate peace in Mindanao.

Since 2005, through its Targeted Commodity Expansion Project (TCEP) and Sustainable Aquaculture and Fisheries Effort (SAFE), USAID-GEM has effectively promoted and developed High-Value Aquaculture as a means to accomplish specific objectives, such as increasing rural incomes and tripling international exports and domestic out-shipments (volume and value) of targeted commodities, including grouper. TCEP also enabled former MNLF combatant communities with pre- and post-harvest facilities and training needed to achieve more profitable farming or fishing.³

IV. Objectives

This document has been prepared to provide the provincial government of Davao Oriental with a plan for the development of its High-Value Aquaculture (HVA). Specifically, it aims to:

1. provide a logical framework within which the government and/or business can develop and pursue business strategies in HVA;
2. serve as a basis for discussion with third parties, such as shareholders, agencies, banks, and investors; and,
3. serve as a comprehensive guide for existing and potential growers and aquaculturists as it contains technical information on the actual production of target species, sources of production inputs and materials, market information and market linkages, financial analyses, and other basic practical information essential to the operation of an aquaculture business enterprise.

³ www.mindanao.org

V. High-Value Aquaculture

A. Definition

There are three main components of fisheries in the Philippines: commercial fishing, municipal fishing, and aquaculture. Unlike the first two, aquaculture deals with the rearing – rather than capture – of fish. It is defined broadly as any intervention in the life cycle of aquatic organisms to increase production. Republic Act 8550 (The Philippine Fisheries Code of 1988) defines aquaculture to include all fishery operations involving all forms of raising and culturing fish and other fishery species in fresh, brackish and marine areas.⁴

Aquaculture is either partial or full cycle. The first is when wild-caught, undersized juveniles are held and reared in confinement until they reach market size. As this practice still requires some sort of fish capture (that of catching juveniles from the wild), this is not as sustainable a practice as full-cycle aquaculture, which entails spawning the fish from a hatchery and subsequently rearing them until they reach market size. In terms of technological innovation, it is likewise the latter that is more challenging as it is the early stages of an aquatic organism's life cycle that is harder to replicate in a controlled environment.

Nonetheless, it is full-cycle aquaculture that our industry must strive to achieve to meet food and market requirements, as well as address the issue of decline in natural fish populations.⁵

Another sub-sector of capture fisheries – in which the Philippines is a major, albeit unacknowledged contributor – is the **live reef food fish (LRFF) trade**. Live fish have traditionally been traded around Southeast Asia as a luxury food item, with 50-70% wild caught. Most LRFF are imported into Hong Kong either for local consumption or for transshipment to the mainland of the People's Republic of China (PRC). Target species for this trade are usually a variety of grouper (lapu-lapu) species and humphead wrasse (*Cheilinus undulatus*), which the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has classified as vulnerable.⁶ CITES is an international

Aquaculture
has enabled me
to provide for
the needs of my
family and show
that good things
come to those
who work hard
and choose the
path of peace.

- Isni Undin
*Fish farmer, former
combatant, and USAID-
GEM beneficiary
Basilan*

⁴ Republic Act 8550

⁵ Ilagan, Lauro. 2008. Aquaculture in Mindanao: Transcending the Barriers. Tambara Research Journal. Ateneo de Davao University, Philippines.

⁶ CITES. 54th meeting of the Standing Committee Geneva (Switzerland), 2-6 October 2006 SC54 Doc. 43.2 (Rev. 1)

agreement between governments whose aim is to ensure that global trade in specimens of wild animals and plants does not threaten their survival.⁷

High-Value Aquaculture, which refers to the farming and rearing of species considered to be of high market value, caters primarily to the LRFF trade.

Other desired non-fish species in this trade are lobster (*Panulirus sp.*), sandfish (*Holothuridae* and *Stichopodidae*) and abalone (*Haliotis sp.*). The most in-demand fish, the groupers, are relatively rare and long-lived, and mature late in life, thus, can be depleted rather quickly in their reef habitats. Some grouper species form spawning aggregations, which are sometimes fished heavily with consequent negative effects on the reproductive component of the population. In other cases, the capture of a large proportion of juvenile fish or young adults — being protogynous hermaphrodites, most groupers are females at this time, changing sex as they grow larger — also potentially reduces the reproductive population. The primary sector engaged in catching these fish are municipal fishermen and gleaners using fish traps, although the high demand has wrought a number of illegal and dangerous practices, such as cyanide fishing and “compressor” diving.



Left: Typical display at a Hong Kong live fish restaurant; Right: groupers on display

Although the LRFF trade has been around for decades, trade information is meager and imprecise. For most source countries, including the Philippines, LRFF exports are not disaggregated at a per species level, are either misreported or underreported, and sometimes combined with non-live reef fish trade. Moreover, since species like humphead wrasse are CITES-covered but caught and exported nonetheless, exports are at times undocumented.⁸

⁷ *Cheilinus undulatus* was included in CITES Appendix II at the 13th meeting of the Conference of the Parties (Bangkok, 2004). To better implement the listing of the species, the “Western Pacific Workshop on policy, enforcement and sustainable trade for the CITES Appendix-II listed Humphead/Napoleon Wrasse, *Cheilinus undulatus*” was held in Hong Kong from 5 to 7 June 2006. Participants included delegates from CITES Management and Scientific Authorities, and other relevant agencies of China, Indonesia, Malaysia, Papua New Guinea and the Philippines, as well as representatives of the CITES Secretariat, FAO, WWF, IUCN, TRAFFIC and the local fisheries. Participants in the workshop agreed on the need for further actions in the fields of regional cooperation, non-detriment finding, trade monitoring, legislation and law enforcement.

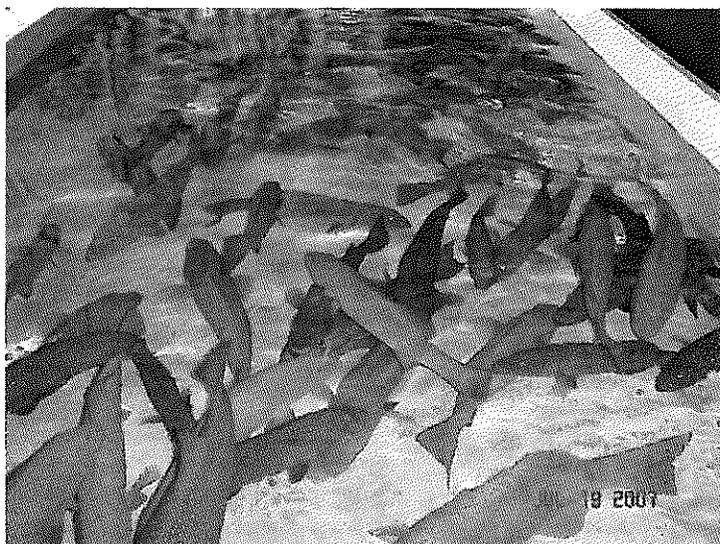
⁸ Sadovy et al. *While Stocks Last: The Live Reef Food Fish Trade*. Asian Development Bank. 2003

Why High-Value Aquaculture?

Majority of aquaculture growers in the Philippines produce traditional foodfish for the domestic market. These are usually freshwater and brackishwater species, such as milkfish, tilapia, catfish, and, in Western Mindanao, seaweeds.

The preponderance in production of these low to medium-value culture species, which reflect high total accumulated value, but, comparatively low per capita income, have been due, in part, to government efforts to promote aquaculture as a livelihood and income-generating activity. These efforts include the Bureau of Fisheries and Aquatic Resources' (BFAR) programs in the dispersal of Genetically Improved Farm Tilapia (GIFT) and Genetically Enhanced Tilapia (GET EXCEL) strain fingerlings, as well as the technology transfer imparted by the local government unit (LGU) and supported by state universities focusing research and development (R&D) efforts on more established foodfish.⁹

While some corporate producers or medium-to-large growers may find it commercially viable to retain prawn or milkfish species as core commodities due to expansive



Coral trout grouper at a live fish buying station

production area and established export markets, the majority -- small growers and pond operators -- are unable to garner sufficient income due to lack of production area and capacity, as well as low farmgate price of traditional culture species.

On the other hand, culture of tropical marine species is gaining ground in other Asian countries as an alternative aquaculture activity. Many tropical marine

species are depleted due to the growing demand of the Asian market -- with resultant high market prices. The international market presents numerous possibilities for niche market species with a diminishing productive capacity on the part of its traditional producers.

The increasing diversity of aquaculture production can be seen in the list of species groups registering the largest growth from 2002 to 2004, with other countries (such as China, Thailand, and even countries that we were at par with or had once surpassed in terms of aquaculture production, like Indonesia and Malaysia) recognizing the vast opportunities in the more lucrative export market.

⁹ Ilagan, 2008

Table 1. Top ten species groups in aquaculture production: quantity and emerging growth

Group	Volume (MT)		APR (%)
	2002	2004	
Sea urchins and other echinoderms	25	60,852	4,833.6
Abalones, winkles, conchs	2,970	287,720	884.3
Frogs and other amphibians	3,074	76,876	400.1
Freshwater molluscs	13,414	142,346	225.8
Sturgeons, paddlefishes	3,816	15,551	101.9
Miscellaneous aquatic invertebrates	12,593	42,159	83.0
Flounders, halibuts, soles	35,513	109,342	75.5
Miscellaneous coastal fishes	386,160	878,589	50.8
Miscellaneous demersal fishes	16,638	31,531	37.7
Shrimps, prawns	1,495,950	2,476,023	28.7

Source: FAO, "State of World Fisheries and Aquaculture 2006"

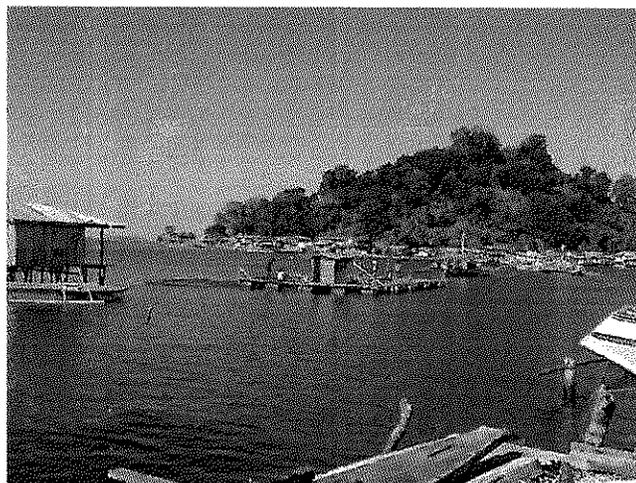
Note: Data exclude aquatic plants. APR refers to the average annual percentage growth rate for 2002–04.

B. Target Species/Commodities

For purposes of this industry plan, focus will be given on **grouper** (*Epinephelus spp.*) varieties, locally known as "lapu-lapu." Among high-value seafood, grouper presents the most potential for promotion and development for the following reasons:

1. High market price –

Groupers have the highest value in the trade, making them the most sought after commodity by both fishers and growers. Live grouper fetches a very high price, even at the farm gate. Current ex-farm value of green grouper (*E. coioides*) and tiger grouper (*E. fuscoguttatus*), which are the most common farmed species, are P450/kg and P550-600/kg, respectively. The more expensive coral trout grouper (*Plectropomus leopardus*) and humpback grouper (*Cromileptes altivelis*) range from P1,500-3,500/kg.¹⁰



There are many suitable sites for grouper mariculture

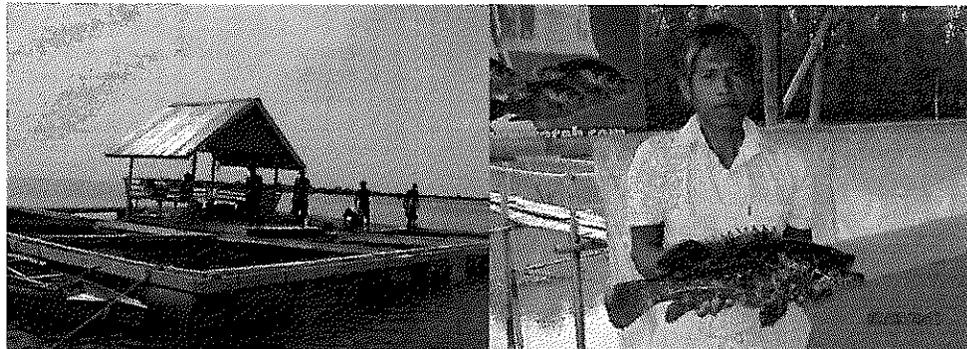
2. There are many suitable sites for grouper mariculture –

either for high-salinity species, like coral trout grouper, humpback grouper, and tiger grouper, or the more saline-tolerant green or "mangrove" grouper, coves in coastal areas or reef flats

¹⁰ Domestic market survey, April 2013.

provide the most ideal places to install fish cages. Some grouper varieties can also be raised in ponds nearby the sea.

3. ***High-value marine species of grouper are endemic or indigenous in many areas*** – since they are indigenous in many places, it follows that the existing marine conditions are suitable and conducive for their survival and optimal growth.
4. ***There is a thriving local and export market for high-value, live marine species like groupers*** – as earlier mentioned, HVA production caters primarily to the live food fish trade, both domestic and international, particularly, Hong Kong and the Asian market. This plan also provides a more detailed discussion of markets.
5. ***There have been developments and advances in aquaculture technology that make it conducive to diversify into mariculture of grouper***, specifically:
 - a. *Efficient grow-out culture protocol* – the industry has made sufficient advances in technology to enable grouper to be farmed up to market size within a commercially acceptable timeframe;
 - b. *Availability of hatchery-bred seedstock* – grouper farming can be done full-cycle, with local hatcheries that have successfully achieved captive breeding and production of juveniles of a number of commercially important species, like *E. coioides* and *E. fuscoguttatus*, up to higher-value varieties like *P. leopardus* and *C. altivelis*; and,
 - c. *Availability of efficient commercial formulated feeds* – unlike the traditional method of using “trash” fish as feed, modern and sustainable grouper culture employs a readily available formulated diet manufactured by commercial feed companies. These feeds have adequate feed conversion ratios (FCRs), ensuring cost-effective production, and are readily available, unlike trash fish.¹¹



Left: Grouper grow-out culture can be done in cages; Right: A grouper farmer shows a sample of his stock

¹¹ Andigan, Cary. Presentation on "Opportunities in Grouper Culture." 1st Mindanao Techno Forum on Mariculture, Aug. 26-27, 2010, Cagayan de Oro City, Philippines

Hong Kong is the largest consumer of LRF worldwide, and some 60% of the trade arrives into Hong Kong by air.

In 2008, the import by air of live groupers alone into Hong Kong totaled 6,766 MT (reported) worth HKD788 million (USD101 million). Austrade reports that in 2009, Hong Kong imported more than 38,000 MT of live fish.

Singapore is the second largest market in the region for live groupers, importing in 2008 1,228 MT worth SGD\$14,097 million (USD10 million).

China imported 6,111 MT live food fish in 2008 (mainly reef fish), and 7,711 MT in 2009.

<http://www.aquarius.com/live-reef-food-fish-trade/>

In the Philippines, the more common species being farmed are the green and the tiger groupers. Culture systems range from hatchery, nursery and grow-out (cages and ponds). A significant high percentage of fry and fingerling stocks that find their way in nursery and grow-out areas, however, are still wild-caught.

Table 2. Wholesale Prices of Live Marine Fish in Hong Kong

English Name	Scientific Name	Wholesale Price (HK\$/Kg)			Ave. Price	Ave. Price
		Highest	Lowest	Average	US\$	PhP
Brown Marbled Grouper	<i>Epinephelus fuscoguttatus</i>	230.00	160.00	193.33	24.94	1,221.85
Brown-spotted grouper	<i>Epinephelus areolaris</i>	180.00	90.00	150.17	19.37	949.07
Camouflage Grouper	<i>Epinephelus Polyphekadion</i>	280.00	200.00	243.83	31.45	1,541.01
Gold-lined seabream	<i>Sparus sarba</i>	66.00	60.00	63.00	8.13	398.16
Green grouper	<i>Epinephelus coioides</i>	190.00	80.00	117.50	15.16	742.60
Head grunt	<i>Pomadourys kaakan</i>	65.00	40.00	54.50	7.03	344.44
Leopard coral grouper	<i>Plectropomus leopardus</i>	595.00	370.00	495.67	63.94	3,132.63
Malabar Red snapper	<i>Lutjanus malabaricus</i>	60.00	30.00	50.50	6.51	319.16
Mangrove snapper	<i>Lutjanus argentimaculatus</i>	60.00	30.00	50.17	6.47	317.07
Painted sweetlip	<i>Diagramma pictum</i>	66.00	28.00	53.67	6.92	339.19
Pompano	<i>Trachinotus blochii</i>	65.00	43.00	52.33	6.75	330.73
Rabbit Fish	<i>Siganus oramin</i>	66.00	28.00	51.50	6.64	325.48
Red grouper	<i>Epinephelus akaara</i>	661.00	160.00	429.00	55.34	2,711.28
Russell's snapper	<i>Lutjanus russelli</i>	66.00	32.00	54.00	6.97	341.28
Yellow-finned seabream	<i>Acanthopagrus latus</i>	165.00	149.00	157.00	20.25	992.24

Note: as of January 2013

Source: Fish Marketing Organization, www.fmo.org.hk

C. Existing and Potential Markets

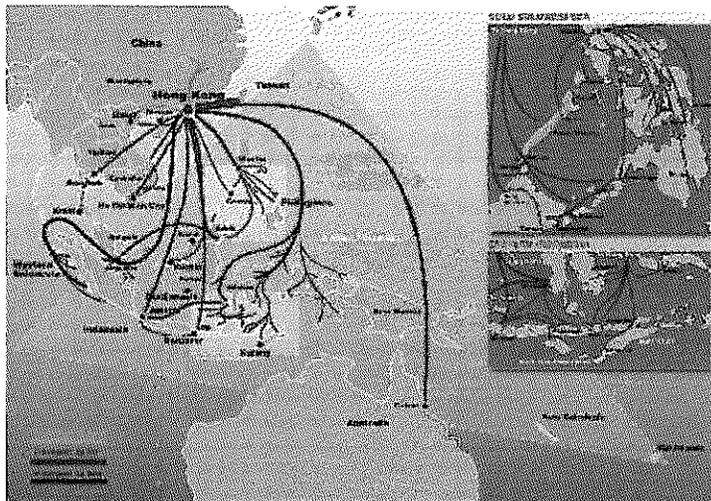
1. Export

The demand for live grouper mainly comes from China, Hong Kong, and to a lesser extent Malaysia, Singapore and Taiwan.

World production of groupers in 2004 was about 58,000 MT valued at US\$ 199 million¹², where Hong Kong and the southern part of China were the main markets. Most of the production was from China, Taiwan, Indonesia, Malaysia and Thailand. In 2000, market demand for cultured groupers was about 20,000-25,000 MT. Since then production has been steadily rising with increasing global demand.

¹² FAO, 2005

Market demand may soar to about 100,000 MT per year by 2020, as evidenced by the growth in China's consumption of aquatic products, which is outpacing growth in production of such products, according to the Agriculture Information Institute at China's Academy of Agricultural Sciences.



Live reef food fish (LRFF) trade transport routes to HK and China

Accordingly, the shift to urbanization of rural residents is driving consumption among previously low-level consumption segment of society. The institute claims that China's current consumption of aquatic products, at 16.5 million MT (compared to 7.56 million MT in 2000), represents 30 percent of the country's total aquatic output, and at a growth rate of 5.71 percent is growing significantly faster than overall output of aquatic products. Rising at an average 3.83 percent a year between 2000 and 2011, growth in China's seafood output has slowed from the highs seen in 1980-90 (10 percent a year) and 1990-2000 (6 percent).

The institute further predicted rising incomes and increased spending on dining out by Chinese consumers will further drive the pace of consumption.



Higher incomes and urbanization are obvious drivers of China's growing taste for seafood. Data shows rural consumers eating 5.36 kg in 2011, compared to just 3.82 kg a year in 2000. By contrast the country's urbanites were eating 14.62 kg in 2011 compared to an average 10.34 kg in 2010.¹³

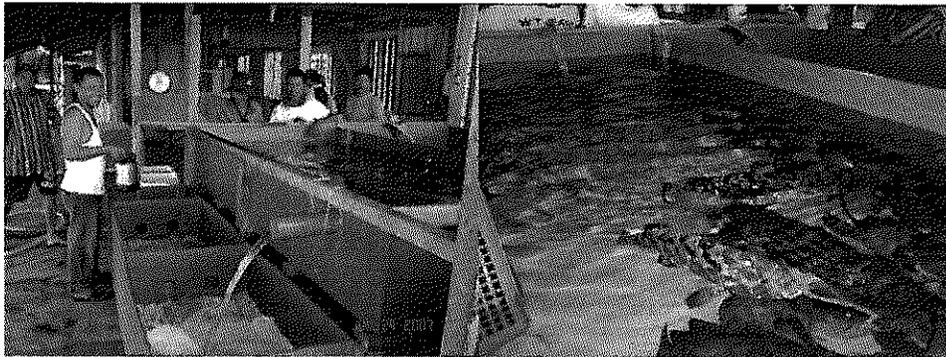
Moreover, new research from the Earth Policy Institute shows that public consumption of seafood is building on a trend started in 2011, and projects that in

¹³ "China eating more seafood than it produces." SeafoodSource.com, June 14, 2013. <http://www.seafoodsource.com/newsarticledetail.aspx?id=21047>

2013 people will eat more farm-raised fish than wild. The trend of increased fish farming grew obvious in 2011, when according to the institute farmed fish production in raw tonnage worldwide surpassed beef. By 2012, fish farming was recorded at 66 million MT, compared to 63 million MT of beef.

With the world's population and worldwide demand for animal protein growing exponentially, the institute said that farmed seafood (including high-value commodities) may well be play a more significant role in food supply in the coming years, more so than beef and more so than wild seafood.¹⁴

In the Philippines, most of live grouper sold for export are done through local buyers and traders, who generally purchase at a lower value. Traders either have buying outlets in areas where a lot of high-value seafood are caught or grown (such as in Zamboanga City, Surigao City, and Bongao, Tawi-Tawi) or utilize live fish carrier boats to procure live harvest directly from the growers (as in the case of the Sibutu Mariculture Park, in Sibutu, Tawi-Tawi).



A typical live fish buying station

Local ex-farm market rates, however, are still relatively competitive. For instance, live green grouper sells at P450/kg, tiger grouper at P550-700/kg, while the more expensive coral trout and humpback are priced locally at P1,500-3,500/kg.

2. Domestic

Domestic demand for live grouper is primarily from live seafood restaurants, and wet markets and grocery stores for fresh/frozen/chilled products (at a much reduced value). Although no actual market study has yet been done on volume, demand for live groupers is sufficient enough that local suppliers are able to consider local restaurants and live seafood markets as regular buyers and competitive alternative to exporters.

Due to limited display space however, such establishments can only absorb a limited quantity per delivery. The market values used by such outlets do not differ from those applied by exporters.

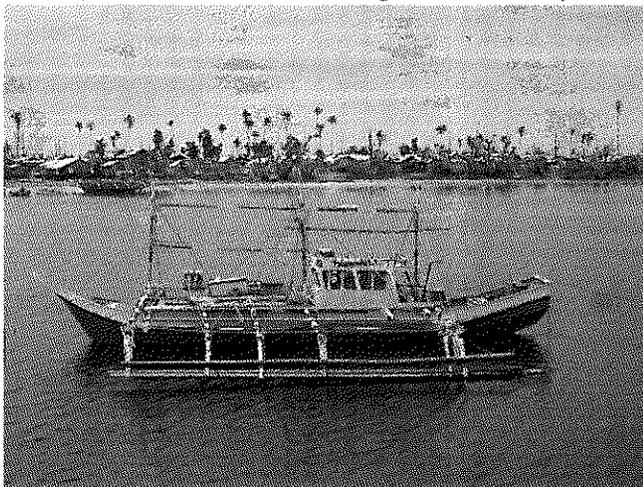
¹⁴ "Study: Farmed fish will rule the plate." <http://www.seafoodsource.com/newsarticledetail.aspx?id=21054>, June 14, 2013

VI. Profile of Davao Oriental



A. Marine and Coastal Resources

Davao Oriental has a very extensive coastal area, the longest in in Region 11, at 586 km and the largest municipal waters, about 5,135.04 km² or 49 percent of the total municipal waters of the entire region. All municipalities, including its capital – Mati City – have coastal shores. (See Fig. 1.)



A typical commercial fishing vessel in Baganga, Dvo. Ortl.

The coastal resources of the province of Davao Oriental, however, have generally been showing symptoms of degradation and depletion. For this reason, it was selected as a project site, along with 6 other provinces in the Philippines, in the Integrated Coastal Resources Management Project (ICRMP).¹⁵

¹⁵ The ICRMP is a 6-year project (July 2007 to June 2013) implemented by the Department of Environment and Natural Resources (DENR), Bureau of Fisheries and Aquatic Resources (BFAR) and Municipal Development Fund Office (MDFO).

The marine waters of the province are abundant in fish. Fish species present can be grouped into 3 ecological clusters: target, indicator and miscellaneous. Target fishes are species that are caught for their commercial value. The major target fish families include: grouper (*Ephinephelinae*), goatfish (*Mullidae*), triggerfish (*Balistidae*), wrasses, and surgeonfish, parrot fish (*Scaridae*), soldier fish, coral breems (*Nemipteridae*), and fusiliers (*Caesionidae*).

Other commercially important fish and marine organisms found in its waters include lobster, mackerel, blue crab, tridacna, sea cucumber, tuna, octopus, and scad.

Indicator fishes observed include butterfly fish and moorish idol. Miscellaneous fishes or those with low commercial value are mostly damselfishes.

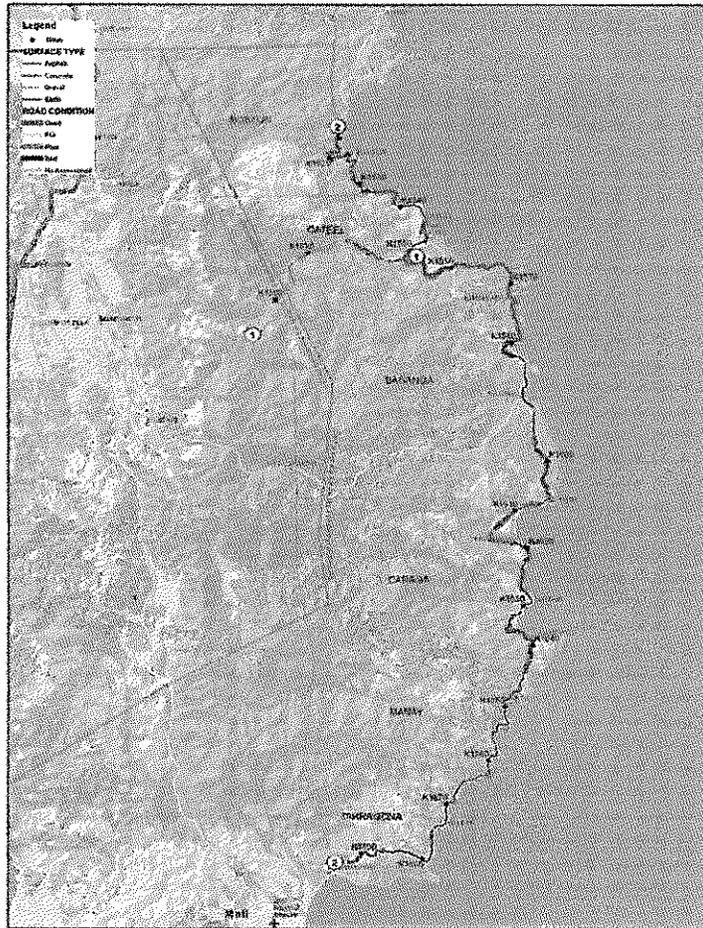


Fig. 1. Davao Oriental's coastline

B. Socio-economic Description of Fisheries Sector

Marine and coastal resources in Davao Oriental play very significant roles in the residents' livelihood and survival. In a survey conducted by the United Nations-World Food Program in March 2013, it was reported that fishermen accounted for roughly 17 percent of the population in the survey areas. About a quarter of the respondents said that their production system is based on the sea. The largest percentage of people relying on the sea is found in Boston, Cateel, and Baganga (40.8 percent). Approximately 16 percent mentioned that their fish production is largely dependent on ponds, although people using ponds are smallest in number in Boston, Cateel, and Baganga (8.5 percent).

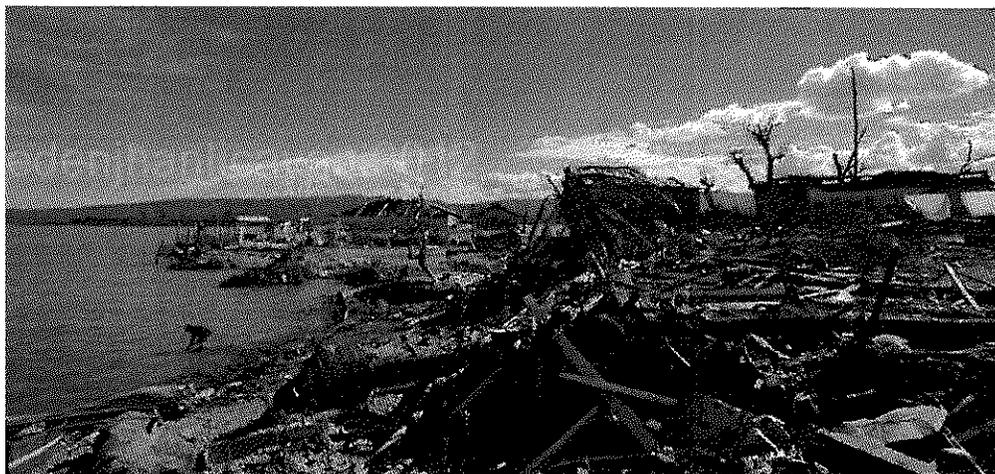
Similarly, agriculture and fishery activities are ranked as the number one economic activity most people engaged in to survive. Respondents from Boston, Cateel, and

Baganga identified it as the fourth economic activities they resorted to in order to survive.¹⁶

Most of the province's coastal residents are municipal fisherfolk, engaged full-time in capture fisheries (hook-and-line, bagnet, traps, etc.). Most of them belong to lower-income brackets due to the generally meager incomes derived from fishing.

The province has at least 15,000 municipal fisherfolk in all of its municipalities operating around 10,000 boats, 50 fish corrals, and 22 stationary bagnets. The province also has 26 commercial fishing operators, mainly based in Mati City, operating 35 fishing vessels, and employing around 2,700 fishermen.

Fishing is seasonal, in municipalities of District 1 (Baganga, Boston, Caraga, Cateel, Manay, and Tarragona) experiencing the east to west-driven wind, locally known as "Amihan," and are normally able to fish only from April to November. Fishing in District 2 (Banaybanay, Gov. Generoso, Lupon, San Isidro, and Mati City), on the other hand, is influenced by the southwest monsoon wind ("Habagat") and generally allowable from November to May.



Post-Pablo Caraga Bay (Source: <http://news.davaooriental.com.ph>)

The province's fish production from capture fisheries in 2010 was 32,814.6 MT, of which around 70 percent was from commercial fishing (longline, ringnet, etc.). Major fishing grounds include Davao Gulf, Pujada Bay, Mayo Bay, Manay Bay, Baculin Bay, Caraga Bay, and Cateel Bay.

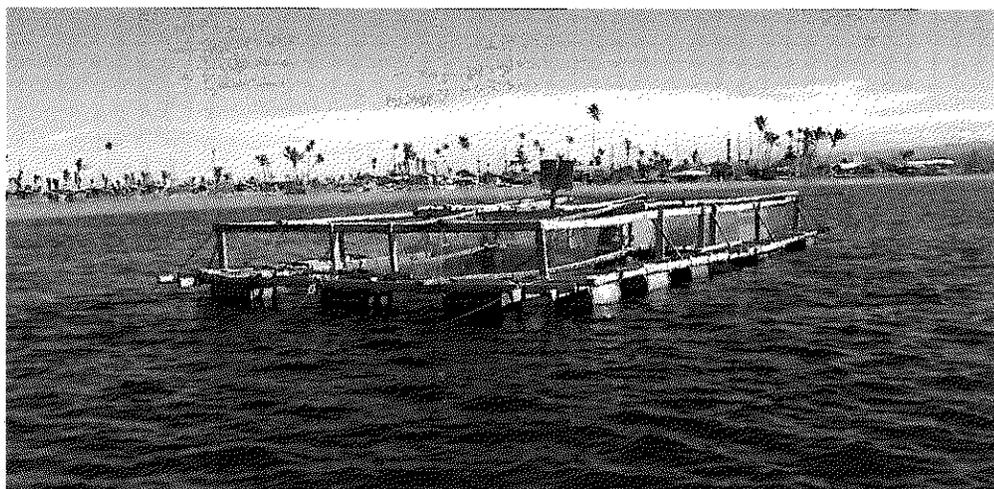
¹⁶ Emergency Food Security, Nutrition, and Livelihoods Assessment for Typhoon Bopha (Pablo). March 2013. This survey was conducted with funding support from UNICEF, UNDP, FAO, ILO and WFP. Survey design was led by WFP. Data collection field staff and supervision was supported by the National Nutrition Council, ACF, World Vision, Department of Social Welfare and Development, Department of Labor and Employment, and Department of Health. The assessment was led by WFP.

In terms of volume of fish production, aquaculture production ranks third in Davao Oriental, after municipal fishing and the local commercial fishing industry.

Local fish growers are engaged in the production of a variety of low-to-medium-value freshwater, brackish, and marine products.

C. Aquaculture Production

In terms of volume of fish production, aquaculture production ranks third in Davao Oriental, after municipal fishing and the local commercial fishing industry.¹⁷ Local fish growers are engaged in the production of a variety of low-to-medium-value freshwater, brackish, and marine products. Davao Oriental has the second largest aquaculture area in Region 11, with 16.07 square kilometers of inland fresh/brackishwater pond area. It comprises 31% of the total fishpond areas of the region. Cultured species range from freshwater (tilapia, catfish, mud crab) to brackishwater species (milkfish, white shrimp).



Milkfish cage in Brgy. Kinablangan, Baganga, Davao Oriental

Around 80 percent of the province's aquaculture production comes from brackishwater sources. Fish reared in existing coastal brackish water ponds are mainly milkfish, catfish, tilapia, crabs, and prawn.

Mariculture (aquaculture at sea, in fish cages or fish pens) is mainly practiced at the Mati Mariculture Park in Brgy. Badas, Mati, Davao Oriental, which had 29 cage modules devoted to milkfish production. Fish cage farming was also existent in Gov. Generoso and Baganga.

¹⁷ NEDA-XI, Regional Physical Framework Plan, Region XI, 2003-2030, ANNEX F, Fish Production, By Category, By Province/City, Region XI, 1999-2002

Aquasilviculture (environment-friendly mangrove aquaculture system) using fish pens and fish ponds, with polyculture of crabs and milkfish, was also introduced by BFAR in Baganga, Boston, and Cateel. However, most structures were destroyed by Typhoon Pablo.

Aside from grow-out ponds, there is currently no other similar aquaculture infrastructure (such as hatcheries or nurseries) in Davao Oriental. However, pond and cage operators in the province have been able to source their juveniles from several existing freshwater hatcheries in neighboring Compostela Valley province (for tilapia, catfish, and freshwater prawn), as well as milkfish fry from the BFAR Regional Fisheries Training Center (RFTC), located at the Panabo Mariculture Park in Panabo City, which is also relatively nearby.



Left: BFAR-RFTC Hatchery in Panabo City; Right: Provincial Freshwater Hatchery at Brgy. Libasan, Nabunturan, Compostela Valley

VII. High-Value Aquaculture (HVA) Industry Development Roadmap

This section will comprehensively tackle the steps and activities required to develop the **High-Value Aquaculture Industry** in the province. It will provide specific information on the sub-components to be developed at a given timeframe, as well as where these may be undertaken.

This plan will propose a gradual and strategic development of industry sub-components, with corresponding revenue potential from each proposed industry sub-component.

The standard model of a fully-developed HVA industry postulates a hatchery (for sustainable supply of seedstock) at the core of the industry, serving as its driver. The community participates the most and derives its income from grow-out operations. Other industry components, such as nursery operations, juvenile distribution, processing (or consolidation), and marketing and distribution, are integral "rings" in the HVA Industry model, but are also in themselves "sub-industries" that are profit-centers. (See Diagram 1. HVA Industry Model)

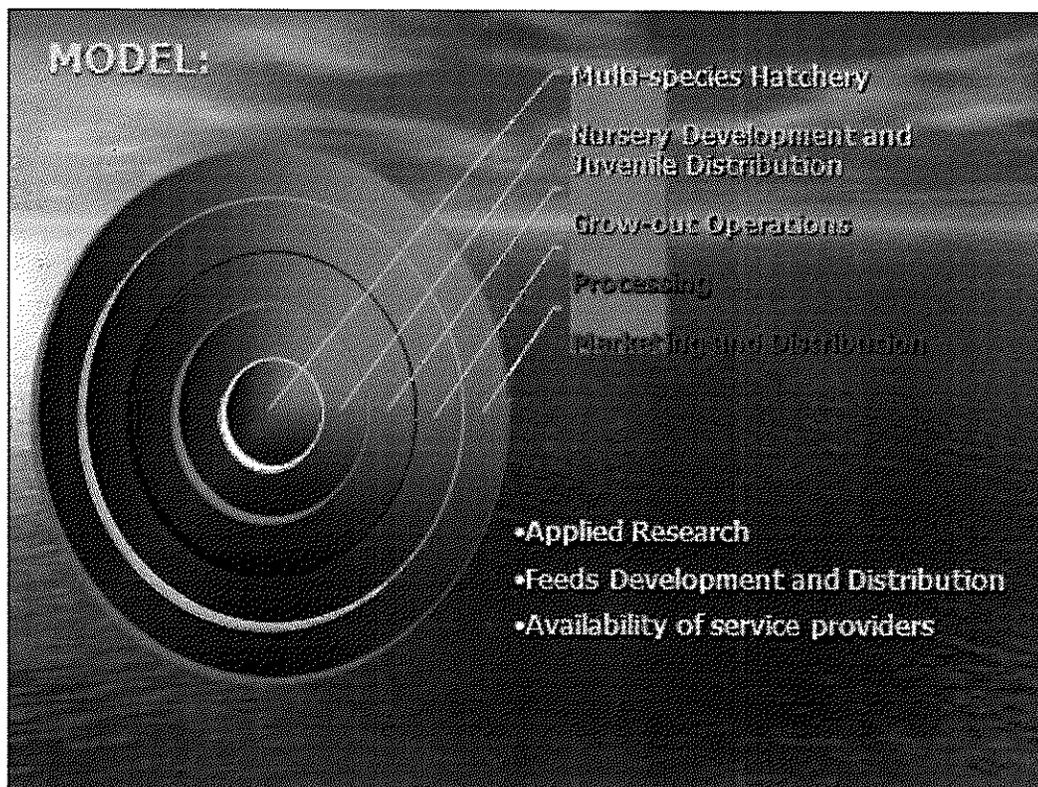


Diagram 1. HVA Industry Model (Source: USAID-GEM)

A. Short-term Development Plan (Year 1)

This period will mark the province's initial foray into the HVA industry, starting with grow-out production of a specific commodity range. This will be the determining stage in the eventual progress of the industry as a viable and sustainable income-earner for the province.

This phase takes off from initial efforts by USAID (through the GEM Program) to establish grouper culture in the province under its Typhoon Pablo disaster recovery assistance project, starting with grow-out production. As such, the evolution of its value-chain will emanate from grow-out production, with other components (such as hatchery development, processing/consolidation, etc.) to follow in subsequent phases (see Diagram 2. Value-chain for Grouper Production).

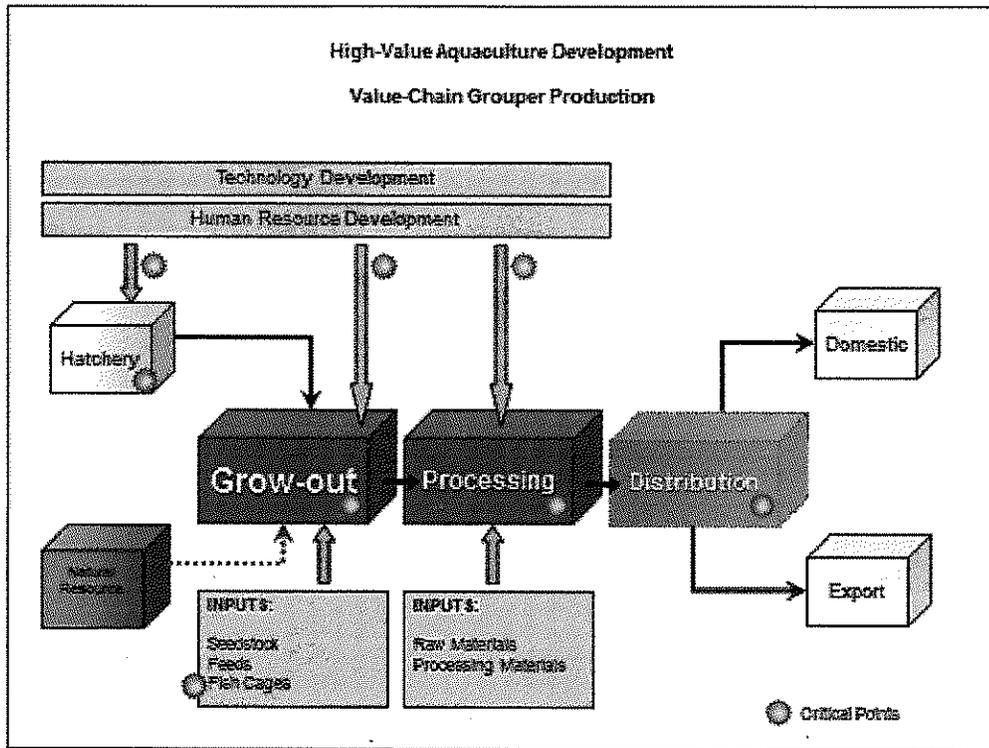


Diagram 2. Value-chain for Grouper Production (Source: USAID-GEM)

1. Grow-out Production

Grow-out refers to the stage in aquaculture in which juveniles of adequate size and age are stocked and reared until grown to a size required by the market. Grow-out production utilizes either water-based systems (cages and pens, inshore/offshore) or land-based systems (rainfed ponds, irrigated or flow-through systems, tanks and raceways).



Hydrographic Factors for Grouper Culture:

- ✓ pH 7.5-8.3
- ✓ Temperature 25-32 °C
- ✓ Salinity 20-32 ppt
- ✓ Dissolved oxygen (D.O.) 4-8 ppm
- ✓ NO₂-N (Nitrite nitrogen) 0-0.05 ppm
- ✓ Un-ionized ammonia (NH₃-N) <0.02 ppm

a. Potential Production Areas

In determining suitable areas for grouper fish cage operations, the following parameters must be taken into consideration:

- Seawater depth of at least 5 meters (during low tide);
- Adequate protection from strong winds, waves, currents, typhoons, floods and siltation – as such, coves and inlets are preferred when installing fish cages;
- Good seawater quality, i.e., appropriate salinity (20-32 ppt), free from pollution, like run-off influx from industrial, agricultural and domestic waste;
- Continuous seawater exchange at high and low tides;
- Supply of freshwater;
- Readily accessible and secure.

In a survey of coastal areas in the province, several suitable sites were identified (see Table 3).

Table 3. List of Potential Sites for Grouper Grow-out Production

Municipality	Area of Mun'l. Water (ha.)	Length of Coastline (km.)	Potential Barangays	Notable Sites
Baganga	347.89	44	11	<i>Ban-ao</i> <i>Kinablangan</i> <i>San Victor</i>
Banaybanay	20,592.0	22	6	
Boston	9,177.31	18	5	<i>Kabugao Isl.</i>
Caraga	-	34	6	<i>Caraga Bay</i>
Cateel	-	-	0	
Gov. Generoso	-	60	14	<i>Monserat</i>
Lupon	-	-	4	
Manay	35,578.0	35	4	
Mati	-	-	16	<i>Mati Mar. Park</i>
San Isidro	2,700.0	18	7	
Tarragona	-	-	3	
TOTAL	68,395.20	231	76	

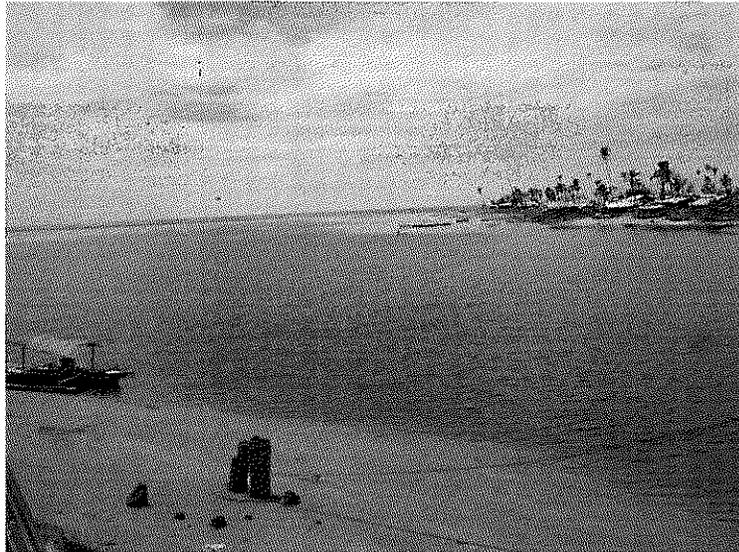
Source: USAID-GEM

Groupers

Class Actinopterygii
Order Perciformes
Family Serranidae
Sub-family Epinephelinae

- Comprise 14 genera and 449 species of the subfamily Epinephelinae, or roughly half of all species in the family Serranidae (groupers and sea basses)
- There are 16 major grouper species that are cultured; the dominant species vary somewhat regionally.
- The most consistently abundant species that are captured for culture purposes and also reared in hatcheries are *Epinephelus coioides*, *E. malabaricus*, and *E. fuscoguttatus*
- Other important species are *E. bleekeri*, *E. akaara*, *E. awoara* and *E. areolatus*. *E. amblycephalus*, *E. lanceolatus*, *E. sexfasciatus*, *E. trimaculatus*, *E. quoyanus*, *E. bruneus*, *Cromileptes altivelis*, *Plectropomus leopardus* and *P. maculatus* are cultured in small amounts.

Source: Tupper, M.; Sheriff, N. 2008. Capture-based aquaculture of groupers. In A. Lovatelli and P.F. Holthuis (eds) Capture-based aquaculture. Global overview. FAO Fisheries Technical Paper, No. 508. Rome, FAO. pp. 217-253.



Potential site in Brgy. Kinablangan, Baganga, Davao Oriental

b. Target Species/Commodity

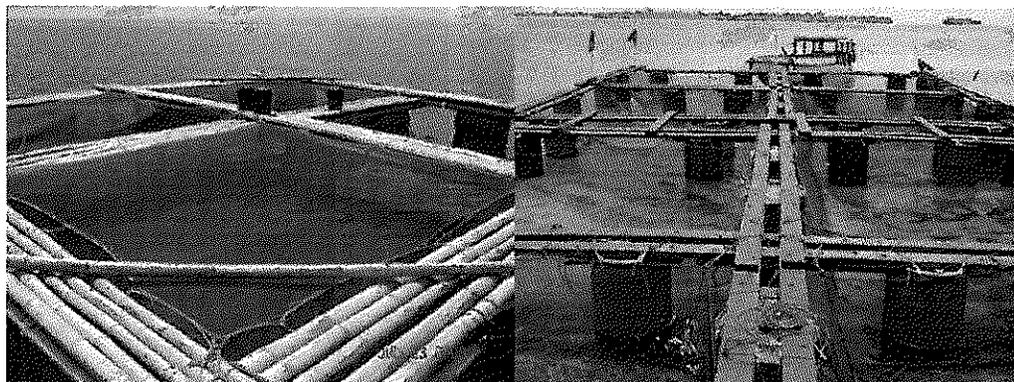
Grouper species to be introduced at this phase will be the varieties whose juveniles are readily available from existing commercial hatcheries and with established culture protocols for full-cycle aquaculture, **green or “mangrove” grouper** and **tiger or “camouflage” grouper** (see Boxes 1 and 2).

c. Culture System

For purposes of this industry plan, the grow-out system to be introduced will be water-based, using floating fish cages. Fish cage design is important, owing to the fact that designs vary according to the cultured fish and their habits. For instance, the typical fish cage design for the ubiquitous milkfish (*Chanos chanos*) is either circular or square, but with a large area (10x10x5 m) because milkfish are consistently swimming around.

Grouper, on the other hand, are sedentary creatures, tend to stay at the bottom and, thus, can be reared in smaller, more manageable compartments. As such, a typical cage module would have 4 to 8 separate “small” compartments (3x3x3.5 m).

For this province, USAID-GEM is promoting its *low-cost, all-weather resilient 4-compartment floating fish cage module* as part of its introduction of climate-adaptive aquaculture. See Annex A for fish cage design.



Left: 4-compartment cage module with bamboo frame and horizontal floats; Right: 8-compartment cage module with wooden frame and vertical floats

Box 1. Species Description: Green grouper

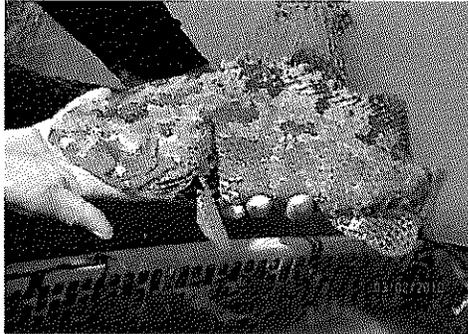


Epinephelus coioides

Common names:	Orange-spotted grouper, estuary/mangrove grouper, green grouper
Vernacular:	<i>inid, kugtong, pugapo</i>
Size and age:	120 cm TL (male/unsexed; Ref. 47613); max. published weight: 15.0 kg (Ref. 11228); max. reported age: 22 years
Environment:	Reef-associated; brackish; marine; depth range 2–100 m
Climate:	Subtropical; 37°N - 34°S, 28°E - 180°E
Importance:	Important for commercial fisheries and aquaculture throughout Southeast Asia; major species in China Hong Kong SAR live fish markets.
Resilience:	Medium, minimum population doubling time 1.4–4.4 years (K=0.17; tmax=22).
Biology and ecology:	Inhabit turbid coastal reefs and are often found in brackish water over mud and rubble. Juveniles are common in shallow waters of estuaries over sand, mud and gravel and among mangroves. Feed on small fishes, shrimps, and crabs. Probably spawn during restricted periods and form aggregations when doing so. Eggs and early larvae are probably pelagic.

Box 2. Species Description: Tiger grouper

¹⁸ Tupper, M.; Sheriff, N. 2008. Capture-based aquaculture of groupers. In A. Lovatelli and P.F. Holthuis (eds). Capture-based aquaculture. Global overview. FAO Fisheries Technical Paper. No. 508. Rome, FAO. pp. 217–253.



*Epinephelus fuscoguttatus*¹⁹

Common names:	Brown-marbled grouper, tiger grouper, dusky grouper, flowery grouper, flowery cod
Vernacular:	<i>pugapo, kulapo, mantis, garupa</i>
Size and age:	120 cm TL; max weight 35.0 kg, max. age >40 years
Environment:	Reef-associated; marine; depth range 1–60 m
Climate:	Tropical; 35°N - 27°S, 39°E - 171°W
Importance:	Minor commercial fisheries, moderate importance in aquaculture and live reef fish trade. Cultured in Singapore, Philippines and Indonesia.
Resilience:	Medium, minimum population doubling time 1.4–4.4 years (K=0.16-0.20).
Biology and ecology:	Occurs in lagoon pinnacles, channels, and outer reef slopes, in coral-rich areas and with clear waters. Juveniles in seagrass beds. Feeds on fishes, crabs, and cephalopods. May be ciguatoxic in some areas. Mainly active at dusk.

d. Maintenance During Culture Period

One production cycle for the target species involves is 5-6 months to reach market size of around 0.6 kg per piece. This means that 2 production cycles can be implemented in a year.

As a carnivorous (and even cannibalistic) species, grouper requires either the use of “trash” fish or commercial formulated feeds. The latter is more advisable for the following reasons:

- Use of commercial feeds improves survival as fish become domesticated and mortalities due to cannibalism are minimized.
- Disease transmission from highly perishable trash fish is reduced.
- Pollution of culture environment from fouling by unconsumed trash fish is prevented
- Formulated diet provides for the complete nutritional requirements of the stock.
- More efficient in terms of feed-conversion-ratio (FCR)

¹⁹ ibid

See Annex B for a comprehensive guide on Grouper Grow-out Culture, Feeding, and Harvest & Transport.²⁰

e. Profitability Analysis

Table 4. Profitability Estimate for Grouper Grow-out Production (4-compartment Module).

A. Technical Assumptions	
Culture Volume (Cu.m.)	108
Cage Capacity Utilization (%)	100%
Stocking Density (pc./cu.m.)	10
No. of Stocks (pc.)	1,080
Survival Rate (%)	80%
Average Body Weight @ Harvest (Grams.)	500
Days of Culture (Mo.)	6
Yield Per Crop(Kg.)	432
No. of Crops per Year	2.0
Feed Conversion Ratio	2.2
B. Operating Cost	
Variable Cost	
1. Seedstocks (pc.)	1,080
Size	7.5 cm.
Unit Cost (P)	48
Total Cost	51,840
2. Feed (Kg.)	950
Unit Cost (P)	63
Total Cost	59,850
3. Harvest cost	4,320
Total Variable Cost	116,010
Fixed Cost	
1. Labor : Salaries & Wages (1pax handles 2 modules)	15,000
2. Materials & Supplies (Fuel, Oil, etc.) @ P500/mo.	3,000
3. Repairs & Maintenance P300/mo.	1,800
4. Depreciation	22,175
Total Fixed Cost	41,975
Total Operating Cost	157,985
C. Profitability Estimate	
Yield per Crop (Kg.)	432
Selling Price (P/Kg.)	500
Revenue per Crop (P)	216,000
Less: Operating Cost	(157,985)
Net Profit per Crop	62,335
No. of Crops per year	2.0
Net Profit per Year	124,670
Initial Investment	280,330
Estimated ROI	39%

²⁰ APEC/SEAFDEC. 2001. Husbandry and health management of grouper. APEC, Singapore & SEAFDEC, Iloilo, Philippines. 94 p.

As a contributor to rural livelihoods, particularly those of coastal fishers, grouper aquaculture can generate potentially large financial benefits. The high value of grouper on the export market ensures that farmers are able to generate a profit even when stocks suffer mortalities. Despite high initial investment costs, studies have shown that with appropriate support, even the poorest can benefit from grouper culture, with implications for both household well-being and community development.²¹

2. Production Inputs and Logistical Requirements

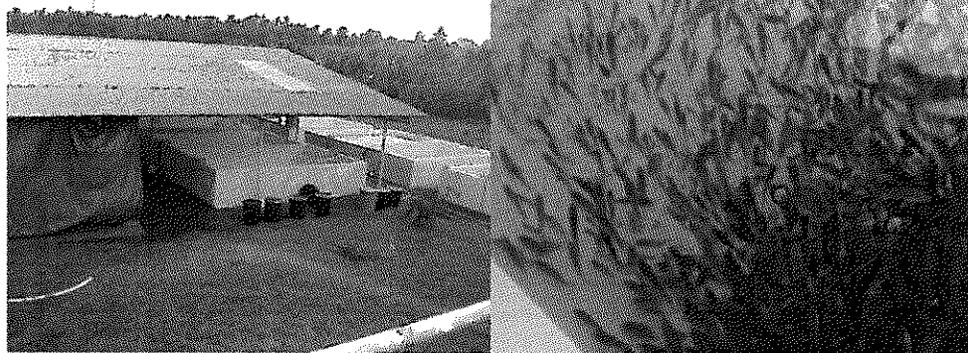
a. Juvenile Sources and Delivery Systems

At this stage when the province does not have its own grouper hatchery or nursery yet, juveniles can be sourced from existing commercial hatcheries and/or nurseries that breed grouper.

Fingerlings are usually delivered packed in oxygenated bags and, depending on the packing density and degree of temperature reduction, can last 8-12 hours.

Recommended density of fingerling to be transported for at least 8 hrs. at 20-22°C:

*2.5 cm (1 in) size - 100-150 fish/L
5 cm (2 in) size - 30-50 fish/L
7 cm (3 in) size - 10-15 fish/L*



Left: grouper hatchery; Right: hatchery-bred grouper fingerlings

For a list of grouper hatcheries and nurseries that are near the province or can easily supply fingerlings (either by land or by air), see Table 5.

²¹ Tupper, 2008

Table 5. Sources of Grouper Fingerlings.

Hatchery/Nursery	Location	Contact Details
Alsons Aquaculture Corp. / Finfish Hatcheries, Inc.	G/F, Alsons Building, 2286 Chino Roces Extension Makati City, Metro Manila Philippines 1231	(02)9823000 (02)9823019
	Maribulan, Alabel, Sarangani Province	(083)508-2314 fhi_mkti@alcantaragroup.com
SEAFDEC-AQD	Tigbauan, Iloilo	(033) 511-9170 to 71 loc 361 or 358 aqdchief@seafdec.org.ph
KGMC Nursery	Kabasalan, Zamboanga Sibugay	09161963271
RM Hatchery & Nursery	Nasipit, Agusan del Norte	09108135252 romel.hipolito@yahoo.com

Source: USAID-GEM

b. Feeds Sources and Delivery Systems

At this stage when the province does not have its own feed mill yet, feeds can be sourced from existing commercial feeds manufacturers or retailers. Commercial feeds usually come in 25-kg bags and in different pellet sizes and nutritive value (with emphasis on protein content), depending on the age/size of the stock (Table 5). Therefore, when planning feeds procurement, it is best to plan ahead and project feeds requirement for a production cycle.

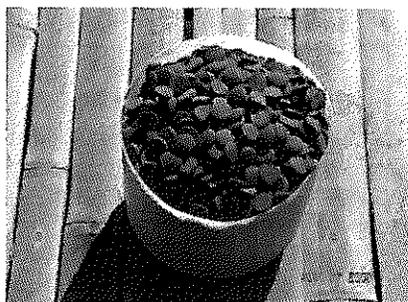


Table 5. Grouper Feed Types

Feed Type	%CP* (min.)	Particle / Pellet size (mm)	Ave. Body Weight (ABW) of Stock (g)	Feed Rate (% Body Weight)	Feeding Frequency
Fry Mash	50	0.5-0.7	Tiny - 2	20-12	6x
Crumble	50	1.2-2.3	2 - 20	12-7	6x
Starter 1	48	2.6-3.0	20 - 35	7-6	5x
Starter 2	48	4.0-4.5	35 - 50	6-5	5x
Grower 1	47	5.0-5.5	50 - 150	5-4.5	2x
Grower 2	47	7.3-7.8	150 - 350	4.5-3.5	2x
Finisher	46	10.1-10.5	350-up	3.5-3.0	2x

* Crude Protein

Source: www.tateh.com

See Annex C for a comprehensive guide on feeding management using grouper formulated feeds. For possible sources of commercial feeds, see Table 6.

Table 6. Sources of Grouper Feeds.

Supplier/Manufacturer	Location	Contact Details
Santeh Feeds Corp.	Manila Office: Santeh Feeds Corporation 601 West Trade Center 132 West Avenue Quezon City	Tel (02) 3751560 to 62 Fax (02) 3748031 09177915478
Oversea Feeds Corp.	Plaridel, Cebu City	Tel (032)2541519 09224867407
San Miguel Corp. / B-Meg Feeds	18th Floor, JMT Corporate Condominium, ADB Ave., Ortigas Center, Pasig City 1605	Tel (02)702 5000 Telefax (02) 634 3036 info@b-meg.com

Source: USAID-GEM

3. Market and Market Linkages

a. Market Destinations

As mentioned in Chapter V Section C, live grouper are primarily for the export market, particularly, Hong Kong and China. However, whether for export or the domestic market, there are usually local traders that act as intermediaries. This has both advantages and disadvantages.

The disadvantage is obviously the lower value that intermediaries normally peg for commodities. However, as explained earlier, prevailing local market rates are still competitive. The advantage, on the other hand, is the convenience of selling stocks since local buying stations are easier to reach (ergo, reducing your transport costs). Moreover, some traders are willing to purchase harvested stocks ex-farm, thereby, totally eliminating growers' costs and additional effort in packing and transport of harvest.

Growers in the province may also directly bring their harvest to nearby live seafood restaurants.



Live seafood restaurant in Tagum City, Davao del Norte

b. Live Fish Buyers

Live fish buyers usually set up buying stations where high-value seafood are produced in sufficient quantities, either from capture fisheries or aquaculture. For a list of high-value seafood buyers / buying stations that are proximate to or can easily access the province, see Table 7.

Table 7. Live Grouper Buyers.

	Company	Owner/ Manager/ Representative	Address	Contact Nos.
1.	Ocean World Marine Products	Nancy Gonato/ Bobby Gonato	Baliwasan Chico, Zamboanga city	(062) 981-0347
2.	J. Maramba Marine Products	Benito sy/ Jackilou Maramba	Varela St., Zone I, Zamboanga city	(062) 993-2029
3.	Cibeles Marine Products Corp.	Paz Mondragon	Macrohon Baliwasan, Zamboanga city	(062) 993-2417
4.	Crustacean Trading, Inc.	Frederick Daculan	Raja Muda Mandi St., Zamboanga city	(062) 991-0762
5.	Yeong Marine Products, Inc.	Armando Bajacan, Operation's Manager	Johnston St., San Jose, Manila Address: 4450D Campos st., Don Galo, Parañaque City	0927-3365196, 0918-9335721, (632) 853-0520
6.	Golden Union Aquamarine Products, Inc.	Merel Tabujara	Baliwasan Chico, Manila Address: 1020 Maura St. Factor Cmpd., Don Galo, Parañaque City	(062) 990-1327
7.	Kenneth Aquamarine Products, Inc.	Consuelo Rectin	Zamboanga city; Surigao City	(062) 991-3135
8.	Marine Dragon Export	Kenneth Salazar	Zamboanga city; Surigao City	(062) 9269072
8.	Nena Baniquid	Nena Baniquid	To be confirmed	To be confirmed
9.	GC-Unimarine Products	Glenn Chua	Zamboanga city; Surigao City Matil City	09177228876
10.	Gold Coast Marine Products	Mr. Anjong, Sorter/ Sizer	Magay St., Zamboanga city	0908-2208209
11.	Star Island	Antonio B. Yanga	Baliwasan seaside, Zamboanga city	To be confirmed

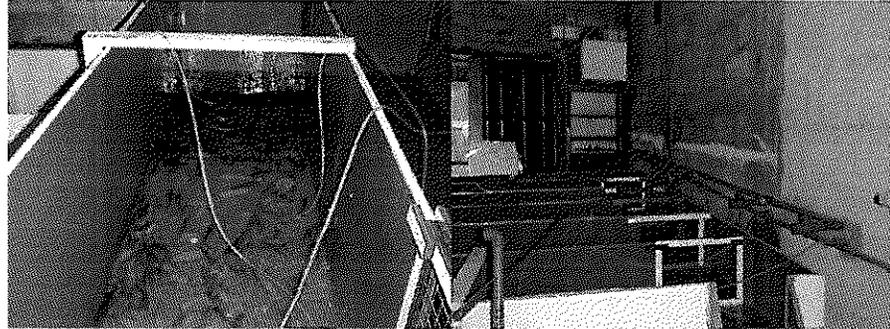
Source: USAID-GEM

c. Logistical Requirements

Harvest and transport requires facilities that can consolidate and deliver live grouper to the market, whether final or intermediary. For the province, common facilities can be developed for the benefit of growers. These can be managed by the local government or private groups.

- **Fish Consolidation Station** – for conditioning of harvest prior to packing, a convenient area to conduct packing, and a holding area for harvested stocks.

This facility may also be utilized to consolidate harvested stocks from different growers in order to meet a required volume; essentially a land-based facility that has access to seawater and equipped with the necessary holding tanks and life-support systems (aeration, filtration, etc.).



Small-scale fish consolidation station, with holding tanks equipped with aeration, filtration, and water supply systems

- **Live Fish Transport System** – especially for outlying areas, a live fish transport system will facilitate transport of live stock from the production area to the consolidation station. It may also be utilized to bring stocks to buying stations. The system can be installed in land-based vehicles (ex. fish car) or pumpboat.

For detailed costs on the abovementioned facilities, see Annex D. Live Fish Transport System and Consolidation Center.²²



Live fish transport system installed on boat

d. Market Information

A common problem of growers is lack of knowledge on current market rates and trends. Consequently, they are preyed upon by unscrupulous traders, who artificially depress prices, claiming that the low value is caused by off-season rates or depreciations in the export market. This can be avoided if the grower is armed with adequate and up-to-date market information and studies. For on-line information on current market rates in the export market, the following websites may be accessed:

- Hong Kong Fish Marketing Organization
http://www.fmo.org.hk/index/lang_en/page_price-sea/
- Network of Aquaculture Centres in Asia-Pacific
http://www.enaca.org/modules/news/article.php?article_id=904
- China Fisheries and Seafood Expo
<http://www.chinaseafoodexpo.com/index.php/seafood-news>

²² Nobillos, Joselito. 2012. Proposed High-Value Aquaculture Production Sites in Eastern Mindanao. SOEMCO

4. Program Plans and Targets

a. Specific Activities

- a.1. Installation of **ten** 4-compartment grow-out modules – these will provide the volume of live grouper to generate the initial economy of scale. These may be managed by duly accredited fisherfolk associations/cooperatives nominated by the LGU. Installation will include procurement of production inputs for 1 cycle production.

Table 8. Proposed Areas for Fish Cage Module Installation

Municipality	Potential Barangays	Notable Sites	No. of Modules
Baganga	11	<i>Ban-ao</i>	1
Banaybanay	6		1
Boston	5	<i>Kabugao Isl.</i>	1
Caraga	6	<i>Caraga Bay</i>	1
Gov. Generoso	14	<i>Monserat</i>	1
Lupon	4		1
Manay	4		1
Mati	16	<i>Mati Mar. Park</i>	1
San Isidro	7		1
Tarragona	3		1
	76	TOTAL	10

- a.2. Establishment of **1** central Fish Consolidation Station (with **1** Live Fish Transport System) – this facility will be strategically located to access all production areas, as well as target market destinations. This can be managed as a profit-oriented operation by either a cooperative or a private enterprise. Aside from consolidating harvest, the facilities may also be utilized for juvenile conditioning and distribution to grow-out sites.

b. Investment Requirements

Table 9. Investment Requirements for Year 1 Projects/Activities

Project/Activity	Unit	Unit Cost (Php)	Qty.	Total (Php)
Grow-out modules (4-comp., including prodn. inputs)	modules	261,000.00	10	2,610,000.00
Fish Consolidation Station	unit	319,500.00	1	319,500.00
Live fish transport system	unit	248,100.00	1	248,100.00
				3,177,600.00

c. Projected Revenue

Table 10. Projected Annual Revenue from Year 1 Projects/Activities

Project/Activity	Projected Revenue (Php) (Annual)		
	Revenue per Unit	Total	Net Profit
Grow-out modules (4-comp., including prodn. inputs)	124,670.00	1,246,700.00	1,246,700.00
Fish Consolidation Station	2,489,400.00	2,489,400.00	2,269,900.00
Live fish transport system	-	-	(248,100.00)
			3,268,500.00

5. Implementing Mechanisms

a. Investment and Local Government Operationalization

The provincial government may opt to fund the establishment of the required facilities and costs for this phase. It may also explore the possibility of securing counterpart investment from the private sector for these projects, such as financing programs for grow-out operations.

The fish consolidation center, as a business enterprise, may also be assumed by the private sector, considering the revenue potential.

Credit programs, specifically, the Development Bank of the Philippines' (DBP) Sustainable Mariculture Investment Program (SMIP) may also be taken advantage of by the provincial government, since it has special arrangements for LGUs, like IRA-intercept payments, re-credit systems extended to end-user beneficiaries (the grower cooperatives), etc.

b. Institutional Mechanisms

b.1. **LGU** - The provincial government, through the Provincial Agricultural Office, may take the lead in overall project supervision. It may also consider the establishment of something like an "HVA Resource Center" that can act in an administrative capacity, coordinating and supervising overall project implementation, as well as be a local technical resource extending technical and support services to growers, investors, and other stakeholders.

b.2. **Consulting Firm** - As this is a crucial phase in the HVA Industry's development in the province, the LGU may well be advised to retain the professional services of an experienced aquaculture consulting firm or individual to minimize the impediments invariably brought about by an inevitable learning curve.

- b.3. **Local Resources** – a number of cooperatives have been trained by USAID (through GEM) and provided with techno-demo grow-out modules. Members of these cooperatives may be optimized and commissioned by the LGU to act as local technical resources in the provision of technical services and guidance to incipient growers.

Table 11. Fisherfolk Associations Trained by USAID-GEM in HVA

Association	Brgy.	Municipality
1. Islander Fisherfolk Association	San Victor	Baganga
2. Kinablangan Development Cooperative	Kinablangan	Baganga
3. Kinablangan Seaweed Growers Association	Kinablangan	Baganga
4. Boston Lobster growers Association	Poblacion Boston	Boston
5. Baybay Fisherfolks Association	Baybay	Cateel
6. Mati Fish Culturist Association	Badas	Mati

Source: USAID-GEM



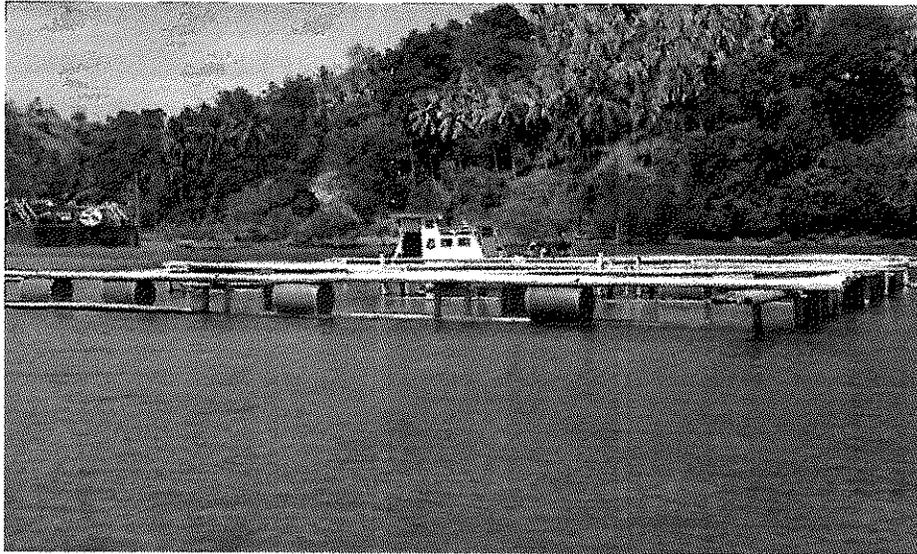
Left: USAID-GEM Aquaculture Team conducts training on High-Value Aquaculture production in Brgy. San Victor, Baganga; Right: Officers of the Kinablangan Devt. Cooperative receive materials for construction of grouper cage module from USAID representatives (June 2013)

B. Medium-term Development Plan (2-3 years)

After its initial year of production, this plan forecasts intensification and expansion of grow-out capabilities and yield. Simultaneously, this stage shall lay the foundation for a “full-cycle” industry whilst ensuring profitability from the other components to be established.

1. Grow-out Production (Expansion and Diversification)

a. Culture System



All-weather resilient 8-compartment floating fish cage module (photo courtesy of C. Andigan)

Aside from the existing 4-compartment “community” modules, the province may significantly boost its production by investing in commercial-scale 8-compartment modules (see Annex E. 8-compartment Module Design, Cost, and Profitability).

b. Profitability Analysis and Budgetary Requirements

Grouper grow-out using 8-compartment modules is much more profitable than the 4-compartment design, not just because of the bigger stocking capacity, but also because this bigger module allows growers to implement multiple cycles simultaneously.²³ Multi-cycle production, which involves redistribution of stock and harvest every three months, while more complex than straight-run production, will enable systematic harvest every quarter, and equates to increased profits, as well as faster and more frequent incomes for growers.

See Annex E for budget requirements and profitability.

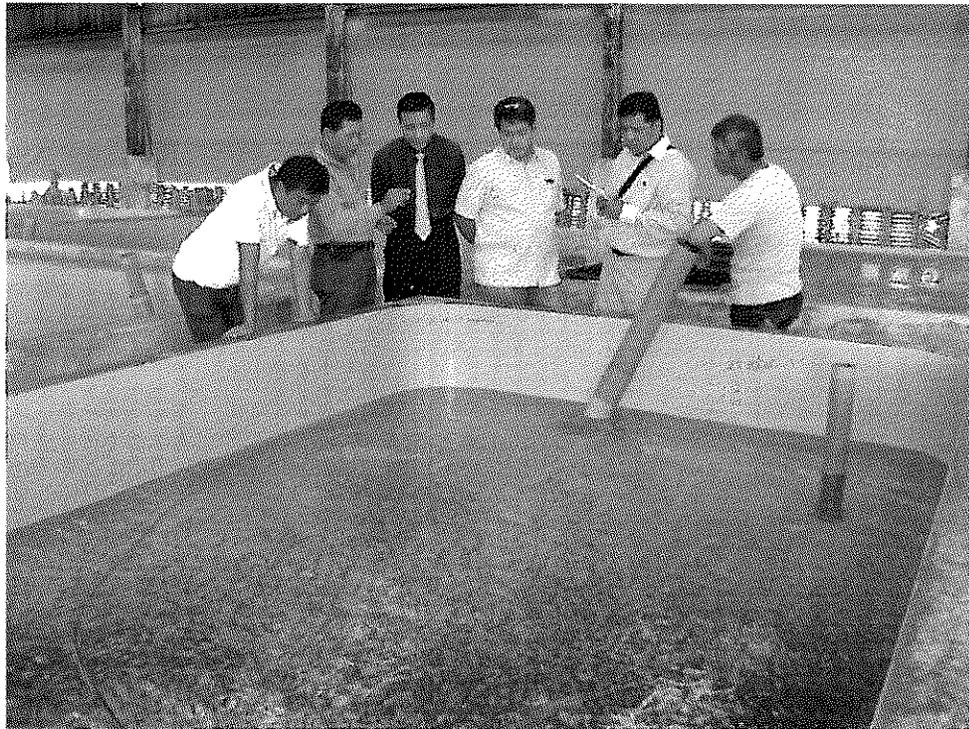
²³ This production technique was developed by Lauro Tito Ilagan, Sr. Aquaculture Specialist of USAID- GEM's Sustainable Aquaculture and Fisheries Effort (SAFE) and introduced to assisted growers during the implementation of the USAID-GEM 3 Program (2008-2012).

2. Nursery Development

At this stage, the province can start gearing towards sustainability of production. Therefore, a local source of seedstock becomes necessary.

A nursery is a facility where fish at either the pre-flexion larval stage or post-flexion larval stage (1.5-2 cm) are bought from a hatchery and reared to 70-80 day old juvenile fingerling stage (10 cm); the nursery then sells the fingerlings to grow-out farmers.²⁴ USAID-GEM, as part of its Sustainable Aquaculture and Fisheries Effort (SAFE), conceived the idea of developing off-site nurseries for pre/post-harvest distribution as the next "ring" in SAFE's economic model. There was a need to establish nursery stations for:

- Distribution of juveniles to grow-out areas
- Facilities for nursery-rearing of larvae
- Freeing up of tanks of post-larval stock in hatcheries to accommodate more spawned larvae



A grouper nursery with a fully-stocked indoor nursery tank (photo courtesy of C. Andigan)

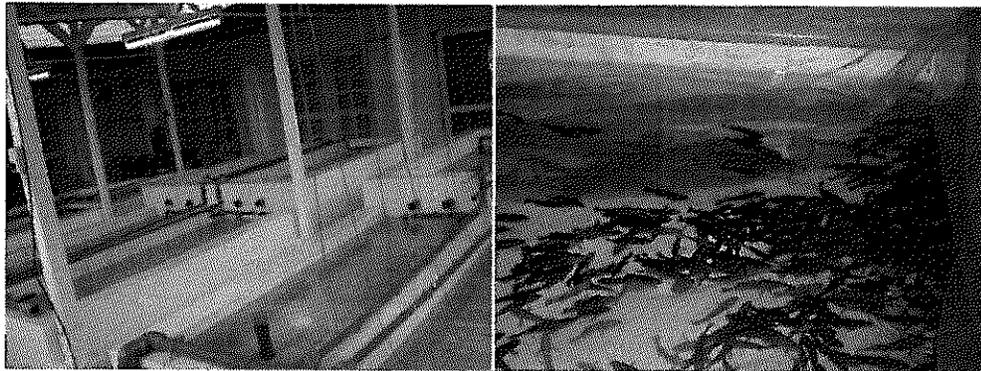
Unlike hatcheries, nurseries are less expensive to construct and operate because they do not possess or maintain "broodstock" or spawners. They can either be land-based, sea-based, or a combination.

²⁴ Ilagan, Lauro Tito. March/April 2012. Green Groupers in Mindanao: KGMC in Focus. Aquaculture Asia Pacific Magazine. ISBN 1793-0561. Singapore.

a. Production Areas

In determining suitable areas for grouper nursery operations, the following parameters must be taken into consideration:

- Access to good seawater;
- Supply of freshwater;
- Accessible by land; and
- Availability of electricity and telecommunications
- With adequate space for land-based structures (such as indoor tanks), land-based ponds, and near the coast (for sea-based nursery cages)



In itself, a nursery can be a very viable enterprise

b. Target Species/Commodity

Nursery production relies on availability of hatchery-bred fry. Therefore, this project will focus on species that are readily produced by existing hatcheries, namely, tiger grouper (*E. fuscoguttatus*) and green grouper (*E. coioides*).

c. Culture System

The grouper nursery will be composed of both sea and land-based rearing facilities. Land-based tanks outfitted with aeration, filtration, and water-circulation equipment will be stocked with grouper larvae and early juveniles for rearing under controlled parameters.

After a certain period, these will be transferred either to sea-based cages or land-based ponds for secondary nursery-rearing. The secondary nurseries will be situated in a protected area with minimal water current to allow the juveniles to gradually adapt to a marine environment.

d. Feeding and Maintenance

The stock will be reared using a combination of natural and formulated feed to eventually "train" them to thrive on a purely formulated diet.

e. Profitability Analysis

Establishing a nursery will essentially have the objective of ensuring the sustainability of the industry by making available a regular supply of juveniles. However, in itself, a nursery can be a very viable enterprise.

Grouper fry will be reared for approximately 2-3 months and transferred to the grow-out area upon reaching the desired size of 3-4 inches per fish, which would then be ready for sale and distribution to grow-out operators. Assuming a 90% survival rate, the initial yield will earn a net profit of around P150,000 per cycle, or P450,000 per year for 3 production cycles. Operating the facility at full capacity can yield a net profit of around P450,000 per cycle, or P1.35 Million annually.²⁵



A USAID-GEM aquaculture specialist shows a sexually mature male green grouper spawner.

f. Budgetary Requirements

See Annex F.

g. Marketing

At this juncture, the province can already initiate exploratory discussions with live fish buyers and also do trial runs of supply to live fish carrier vessels. Establishing a supply route using this system offers a number of advantages to local growers, including reduced cost in post-harvest packing and transport.²⁶

3. Broodstock Development

In preparation for when the province can establish its own hatchery, developing "broodstock" or spawners of desired grouper species may now be initiated. Broodstock are specimen or species, from which a first or subsequent generation may be produced in captivity, whether for growing as aquaculture or for release to

²⁵ Andigan, Cary. 2013. A Beginner's Guide to Grouper Aquaculture in Mindanao, Philippines. Philippines (pending publication).
²⁶ *ibid*

the wild for stock enhancement.²⁷ The term “development” refers to rearing and conditioning desired species of both sexes to become sexually mature.²⁸

Grouper are protogynous hermaphrodites, maturing initially as females, and then changing sex to male at a later age, which is why preparing spawners for use ultimately in hatchery production requires the early collection and accumulation of several pieces of fish of the same species.

Based on USAID-GEM's survey among fishing practitioners in Davao Oriental, it has been determined that a variety of grouper species, including target species for aquaculture, are indigenous and endemic in the coastal waters of the province. Hence, the province should commence collection activities at this stage. Broodstock can be acquired from the wild, through fishermen, and maintained either in sea cages or in land-based facilities. However, wild-caught fish for broodstock development must have been caught using only fish traps (*bobo*) or hook-and-line, undamaged by the fishing, and not subjected to harmful chemicals, like cyanide.



A special large-sized fish trap (*bobo*) designed by USAID-GEM, specifically, for capture of wild grouper to be used as broodstock.

Another method of acquiring broodstock is to grow fish produced in the hatchery. Cage, pond or tank-reared fish are already accustomed to culture conditions and consequently easier to develop into suitable broodstock. However, it can take 4 years to grow juvenile grouper up to broodstock size.²⁹ In the Philippines, the smallest recorded size of sexually mature tiger grouper (*E. fuscoguttatus*) grown in captivity and fed on dry pellets is 2.2 kg (female) and 3.5 kg (male).³⁰

In preparation for eventual upgrading into a full-blown hatchery, collected broodstock may be kept and reared at the provincial nursery. Further, this will save costs on procurement of additional equipment.

²⁷ Food and Agricultural Organization (FAO). <http://www.fao.org/fishery/aquaculture/en>

²⁸ Sugama K., Rimmer M.A., Ismi S., Koesharyani I., Suwirya K., Giri N.A. and Alava V.R. 2012. Hatchery management of tiger grouper (*Epinephelus fuscoguttatus*): a best-practice manual. ACIAR Monograph No. 149. Australian Centre for International Agricultural Research: Canberra. 66 pp.

²⁹ Sugama et al, 2012

³⁰ Andigan, 2013

4. Applied Research and Development (R&D)

The province may, through local academic centers, like the Davao Oriental State College of Science, promote studies and applied research activities to further develop and support its incipient aquaculture industry.

5. Human Resources Development

Similar to R&D, the province may endeavor to encourage local technical-vocational schools and universities to offer courses related to aquaculture, using existing aquaculture (National Certificate 2) training regulations of the Technical Education and Skills Development Authority (TESDA). This is to develop future aquaculture practitioners in the province.

To match academic training with actual local industry requirements, aquaculture students may undergo workplace training, practicum, or on-the-job training in grow-out production areas or the nursery facilities.

6. Legal Framework and Policy Modification

To create the policy environment conducive to high-value aquaculture production and as a business, the LGU may create and enact local issuances that would help promote the industry, such as creating more mariculture parks and/or zones. However, the province may anticipate possible excesses and adverse impacts to the environment, hence, it is prudent to also develop regulations to ensure sustainability. These may include ordinances on the following:

- a. Zoning regulations
- b. Regulations on the indiscriminate catching of grouper fry in the wild
- c. Increased sanctions against illegal and harmful fishing (that may cause harm to nearby fish cage operations)
- d. Setting regulations on the number of cages operating in an area to meet carrying capacity limitations
- e. Regulations on the trade, transport, and sale of grouper species not produced through aquaculture

7. Program Plans and Targets

a. Specific Activities

- a.1. Installation of ten 8-compartment grow-out modules – these will enable the volume of live grouper produced to reach the economies of scale to enable the establishment of a live fish carrier route. These modules may either be owned and financed by private investors or managed by duly accredited fisherfolk associations/cooperatives nominated by the LGU.
- a.2. Establishment of a grouper nursery to provide for the fingerling requirements of the province – the nursery may be initiated by the provincial government and leased to a private operator for commercial operations.

- a.3. Broodstock collection and maintenance – the province will procure and maintain grouper for broodstock development
- a.4. Initiate an applied research program – to be spearheaded by the provincial government and involve local universities and research institutions.
- a.5. Conduct training programs on high-value aquaculture and establish aquaculture courses in local schools – the Provincial Agriculture office can regularly hold training workshops on high-value aquaculture, as well as encourage local schools to offer aquaculture as a tertiary or diploma course.

b. Investment Requirements

Total investment requirements for the abovementioned activities will reach **P6.2 Million** for the 3-year medium-term development phase. Some activities, such as broodstock maintenance, are cost centers, whose benefit will not yet be realized over this period.

However, from all other operations, the province will generate revenues (net) of around **P6.33 Million**.

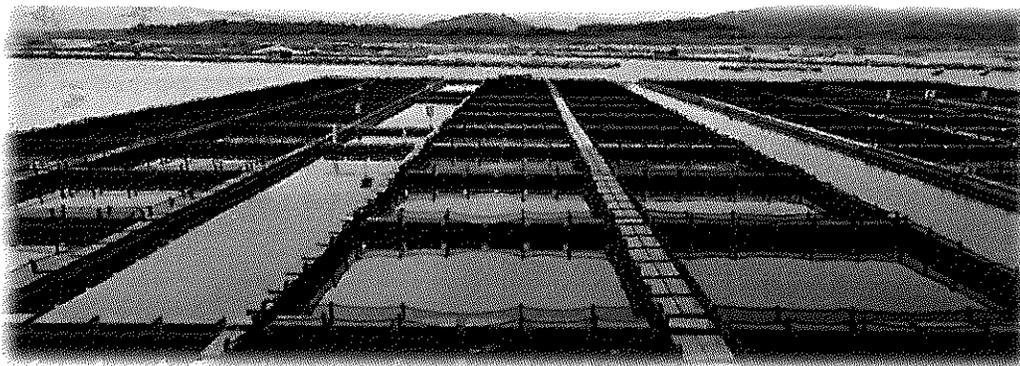
See Annex G. Investment Requirements and Projected Revenues for Medium-Term Phase (3 Years).

8. Implementing Mechanisms

Implementing mechanisms will still be the same, with the provincial government taking the lead in the overall implementation of the industry development plan, with the option of obtaining the services of a private aquaculture technical group.

Public-Private-Partnership (PPP) arrangements may also be explored in nursery development, as well as the 10-compartment modules to be installed.

C. Long-term Development Plan (5-6 years)



This phase in the Development Plan foresees the industry to be fully sustainable and has expanded to include ancillary industries, such as feeds production, juvenile production, intermediary, and downstream/forward industries that can be developed.

1. Grow-out Production

a. Production Areas

It is envisioned that most municipalities will establish their respective mariculture zones to ensure that biological limits of marine ecosystems will not be exceeded. Most of the investment in grow-out production will now come from the private sector.

b. Target Species/Commodity

Local growers will have become very sophisticated in their production methods, diversifying their cultured species to other high-value commodities, like coral trout grouper (*Plectropomus leopardus*) and humpback grouper (*Cromileptes altivelis*). Both species already have full-cycle technology with recent advances in hatchery protocols (even in the Philippines). However, grow-out period of these species in aquaculture is relatively longer. While coral trout may be grown out to reach market size in 7 months, humpback growth rates are much smaller and can take 1.5 to 2 years to culture (boxes 3 and 4).

However, as earlier mentioned, these are the more expensive grouper varieties, with prices ranging from P1,500-3,500/kg, which make them still very attractive to growers.³¹ Juveniles of these species will have to be sourced either from hatcheries outside the province or from local gleaners.

³¹ Domestic market survey, April 2013

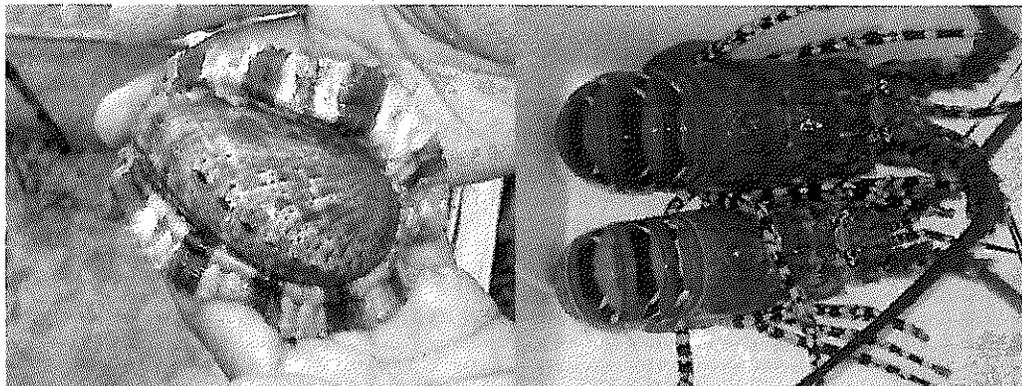
Moreover, depending on how technology will have advanced by the time this stage is in implementation, other high-value seafood that might become viable for full-cycle aquaculture and introduced in the province include lobster (*Panulirus ornatus*), tropical abalone (*Haliotis asinina*), king crab (*Scylla serrata*), and sea cucumber (*Holothuria scabra*).

Box 3. Species Description: Humpback grouper



*Cromileptes altivelis*³²

Common names:	Humpback grouper, panther grouper, mouse grouper, highfin grouper
Vernacular:	<i>kubing, senyorita</i>
Size and age:	Max size 70.0 cm TL
Environment:	Reef-associated; marine; depth range 2–40 m
Climate:	Tropical; 32°N - 23°S, 88°E - 168°E
Importance:	Juveniles are commonly caught for the aquarium trade while adults are utilized as a food fish. Very high value in China Hong Kong SAR live fish markets.
Resilience:	Low, minimum population doubling time 4.5–14 years.
Biology and ecology:	Generally inhabits lagoon and seaward reefs and are typically found in dead or silty areas. Also found around coral reefs and in tide pools. Growth is very slow. Feed on small fishes and crustaceans.



Other high-value seafood: Left – abalone; Right - lobster

³² Tupper, 2008

Box 4. Species Description: Coral Trout grouper



*Plectropomus leopardus*³³

Common names:	coral trout grouper, leopard grouper, red grouper, 7-star
Vernacular:	<i>kubing, senyorita</i>
Size and age:	120 cm TL; max weight 35.0 kg, max. age >40 years
Environment:	Reef-associated; marine; depth range 1–60 m
Climate:	Tropical; 32°N - 23°S, 88°E - 168°E
Importance:	Very high value in China Hong Kong SAR live fish markets. High importance in aquaculture and live reef fish trade. Cultured in Taiwan, Philippines and Indonesia.
Resilience:	Medium, minimum population doubling time 1.4–4.4 years (K=0.16-0.20).
Biology and ecology:	Occurs in lagoon pinnacles, channels, and outer reef slopes, in coral-rich areas and with clear waters. Juveniles in seagrass beds. Feeds on fishes, crabs, and cephalopods.

2. Hatchery Development

A hatchery is a facility where fish eggs are hatched and the fry raised, especially for stocking in grow-out ponds and/or cages.³⁴ Its primary difference from a nursery is in its capability to spawn eggs or larvae.



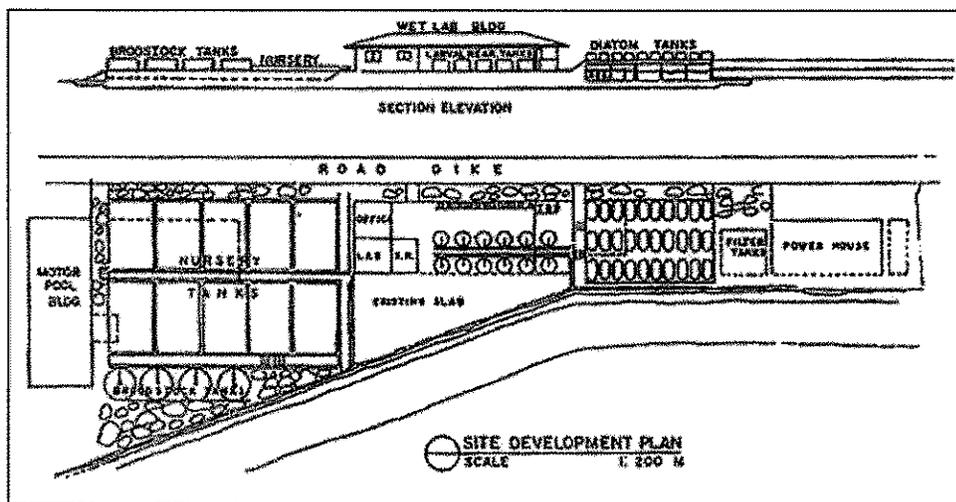
The Tawi-Tawi High-Value Multi-species Hatchery in Bongao, Tawi-Tawi is primarily a grouper hatchery.

For purposes of this development plan, the existing nursery can be upgraded to become a full-blown hatchery (albeit small-scale), rather than set up an entirely different facility. This way, the province will save on costs by just adding to existing

³³ *ibid*

³⁴ Andigan, 2012

facilities and equipment. Moreover, nursery personnel will already have garnered sufficient experience in the nursery part of operations and will be easy to train in additional operations, such as broodstock maintenance, egg collection and hatching, larviculture, natural food production (phytoplankton and zooplankton), and other hatchery systems. The collected spawners from the previous phase will be used for this hatchery's operations.



Sample grouper hatchery lay-out

Hatchery design and operations are much too extensive to be discussed in this plan, but a typical hatchery is generally composed of the following:

- Sea water pumping and distribution system;
- Aeration machinery and distribution system;
- Holding tanks for broodstock;
- Spawning tanks;
- Phytoplankton and zooplankton production laboratory and culture tanks;
- Larval rearing tanks;
- Nursery tanks;
- Wastewater disposal system;
- Office;
- On-site housing for critical personnel.

Suffice to say that if and when the province reaches this stage in its implementation of the industry plan, it will necessarily have to obtain the services of a grouper hatchery specialist or aquaculture institution like the Southeast Asian Fisheries Development Center – Aquaculture Department (SEAFDEC-AQD). This will be discussed more in *Implementing Mechanisms*.

a. Target Species/Commodity

The hatchery will be for the production of primary target species, tiger grouper (*E. fuscoguttatus*) and green grouper (*E. coioides*), although at a later stage it may evolve into a multi-species hatchery.

b. Budgetary and Other Requirements

To upgrade the province's existing nursery into a small-scale 8-LRT³⁵ hatchery will require an estimated cost of P3.02 Million. For details, see Annex H.



Indoor LRTs in a typical grouper hatchery

c. Profitability Analysis

Although a detailed profitability analysis would require a more comprehensive identification of financial details based on projected industry requirements, costs, and other expenses specific to the locality, a general idea of profitability of grouper hatchery operations is presented in Annex I (Grouper Hatchery Projected Balance Sheet).

3. Ancillary Industries and Business Opportunities

a. Natural food production

As the hatchery's production requirements increase, it will make sense for it to outsource some of its subordinate operations, such as natural food production. Natural food refers to phytoplankton and zooplankton required by hatcheries in large volumes and often times needing large outdoor space for tanks.



Hatcheries need plenty of outdoor natural food tanks

An alternative would be to provide natural food "starters" and enrichment media to coastal households with backyard tank space and later buying back fully populated culture media for hatchery use (sold on a per liter basis).

³⁵ Larval rearing tank

b. Wild juvenile collection and consolidation

Coastal fisherfolk may participate in a fingerling collection enterprise, wherein gleaners and fish trappers sell to the nursery grouper fingerlings collected from the wild. The nursery can then rear the juveniles and condition them to captive conditions for an easy transition to grow-out cages. This operation will have to be heavily regulated and limited, however, so as not to deplete local populations or cause harm to coastal and marine habitats.

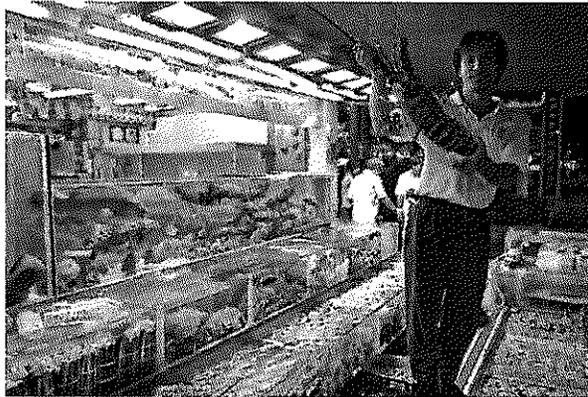


Gleaners can earn from selling wild-caught fingerlings

c. Live fish/seafood trading

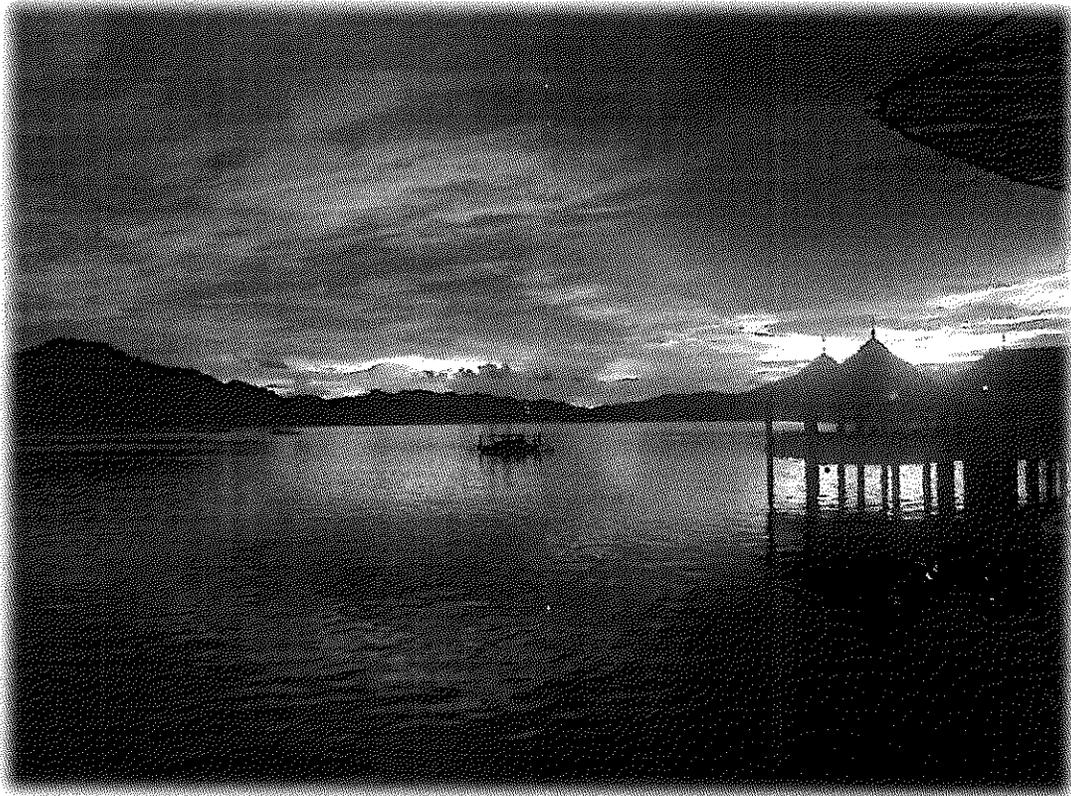
Some local entrepreneurs might be interested in establishing their own market channels, purchasing

pure live fish trading by live harvest from growers, and selling them direct to restaurants or exporters, along with other fresh/chilled seafood for wet markets.



This business would entail having a fully equipped live fish holding station for consolidation and conditioning of stock, as well as adequate refrigeration equipment.

Live fish trading would garner gross revenues ranging from P2.7 to 6.4 Million per month (less expenses), depending on the species to be sold. For an indicative presentation on profitability estimates, see Annex J.



An illustrative presentation of a beachside restaurant for tourists (photos above and below right taken in Coron, Palawan, courtesy of Lauro Ilagan)

d. Beachside and Resort Seafood Restaurants

Complementing the recent passage of Republic Act 10560, declaring Davao Oriental as a tourism development area, the province can capitalize on the high-value aquaculture industry by establishing restaurants specializing in live seafood in beach resorts or beachside properties.

Such establishments would invariably increase the appeal of the province by not just offering exotic beaches, but also tropical seafood cuisine.



4. Program Plans and Targets

a. Specific Activities

- a.1. Creation of legislation and establishment of mariculture zones and parks in 10 municipalities in the province.
- a.2. Installation and operation of at least **460** fish grow-out cage modules (based on initial survey of potential grow-out areas in the province) in the province.
- a.3. Establishment of **1** grouper hatchery
- a.4. Establishment of ancillary businesses – private sector-led

b. Investment Requirements

This plan will not attempt to comprehensively present all of the investment requirements for all 5-6 years of this stage in the plan. However, it is anticipated that the main investment requirement by the province at this stage – given that all other investments will be private in nature – will only be for the construction of the grouper hatchery at P3.02 Million (see Annex H).

5. Implementing Mechanisms

- a. **Private Investment** – at this stage, it is anticipated that the main driver for further business development will be the private sector, especially for small-to-medium enterprises like restaurants, live fish trading, and more grow-out modules.
- b. **BFAR** – BFAR, through its mariculture park program, would provide technical and financial assistance to the province by setting up more mariculture parks. BFAR normally appropriates a total investment of P5 Million for a 200-ha. Park (including moorings, demonstration cage modules, and technical services).
- c. Establishing a commercial hatchery would be more difficult considering the technical and financial requirements involved. Thus, it would again be necessary for the provincial government to initiate this component, possibly through PPP or build-operate-transfer (BOT) arrangement. A good model to follow would be the Tawi-Tawi High-Value Multi-species Hatchery in Bongao, Tawi-Tawi. Built in partnership between the provincial government of Tawi-Tawi and BFAR, it was then leased to a private company for management. Technical assistance was provided by USAID-GEM and **SEAFDEC-AQD**.

SEAFDEC-AQD's Agree-Build-Operate-Transfer (ABOT) Negosyo Program. The country's premier research institution for aquaculture offers LGUs and private investors the opportunity to avail of its technical expertise in various components of an aquaculture business, with flexible remuneration arrangements. For more information about SEAFDEC's ABOT Program, access: http://www.seafdec.org.ph/wp-content/uploads/2011/08/abot_20-July-2012_final.pdf

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US backs redevelopment of typhoon-swept banana industry in ComVal

COMPOSTELA VALLEY—Banana growers in this once thriving agricultural province are still struggling to get back on their feet months after Typhoon Pablo swept about 40 percent of their production areas and plantations. Exporters are having difficulty meeting delivery commitments to prime markets and have delayed banana shipments to the U.S. for almost half a year.

"Losses to banana exporters due to Pablo have exceeded Pnp1 billion. We have been forced to stop shipments to some areas," said Bing Delos Reyes of the Mindanao Banana Farmers and Exporters Association (MBFEA).

Banana is the country's second largest agricultural export industry and Compostela Valley is responsible for about 14 percent of total production. In the last quarterly assessment released by the Bu-

reau of Agricultural Statistics, banana production, which had steadily risen in recent years, posted declining figures owing significantly to the 16 percent drop in Davao Region's output following Typhoon Pablo.

U.S. Embassy Manila's United States Agency for International Development Mission Director Gloria D. Steele said, "Closer coordination among industry leaders, government and donor agencies, is important to accelerate the rehabilitation of banana production areas and restore livelihoods in the area."

"Helping farmers in Compostela Valley regain traction and preparing the local industry for the potential effects of climate change will directly impact the country's overall export competitiveness," Director Steele added.

US BACKS/page 27

tance we can get," said Bernadette San Juan, Assistant Regional Director of DA Regional Field Unit 11. "We welcome the support of USAID which complements DA's post-Pablo rehabilitation effort."

Participants agreed that it was important to enable the immediate revitalization of damaged production areas, coordinate with government on the delivery of assistance to growers, assist growers in accessing farm inputs for the cultivation of alternative crops, and collaborate on the pilot-testing of control measures for the fusarium dis-

ease.

"*Maloko ang nawala sa amin. Sa tulong ng mga ahensya tulad ng DA at USAID, nabigyan kami ng mga farm inputs at training. Imaangal na ang aming kabuhayan.* [We lost a lot. But with the help of DA and USAID, we were given farm inputs and training. We are now moving forward.]" said Alexander De Jesus, a local farmer.

The U.S. Government's ongoing disaster recovery assistance also includes the establishment of techno-demo farms in the hardest hit municipalities in Compostela

Valley and Davao Oriental. These farms will showcase short-term cash crops such as corn and vegetables that can help increase food sufficiency, augment incomes, and strengthen the climate resilience of affected communities. Other climate change adaptive technologies such as protective cropping, integrated pest management and vermi-composting will also be featured as alternatives to minimizing the effects of unfavorable weather conditions and reducing over-all production costs among farmers. **USAID-GEM**

REGIONAL

2 SATURDAY, SEPTEMBER 14, 2013

US embassy earmarks P26.4M for Zambo crisis

The U.S. Embassy has responded to the immediate needs of some 14,000 citizens displaced by the ongoing crisis situation in several areas of Zamboanga City by designating P26,400,000 (US\$600,000) (US AID) to provide relief and emergency through the United States Agency for International Development (USAID). U.S. Ambassador to US EMBASSY page 17

"I want to commend the people in the local community who are banding together through social media and other means to help their friends and neighbors," Thomas said.

This coordination of Philippine and U.S. partners for the assistance of people in need is an example of the close working cooperation between both countries. The items sent were requested by Mayor Climaco of Zamboanga City, Thomas said.

"While we continue to pray for calm to prevail and for a peaceful and speedy resolution to this crisis, we are proud to be able to work beside our Philippine colleagues in time of need," he added.

USAID expects to procure a total of 10,000 units of these items to help meet the needs of evacuees. Additionally, USAID is supporting the local construction of 40 portable toilets and is providing four 500-gallon water tanks to ensure better sanitation and access to water for those who have been displaced.

The delivery of these items has been coordinated by the Armed Forces of the Philippines and the Philippine National Police with the support of the U.S. Joint Special Operations Task Force-Philippines (JSOTF-P).

US EMBASSY -
from page 2
the Philippines Harry Thomas. He said the United States has always been there for the Philippines in times of need, and we continue our tradition today for those suffering in Zamboanga.

Through its local partner Growth With Equity in Mindanao (GEMVA), USAID has procured 5,000 sleeping mats, blankets, tooth brushes, toothpaste, buckets, and canned goods for distribution to those in need.

SUN-STAR Business

Economic Developments | Market Trends | Financial Matters



FUTURE VEGETABLE BASKET Small vegetable growers in Monkayo, Compostela Valley, listen attentively as municipal agriculturist Engr. Christopher Edjie stresses the benefits of vegetable farming at the launch of the Farmer's Field School Project and techno demo, spearheaded by the U.S. Embassy Manila's United States Agency for International Development (USAID) in

partnership with the Philippine government. The project, which supports the vision of transforming the municipality into a major vegetable production area, is part of the U.S. government's ongoing P201-million disaster recovery assistance program for Compostela Valley and Davao Oriental, the two provinces that were most severely affected by Typhoon Pablo. **USAID-DEM/SOMNY MENDOZA**

SUNDAY, SEPTEMBER 29, 2013

MIRIAMAS TIMES

3

MORE NEWS



HOPES FLOWS. Children wait in line to fill their containers with potable water from one of the four 500-gallon tanks provided by the U.S. Government as part of its \$100-million (\$500,000) relief operation amidst the on-going crisis situation in Zamboanga City. U.S. Embassy Manila's United States Agency for International Development (USAID) also procured and delivered 16,000 blankets, 37,300 sleeping pads, medicines, food items, and construction materials for 60 portable toilets to help improve sanitation in evacuation centers. USAID-GEN/Sarah Maghian

'Pablo' damage to banana farms seen at P1B

BANANA growers in Compostela Valley are still struggling to get back on their feet months after "Typhoon Pablo" ravaged last December 2012 about 40 percent of their production areas and plantations.

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US Embassy Manila's United States Agency for International Development (USAID) Mission Director Gloria D. Steele said, "Closer coordination among industry leaders, government and donor agencies, is important to accelerate the rehabilitation of banana production areas and restore livelihoods in the area."

"Helping farmers in Compostela Valley regain traction and preparing the local industry for the potential effects of climate change will directly impact the country's overall export competitiveness," Steele added.

To this end, USAID, in partnership with the provincial and municipal governments of Compostela Valley and the Department of Agriculture (DA), organized a province-wide banana industry forum

to harmonize rehabilitation efforts, showcase alternative crops, and promote climate change-adaptive farming systems and technologies.

The activity is part of the U.S. Government's Php201 million (US\$5 million) Typhoon Pablo disaster recovery assistance, implemented by USAID in partnership with the Mindanao Development Authority (MindA).

Some 180 local growers, representatives of private firms, cooperatives and government line agencies participated in the dialogue. Major banana exporters operating in the area, including Dole, Sumifru, Dizon Farms and the Mindanao Banana Farmers and Exporters Association (MBFEA), presented their plantation rehabilitation plans and discussed related concerns with farmers and contract growers.

"We are grateful that the government and organizations such as USAID have taken an active role in

bridging concerned parties," Delos Reyes said.

For its part, the DA reported on the progress of the government's cash for work initiative and provision of farm inputs and tools, which has so far benefited more than 4,000 growers in the province. The agency also committed to increase its level of assistance to small scale banana producers.

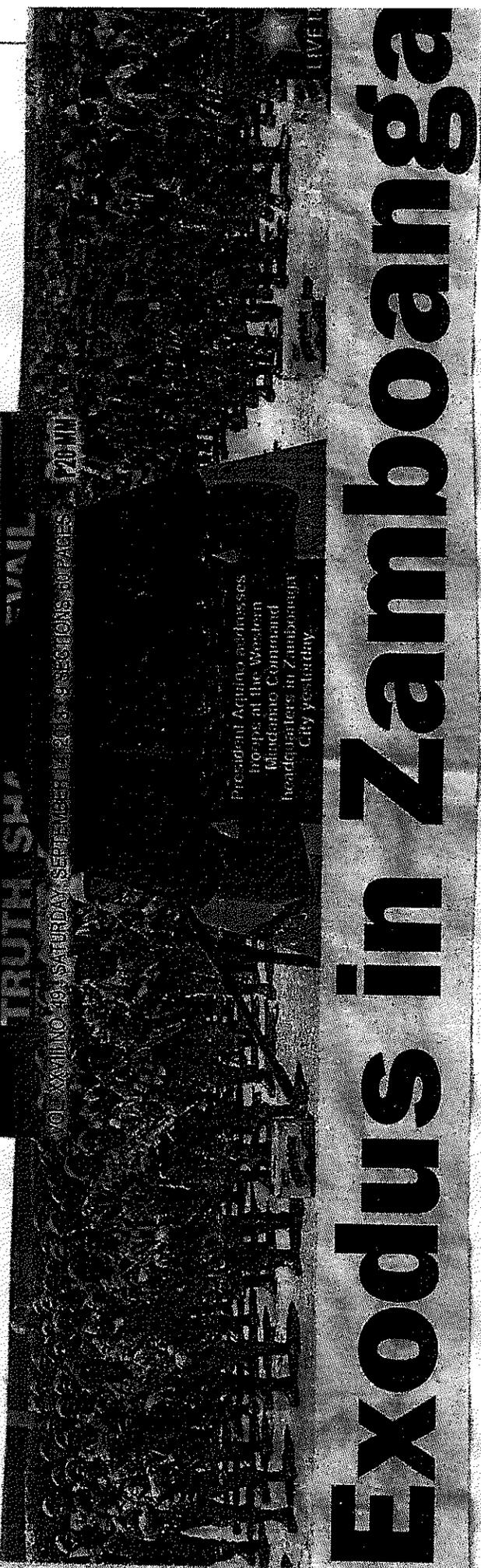
The DA's Bureau of Plant Industry also updated participants on the development of technologies to combat the Panama disease (*Fusarium wilt*), which has threatened the industry since late 2011, and has affected several banana farms in Compostela Valley and neighboring provinces.

Meanwhile, the government-owned Land Bank of the Philippines discussed its financing window designed to help growers fund the rehabilitation or expansion of their production areas. The bank also encouraged farmers to plant corn, cacao, and cardava banana.

THE PHILIPPINE STAR

TRUHAN SPAN... VAL

CELEBRATING 49th SATURDAY SEPTEMBER 20th 3 SECTIONS 10 PAGES P10111



President Aquino addresses troops at the Western Mindanao Command headquarters in Zamboanga City yesterday.

Exodus in Zamboanga

ZAMBOANGA CITY -
BY ROEL PARENO

The streets of Zamboanga started emptying yesterday as residents hurriedly packed belongings and left the besieged city.

Public and private vehicles filled to the rooftops with suitcases and boxes packed with personal and household items crowded the streets, streaming out of the city as government forces moved into position against rebels loyal to Nur Misuari, chairman of the Moro National Liberation Front (MNLF).

The government ordered a forced evacuation in four coastal villages where Muslim men have been held out since the hostilities erupted last Monday.

Mayor Ma. Isabella Collins go Salazar said the city council approved a resolution declaring some parts of the city as "no-man's land" where all residents must move out.

Salazar said the affected barangays included Rio Hondo, Sta. Barbara, Sta. Catalina, Jacon-Balon, Casangyampang, Marigu and Mampang.

Long lines of trucks, jeeps and motorcycles soon left these areas. Police were tasked to check identification.

Turn to Page 9

Exodus

From Page 1

papers to make sure no rebels would slip out.

Armed forces of the Philippines (AFP) spokesman Bely Gen. Domingo Tujan Jr. announced the city government's order for a forced evacuation.

The evacuation is expected to swell the number of residents displaced by the fighting. Earlier, authorities counted 5,607 families or about 20,557 people already housed in 17 evacuation centers in the city.

In the absence of a ceasefire, soldiers continued to flush out the MNLF rebels, whose occupation of several barangays has trapped hundreds of civilian residents.

Fighting continued into the fifth day, marked by exchanges of mortar and sniper fire. In Sta. Barbara, government forces entered a school and a mosque vacated by the MNLF and recovered the corpses of at least two suspected rebels.

Some homes in nearby Sta. Catalina were ablaze after another firefight broke out between the troops and the rebels. Initial reports said 11 people were injured as the rebels fired rocket-propelled grenades at the advancing troops in Sta. Catalina.

Among the injured were five Red Cross volunteers, two policemen, a representative from the Commission on Human Rights, two soldiers and a

and 16 civilians caught in the crossfire.

"Our mission is to contain them. If there is movement by the rebels, we will undertake calibrated action," Zagalza said. Zagalza said government forces had recovered advanced positions formerly occupied by the rebels.

This developed as a Catholic priest held hostage by the rebel leader. His week was released yesterday.

Fr. Michael Orlana, one of the hostages used as human shield by the rebels since the fighting broke out, was released unharmed.

Orlana, shot in white-shirted clerical garb with a chest wound, said he was shocked to freedom at the intervention of Laurel and Sen. Gualina. Police chief Venator, superintendent Jose Churiano, Malayo and other authorities in neighboring areas.

The priest told police that the rebels were still looking for shelter and fatherly hostage.

Priest visits Zambo

Assistant Aquino flew to Zamboanga City yesterday and visited the wounded policemen and soldiers at a military hospital.

"I am here to help and sympathize to the extent possible. I don't believe it's proper for me to spend all my time in Manila while you here have to go at it alone. This problem has taken long enough. I've been with you since the beginning, and

I'll be here until the situation is resolved," Aquino told the wounded.

He also handed over boxes of relief goods to soldiers during a brief meeting at the Naval Forces Western Mindanao headquarters.

Aquino also planned to visit some evacuation centers to see the conditions of the affected civilians.

Accompanying Aquino were Armed Forces chief Gen. Emmanuel Bautista and Philippine National Police chief Director General Alan Purisima. They assessed the condition of the wounded soldiers before returning to the war room.

Various sectors are also pitching in to help the evacuees displaced by the five days of fighting.

Assistance for the displaced

The US government is giving assistance to those displaced by the fighting. In a statement, the US embassy said \$500,000 or P26.3 million has been allocated for relief and emergency assistance for the affected residents.

"The United States has always been there for the Philippines in times of need and we continue that tradition today for those suffering in Zamboanga," US Ambassador Henry Thomas Jr. said. "I want to commend the people in the local community who are banding together through social

their friends and neighbors." The assistance will be channelled through the United States Agency for International Development (USAID).

The first batch of relief goods consisting of blankets, sleeping pads, toilet paper, water buckets, baby diapers, bottled water and canned sustenance was expected yesterday.

USAID will also install portable toilets and water tanks to help evacuees get access to clean drinking water.

It has procured 5,000 bottles of water, 1,500 sleeping mats, blankets, toothbrushes, toothpaste, buckets and canned goods for distribution.

It expects to procure a total of 10,000 units of these items to meet the needs of evacuees.

USAID is also supporting the construction of 40 portable toilets and is providing 100,000-gallon water tanks to ensure better sanitation and access to water.

Truckloads of relief

On Thursday, the ARMM sent to Zamboanga City three truckloads of relief goods for distribution to displaced residents. Amihika Sangayapan, chief of staff at the Office of the

Regional Governor, said the supplies, consisting of food, tents, blankets, medicine and other necessities, would be packed in 100 boxes and sent to the office of the Zamboanga City mayor.

ARMM local government under secretary Jamil Hamid said many of the evacuees, who are residents of Basilan, Sultan Kudat and Davao, have been

displaced by the ARMM Gov. Mufly Haffman had mobilized the region's inter-agency humanitarian emergency action and response team (HEART) contingent to help address the needs of thousands of displaced Zamboanga residents.

The relief supplies consisted of tarpaulins that can be used as tents and sleeping mats. Sangayapan added, Haffman has also directed the ARMM's health department to organize a medical team to assist the office of the

star in attending to the health needs of the evacuees. Sangayapan said they were coordinating with the police and military for the shipment of relief supplies. With Jaime Landa, Sheila Crispiniano, Edith Regalado, John Urton, Evelyn Maranan, AFP

Zamboanga Assistance

BUTUAN CITY - Food packs, boxes of medicines, and food, and other basic necessities were distributed to a huge number of displaced individuals in the war-torn southwestern city of Zamboanga.

The Region 13 offices of the Department of Social Welfare and Development (DSWD-13) in the Caraga Region, Northern Mindanao, and Southern Mindanao already deployed their relief assistance to that city.

The United States (US) government also allocated some P25-million for the acquisition of food, medicines, and other basic necessities for the displaced residents of Zamboanga City.

"In an expression of concern for the well-being of the people of Zamboanga, the US embassy is responding to the immediate needs of 16,000 citizens displaced by the on-going crisis situation in several areas of the city," said site contact person of the United States of Agency for International Development Sarah Matalam.

She said that the first batch of relief goods was delivered Friday, consisting of blankets, sleeping pads, baby diapers, bottled water, and canned sardines. (Mike U. Crismundo, Alexander D. Lopez, and Camcer Ordoñez-Imam)

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MANILA BULLETIN

THE PHILIPPINES' LEADING NATIONAL NEWSPAPER

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No Ceasefire - Gazmin

Peace Talks Early Death Toll Rises To 53 As Fighting Continues

Peace talks between the government and the rebel group, the New People's Army (NPA), have failed to produce any significant results, according to a report from the Department of Health (DOH) on Sunday. The report states that the death toll from the conflict has risen to 53, with 15 more people injured. The DOH also reported that the NPA has been active in several areas, including the provinces of Mindanao and Luzon. The report also mentions that the NPA has been using various tactics, including ambushes and bombings, to achieve its goals. The government has expressed its willingness to continue peace talks, but only if the NPA agrees to a ceasefire. The NPA has refused to do so, claiming that the government is not sincere in its efforts to achieve peace. The conflict has caused significant suffering and displacement of people, and it is hoped that a peaceful resolution can be found soon.

No Ceasefire...

(Cont'd from page 1)

boanga City standoff but President Benigno S. Aquino III and Misuari failed to agree on some terms proposed to end of the hostilities.

"I'm sad but it was worth a try," Binay told Manila Bulletin over the phone shortly upon his arrival from Zamboanga City where he had met with Aquino, Gazmin, Armed Forces of the Philippines (AFP) Chief of Staff Emmanuel Bautista, and Philippine National Police (PNP) chief Alan Purisima to discuss the issue. Binay was accompanied by his son, Makati Mayor Junjun Binay.

"I'm sad because I only wanted to secure the release of the hostages and prevent further bloodshed," Binay said, speaking in Filipino.

He declined to comment when asked whether there will be another round of negotiations for a peaceful settlement of the standoff.

In a statement released last night, Binay's spokesman, Joey Salgado, said, "The Vice President is sad that his efforts to secure the release of the hostages in Zamboanga City did not prosper. Both the MNLF and the Philippine government wanted peace, but there were terms set that were not acceptable. The Vice President asks everyone to pray for the safety of the hostages and for peace in Zamboanga City."

With the renewed fighting, the death toll in the Zamboanga crisis, which entered its sixth day yesterday, climbed to 53, with at least 70 wounded.

The number of displaced residents on the other hand, rose to more than 60,000.

Ceasefire Talks

Binay put the truce plan to Misuari and Gazmin late Friday as the gunmen torched homes and tens of thousands in the city of nearly one million fled the fighting.

Deputy presidential spokeswoman Anibal Valte said that until the ceasefire was implemented, military operations would continue "as necessary."

Salgado said the vice president had talked to Misuari, a contemporary at the University of the Philippines (UP), Friday night to propose a ceasefire that would come into effect at midnight Saturday.

"He talked to Misuari and he talked to Gazmin, and they agreed to discuss a ceasefire," Salgado told AFP early Saturday.

Gazmin assured that the government is taking all steps to prevent a bloody confrontation.

Still No Truce

But as of yesterday morning, gunfire and explosions were again heard in Zamboanga City.

Gazmin said firing continues as the ceasefire has never been implemented, and that it will not take effect as long as the rogue Moro rebels will not stop firing at government forces securing the city.

The secretary also said Vice President Binay had called him up Friday

night and said he can "reach out" to Misuari. Gazmin added the Vice President then asked him if he would have no objections to a ceasefire.

"I told Binay all of us want peace. He said he can talk to Misuari. I said government troops will stop firing only if the MNLF stops firing," said the defense chief.

Casualties

Based on data released by the AFP, the number of casualties from the ongoing Zamboanga crisis is now 124, with 53 dead mostly MNLF fighters, and 70 wounded.

Among the 53 fatalities, the AFP said, three were soldiers, three policemen, four civilians, and 43 MNLF rebels.

On the other hand, 35 soldiers, six policemen, 20 civilians, and nine rogue MNLF elements have so far been wounded in the on-going skirmishes that started before dawn on Monday.

19 MNLF Fighters Captured

The AFP reported that another encounter took place at around 1:04 a.m. yesterday in Barangay Kasanyangan resulting in the death of one Marine soldier and four MNLF elements. Five soldiers were also wounded while government security forces recovered one M60 machine gun and an armalite rifle.

At around 3:30 a.m., a firelight was also reported at KKK Building.

60,000 Displaced

A report by the Mindanao Human Rights Action Center (MinHRAC), citing data from the Department of Social Welfare and Development (DSWD), showed the number of displaced people in Zamboanga City is now 60,000 or 14,000 families.

It said the dramatic rise in number of displaced persons was due to the forced evacuation that was implemented Friday.

The affected residents are currently sheltered in 20 evacuation centers in the city.

Relief Goods Pouring In

With the standoff, local and foreign institutions are pouring in relief assistance to thousands of residents affected.

The United States Agency for International Development and the International Committee of the Red Cross started bringing in relief goods through their local conduits Thursday. USAID and ICRC officials said yesterday.

Parcels containing enough food for 27,000 daily rations were provided to the local Red Cross branch in Zamboanga (Thursday) to feed people sheltering in evacuation centers set up by the local authorities. The rations consist of basic food items like rice, oil, salt, sardines, soy sauce, sugar and coffee. ICRC's Anton Lopez said in a press statement.

The Department of Social Welfare and Development (DSWD) continues to send additional food and other basic needs of the affected families.

DSWD-Caraga sent last Thursday

P1.9 million worth of relief supplies composed of 3,000 family food packs, 480 blankets, and one unit big tent.

Likewise, DSWD Region 10 provided 2,000 family food packs, 2,000 hygiene kits, 100 sacks of rice, 20 pcs of tarpaulin, 20 cases of sardines, 20 cases of corned beef, and 100 boxes of coffee. DSWD-Region 11 also sent 3,000 family food packs and 1 big tent.

Basilan Folk Seek Help

In Basilan, thousands of residents displaced by hostilities between joint fighters from the MNLF Abu Sayyaf Group (ASG), and the Bangsamoro Islamic Freedom Fighters (BIFF) on one side and government security forces on the other are now appealing for humanitarian assistance.

A report by the Mindanao Human Rights Action Center (MinHRAC) said hostilities in the island province have spread from Lamitan City to the towns of Tuburan, Tipo-Tipo, and Akbar. MinHRAC is a member of the International Monitoring Team-Civilian Protection Component (IMT-CPC) of the GRP-MNLF Peace Process and a partner NGO of the Commission on Human Rights (CHR).

Amid the standoff in Zamboanga City, clashes also broke out Thursday in Barangay Coloria, Lamitan City, Basilan, after armed men identified with Misuari attacked two military detachments in the area.

Three soldiers were killed while nine others were wounded during that attack (With reports from Madel S. Namit, All G. Macabalang, Elsiayn B. De Vera)

PHILIPPINE DAILY INQUIRER

BALANCED NEWS, FEELINGS

Gov't calls for more aid to evacuees

THE GOVERNMENT has urged Filipinos to send more aid for more than 100,000 people who have fled heavy fighting between state security forces and Moro rebels in Zamboanga City, calling their plight a "humanitarian crisis."

The conflict has claimed more than 100 lives since 200 rebels from the Moro National Liberation Front (MNLF) faction led by Nur Misuari stormed into Zamboanga City on Sept. 9 in a bid to derail peace talks between the government and a rival group, the Moro Islamic Liberation Front.

While many of the MNLF rebels have surrendered and most of the dozens of hostages they took have escaped or been freed, attention has turned to conditions faced by 118,819 people displaced by the fighting.

"This has become a humanitarian crisis," Social Welfare

GOV'T/AN

Gov't calls for more aid to evacuees

From page A1

Secretary Dinaky Soliman said Agency France-Press on Saturday.

Soliman said those displaced were staying in 57 evacuation centers, including the city's main sports complex, where more than 70,000 people lodged for space and erected tents and shelters fashioned from scavenged materials.

"We are trying to organize them by providing them better materials," she said, but appealed to the public to send in more aid in the form of clothes, food, education materials and toys for the many children among the displaced.

"Tenters are very fragile. If it starts raining hard, there will be a massive problem for chil-

dren, women, the elderly, the babies and their caregivers," she said.

The United Nations Office for the Coordination of Humanitarian Affairs has said in a report that there was an insufficient supply of tents, cooling systems and health and sanitation facilities.

It added that children were traumatized while immunizations for common diseases were being undertaken to prevent an outbreak.

Children's protection

The United Nations Children's Fund (Unicef) has provided hygiene and water kits to protect the children from diseases and tents that serve as temporary learning spaces.

But Unicef said reports indicated that more needed to be

done to protect children's rights and ensure their well-being.

The Unicef said action must be taken to prevent diseases, such as diarrhea, pneumonia and measles, and prevent malnutrition among children, including the protection and promotion of breast-feeding, and the prevention of uncooled, unprocured, unaccepting distribution and use of infant formula that increase the risk of diarrhea and malnutrition at emergency sites.

The earliest resumption of education must be ensured along with special protections to reduce the additional risk of neglect, abuse and exploitation

of and violence against children that commonly accompany prolonged instability and insecurity, it said.

Special care and support services must be provided to children to reduce and deal with conflict-induced psychosocial problems, such as distress, depression, anxiety disorder and trauma, it added.

Registering evacuees

Soliman urged displaced people who were not staying in evacuation centers to register with the city's Social Welfare Office to receive assistance from the government.

The Social Welfare Office has branches in the districts where the evacuees can register.

Most relief goods arrived in Zamboanga City on two Philippine Coast Guard vessels on Saturday.

Armand Balilo, spokesman for the Coast

Guard, said the BRP Edsa and the BRP Corregidor carried rice, groceries and other relief goods sent by the Department of Social Welfare and Development (DSWD).

On Thursday, another Coast Guard vessel, the BRP Pampanga, arrived in Zamboanga City carrying rice, groceries and high-energy biscuits for the evacuees.

In a meeting with her department's staff, Soliman gave instructions for all people in evacuation centers to be given, in addition, to food and other necessities, stress tabling to help them deal with trauma from their experience.

Soliman reported that 9,500 hygiene kits containing bath soap, detergent, a towel and a pal were given to evacuees

staying in the city's main sports complex.

The evacuees were also given eating utensils, mats and tube skins, she said.

Red Cross meals

The DSWD has engaged local food providers and other organizations to feed the evacuees.

The Philippine National Red Cross has also helped provide 10,000 meals every night to augment those coming from local organizations.

Full-time day shift at the hospital began, feeding the evacuees has cost more than P1 million with the DSWD providing P1 million, the local government P1 million and private groups P1.4 million.

Reports from AFP, Cynthia Batana and Jerry Espinada

Monday, September 20, 2004

Business Week
The Nation



Tragedy
A construction worker is seen in a dark tunnel, possibly a subway station, after a major earthquake in Mexico City. The image shows the aftermath of the quake, with debris and structural damage visible in the background.

Agriculture/Environment

B-4

Editor: MARIANNE V. GO

Sunday, September 1, 2013

US gov't supports redevelopment of ComVal banana industry

COMPOSTELA VALLEY - Banana growers in this once thriving agricultural province are still struggling to get back on their feet months after Typhoon Pablo swept about 40 percent of their production areas and plantations.

Exporters are having difficulty meeting delivery commitments to prime markets and have delayed banana shipments to the US for almost half a year.

"Losses to banana exporters due to Pablo have exceeded P1 billion. We have been forced to stop shipments to some areas," said Bing Delos Reyes of the Mindanao Banana Farmers and Exporters Association (MBFEA).

Banana is the country's second largest agricultural export industry and Compostela Valley is responsible for about 14 percent of total production. In the last quarterly assessment released by the Bureau of Agricultural Statistics, banana production, which had steadily risen in recent years, posted declining figures owing significantly to the 16 percent drop in the Davao Region's output following Typhoon Pablo.

US Embassy Manila's United States Agency for International Development (USAID) mission director Gloria D. Steele said, "Closer coordination among in-

dustry leaders, government and donor agencies is important to accelerate the rehabilitation of banana production areas and restore livelihoods in the area."

She added, "Helping farmers in Compostela Valley regain traction and preparing the local industry for the potential effects of climate change will directly impact the country's overall export competitiveness."

To this end, USAID, in partnership with the provincial and municipal governments of Compostela Valley and the Department of Agriculture (DA), organized a province-wide banana industry forum to harmonize rehabilitation efforts, showcase alternative crops, and promote climate change-adaptive farming systems and technologies.

The activity is part of the US Government's P201 million (\$5 million) Typhoon Pablo disaster recovery assistance implemented by USAID in partnership with the Mindanao Development Authority (MindA).

Some 180 local growers, representatives of private firms, cooperatives and government line agencies participated in the dialogue. Major banana exporters operating in the area, including Dole, Sunmfru, Dizon Farms and the MBFEA presented their

plantation rehabilitation plans and discussed related concerns with farmers and contract growers.

"We are grateful that the government and organizations such as USAID have taken an active role in bridging concerned parties," Delos Reyes said.

For its part, the DA reported on the progress of the government's cash for work initiative and provision of farm inputs and tools, which has so far benefited more than 4,000 growers in the province. The agency also committed to increase its level of assistance to small-scale banana producers.

The DA's Bureau of Plant Industry also updated participants on the development of technologies to combat the Panama disease (Fusarium Wilt) which has threatened the industry since late 2011 and has affected several banana farms in Compostela Valley and neighboring provinces.

Meanwhile, the government-owned Land Bank of the Philippines discussed its financing window designed to help growers fund the rehabilitation or expansion of their production areas. The bank also encouraged farmers to plant corn, cacao, cardava banana and cassava as alternative income sources while banana production areas are undergoing rehabilitation.

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17 Sep 2013

Supplies, volunteers continue to pour in Zambo City

Report

from [Government of the Philippines](#)Published on 16 Sep 2013 — [View Original](#)[Print](#)[Recommend](#)

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[✉ EmailBy: Dominic I. Sanchez](#)

ZAMBOANGA CITY, Sept 16 (PIA) – Donations and

volunteers continue to pour in Zamboanga in these critical times.

City councilor Myra Paz V. Abubakar said that resources have been coming in from different organizations –government, private, local or foreign.

"As of September 14, we already have 25 evacuation centers in the city, the biggest of which is in the Joaquin Enriquez Memorial Sports Complex," said Abubakar. "Relief operations done by government and non-government organizations continue."

The USAID, according to Abubakar is by far the biggest outside donor. "USAID gave us 10,000 noodles, 10,000 styro cups, blankets, pails, toiletries, mats, portalets and the like," she said.

"The fishing companies had provided us with fish. Local caterers like Cecille's, Chinitos, Zamboanga Seafood and many others have also been continuous in providing food," Abubakar said.

In addition to food, supply, and medicine, organizations provide round-the-clock service for evacuees. They cook and deliver food, provide medical services, and just about anything needed. The JCI Zamboanga, Rotary Club, and the Zamboanga Archdiocese, to name a few, are providing 24/7 service to evacuees.

"Schools and universities have put up kitchens in some evacuation centers," she added.

Food was not only prepared for the affected families, but also for soldiers and policemen there.

Meanwhile, DSWD Information Officer Jayson Elias said the Tzu Chi Foundation has provided 14 metric tons of potable water distributed to service facilities in evacuation centers. He said help coming from many sources are overwhelming.

But the evacuees are not simply waiting to be served. In the centers, they help cook and serve food for thousands of fellow displaced persons. Everybody works, helping one another. Many lack sleep.

Social Welfare Secretary Dinky Soliman earlier praised the spirit of the Zamboanguenos, citing that this same spirit will lead the city towards victory even in difficult times such as this. "Magtatagumpay ang mga Zamboangueno," she said.

For her part, fourth ent Jenny Rojas helps DSWD repack relief goods like used clothing, sanitary

napkins, noodles, and the like at the command center at the Women Center.

"Kahapon lang po ako nagsimulang mag-volunteer, pero itutuloy ko po ito. Kung walang klase at nasa bahay lang ako, mas mabuti po kung tutulong na lang ako. Kawawa na po talaga ang mga tao," Jenny said.

Councilor Abubakar says food and supplies are sufficient even as the number of affected persons is over 62,000.

Abubakar is very thankful for the help, but is concerned that donors' resources may soon be depleted.

One of the victims, Ronnie Cario, lost his home and property to a fire in Sta. Catalina. "Wala na ko'y maulian (I have no home)," he wept. But in spite of this very sad experience, he firmly believes that the crisis will end soon.

"Hapit na siguro mahuman kining gubut, daghan tag mga tangke ug perting isuga sa atong mga sundalo (Maybe the end to this violence is near. We have many tanks, and we have many brave soldiers)," he said. In spite of what he had lost, Ronnie is hopeful. (NBE/DIS/PIA9-ZBST)

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Aids, volunteers continue to pour in Zambo

Tuesday, 17 September 2013 13:47

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Mindanao banana exporters suffer P1-B losses from Typhoon

By **Bernie Cahiles-Magkilat**

Published: August 15, 2013

Losses to banana exporters due to Typhoon Pablo have exceeded R1 billion as growers have been forced to stop shipments to some areas, the Mindanao Banana Farmers and Exporters Association (MBFEA) reported.

Bing Delos Reyes of MBFEA said in a statement released by USAID-GEM (Growth With Equity In Mindanao) that banana growers in this once thriving agricultural province of Compostela Valley are still struggling to get back on their feet months after Typhoon Pablo that swept about 40 percent of their production areas and plantations.

Exporters are having difficulty meeting delivery commitments to prime markets and have delayed banana shipments to the U.S. for almost half a year, the statement said.

Banana is the country's second largest agricultural export industry and Compostela Valley is responsible for about 14 percent of total production. In the last quarterly assessment released by the Bureau of Agricultural Statistics, banana production, which had steadily risen in recent years, posted declining figures owing significantly to the 16 percent drop in Davao Region's output following Typhoon Pablo.

U.S. Embassy Manila's United States Agency for International Development Mission Director Gloria D. Steele said, "Closer coordination among industry leaders, government and donor agencies, is important to accelerate the rehabilitation of banana production areas and restore livelihoods in the area."

"Helping farmers in Compostela Valley regain traction and preparing the local industry for the potential effects of climate change will directly impact the country's overall export competitiveness," Steele added.

To this end, USAID, in partnership with the provincial and municipal governments of Compostela Valley and the Department of Agriculture (DA), organized a province-wide banana industry forum to harmonize rehabilitation efforts, showcase alternative crops, and promote climate change-adaptive farming systems and technologies.

The activity is part of the U.S. Government's P201 million (US\$5 million) Typhoon Pablo disaster recovery assistance, implemented by USAID in partnership with the Mindanao Development Authority.

The U.S. Government's ongoing disaster recovery assistance also includes the establishment of techno-demo farms in the hardest hit municipalities in Compostela Valley and Davao Oriental. These farms will showcase short-term cash crops such as corn and vegetables that can help increase food sufficiency, augment incomes and strengthen the climate resilience of affected communities. Other climate change adaptive technologies such as protective cropping, integrated pest management and vermi-composting will also be featured as alternatives to minimizing the effects of unfavorable weather conditions and reducing over-all production costs among farmers

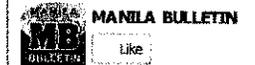
Major banana exporters operating in the area, including Dole, SumiFru, Dizon Farms and the Mindanao Banana Farmers and Exporters Association (MBFEA), presented their plantation rehabilitation plans and discussed related concerns with farmers and contract growers.



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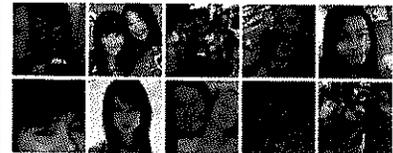
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US sets aside P26-M for Zamboanga aid

ABS-CBNnews.com

Posted at 09/12/2013 6:25 PM | Updated as of 09/12/2013 6:25 PM

MANILA – The United States has come to the aid of the people of Zamboanga amid the ongoing standoff between government security forces and Moro National Liberation Front (MNLF) rebels.

The US Embassy in Manila announced that it has set aside over P26 million for relief assistance for the residents affected by the standoff.

The funds, which will be sourced from the US Agency for International Development (USAID), will be used to buy bottled waters, sleeping mats and canned goods, as well as portable toilets and water tanks.

At least 13,000 residents from at least 6 barangays have already fled their homes as the fighting enters its fourth day today.

Some residents are also now starting to get sick.

They are complaining of coughs and colds due to the cold weather and lack of roofing. They are also complaining of lack of food.

Some residents have already set up tents in the open field while some were forced to sleep on the road due to lack of space.

The standoff has already claimed at least 12 lives.

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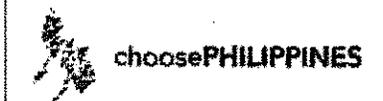
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US earmarks P26.4 million for Zamboanga aid

by Roy Mabasa
September 12, 2013

The United States government has set aside \$600,000 (roughly P26.4 million) to help address the immediate needs of some 14,000 citizens displaced by the ongoing crisis situation in several areas of Zamboanga City.

In a statement issued Thursday afternoon, the US Embassy in Manila said the emergency assistance, which will be released through the United States Agency for International Development (USAID), is an expression of concern for the well-being of the people of Zamboanga.

"The United States has always been there for the Philippines in times of need, and we continue that tradition today for those suffering in Zamboanga," said US Ambassador Harry K. Thomas, Jr.

According to Ambassador Thomas, through its local partner Growth With Equity in Mindanao (GEM), USAID has procured 5,000 bottles of water, 1,500 sleeping mats, blankets, tooth brushes, toothpaste, buckets, and canned goods for distribution to those in need.

He said the USAID expects to procure a total of 10,000 units of these items to help meet the needs of evacuees.

Additionally, Thomas disclosed that USAID is supporting the local construction of 40 portable toilets and is providing four 500 gallon water tank to ensure better sanitation and access to water for those who have been displaced.

He pointed out that the delivery of these items has been coordinated by the Armed Forces of the Philippines (AFP) and the Philippine National Police (PNP) with the support of the US Joint Special Operations Task Force-Philippines (JSOTF-P).

"This coordination of Philippine and US partners for the assistance of people in need, is an example of the close working cooperation between both countries," Thomas declared as he revealed that the items sent were requested by the local government of Zamboanga City.

"While we continue to pray for calm to prevail and for a peaceful and speedy resolution to this crisis, we are proud to be able to work beside our Philippine colleagues in time of need," the top US diplomat in the country stated. "I want to commend the people in the local community who are banding together through social media and other means to help their friends and neighbors."



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US offers aid to dislocated Zamboanga residents

By Tarra Quismundo

Philippine Daily Inquirer

8:53 pm | Thursday, September 12th, 2013

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US EMBASSY. AP FILE PHOTO

MANILA, Philippines — The United States has allocated P26.4 million (\$600,000) to aid residents in Zamboanga City displaced by the standoff between government forces and armed fighters of the Moro National Liberation Front.

The US Embassy in Manila said the assistance, to be coursed through the US Agency for International Development, was in response to the urgent needs of some 14,000 Zamboanga residents displaced by the security crisis.

“The United States has always been there for the Philippines in times of need, and we continue that tradition today for those suffering in Zamboanga,” US Ambassador to Manila Harry Thomas Jr. said in a statement.

USAID and its local partner, Growth With Equity in Mindanao (GEM), will use the fund to distribute

bottled of water, 1,500 sleeping mats and some 10,000 blankets, personal hygiene items and canned goods.

The amount will also fund the construction of 40 portable toilets and the dispatch of four 500-gallon water tanks for sanitation needs of the displaced.

The items will be delivered in coordination with the Armed Forces of the Philippines and the Philippine National Police, with the assistance of the US Joint Special Operations Task Force-Philippines stationed in Zamboanga.

The military earlier said the US military unit, established to assist the AFP in anti-terror operations, is strictly prohibited from being involved in the ongoing security operations.

“While we continue to pray for calm to prevail and for a peaceful and speedy resolution to this crisis, we are proud to be able to work beside our Philippine colleagues in time of need,” said the Embassy.

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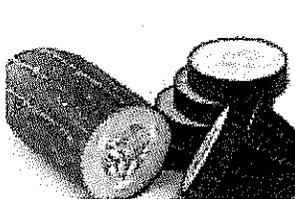
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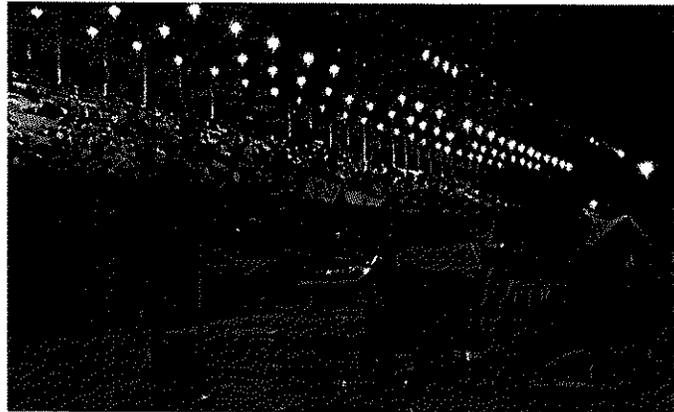
Zambo siege forces 3,800 families to flee homes

By Liza Jocson

Zamboanga City - They are victims who are always relegated to the sidelines in times of war.

This time their sheer number alone captured public interest on their dismal plight and misfortune.

More than 3, 800 families with 15,756 dependents are now housed in the Zamboanga City's 13 evacuation centers, with more than 2,000 families in the Joaquin Enriquez Memorial Grandstand alone.



At the Joaquin Enriquez Memorial Grandstand alone, 2,000 families have sought refuge from the ongoing clash between government troops and rogue members of the Moro National Liberation Front (MNLF).

Social Welfare Secretary Corazon "Dinky" Soliman announced this at a press briefing on Thursday morning, as the siege of the city by rogue members of the Moro National Liberation Front (MNLF) entered its fourth day.

On Wednesday night, the city's grandstand housed almost 2,000 families.

The number surged after strong gunfire and loud explosions starting in the late afternoon sent the remaining residents packing and fleeing.

The Department of Social Welfare and Development (DSWD) and its city counterpart joined forces to serve the huge number of refugees, assisted by city officials

and personnel in charge of distributing food.

The work did not stop at the Sangguniang Panlungsod where packs of food and basic goods are being prepared by the thousands.

Councilor Josephine Pareja, who is now in charge of food distribution, said mere breakfast distribution lasted from 6 a.m. to 11 a.m.

Bags of sardines and other necessities were also distributed to augment the food prepared by the government.

Pareja feared that, if the number of multiple-meal pass holders went on unchecked, the apparently endless supply of food for now would not be enough for the thousands in evacuation centers and the hundreds more who might also seek shelter.

Meanwhile, sanitation became a problem at the Joaquin Enriquez Memorial

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Monday's polls. Aired on Solar Daybreak May 10, 2013.

Grandstand as toilet at the grandstand are limited.

On Thursday morning, Soliman announced the arrival of eight portalets, with 16 more expected to be added soon.

Soliman said international aid organizations had already announced their intention to aid evacuees.

The United States Embassy in Manila posted a message in its Twitter account, saying that the US Agency for International Development (USAID) would spend nearly P26.5 million for relief and emergency operations in Zamboanga City.

The organization has also procured water, sleeping mats, blankets, toothpaste, and other necessities for evacuees.

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USAID mobilizes aid for Zamboanga City evacuees

September 13, 2013 9:13 am

COTABATO CITY, Sept. 13 — Responding to the needs of some 14,000 evacuees in the continuing Zamboanga standoff, the United States Agency for International Development (USAID) released Thursday an allotment of P26.4 million for coordinated relief and emergency missions in the area.

A communique sent to various media outlets here said USAID, through its local partner Growth With Equity in Mindanao (GEM), procured 5,000 bottles of water, 1,500 sleeping mats, blankets, toothbrushes, toothpaste, buckets and canned goods for distribution to some 14 evacuation centers.

More so, USAID is supporting the construction of 40 portable toilets and setting up of four 500-gallon water tanks to ensure better sanitation and access to water by the displaced families.

“The United States has always been there for the Philippines in times of need, and we continue that tradition today for those suffering in Zamboanga,” U.S. Ambassador Harry Thomas Jr. said in the communique adding that he looks forward for the speedy resolution of the crisis.

The deliveries of the items were coordinated with the Armed Forces of the Philippines (AFP) and Philippine National Police (PNP) with support from the U.S. Joint Special Operations Task Force-Philippines. (PNA)

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US aids displaced residents

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Published : Friday, September 13, 2013 00:00
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Aware of the needs of 14,000 Zamboanga residents who were displaced by the ongoing clash between government troops and a faction of the Moro National Liberation Front (MNLF), the United States has provided P26.4 million in relief and emergency assistance for the evacuees.

A statement issued by the US Embassy in Manila said "In an expression of concern for the well-being of the people of Zamboanga, the US Embassy is responding to the immediate needs of some 14,000 citizens displaced by the ongoing crisis situation in several areas of the city by designating P26,400,000 (US\$600,000) to provide relief and emergency through the United States Agency for International Development (USAID)."

According to US Ambassador Harry K. Thomas Jr., "The United States has always been there for the Philippines in times of need, and we continue that tradition today for those suffering in Zamboanga."

Through its local partner Growth With Equity in Mindanao (GEM), USAID has procured 5,000 bottles of water, 1,500 sleeping mats, blankets, tooth brushes, toothpaste, buckets, and canned goods for distribution to those in need.

Cristina Lee-Pisco

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BI seeks HDO cancellation info

Published : Thursday September 19, 2013 | Category : National | Views : 40

By : Itchie G. Cabayan

The Bureau of Immigration (BI) reiterated appeals to clerks of the different regional trial courts nationwide to immediately furnish the bureau with copies of orders cancelling the hold-departure-orders or HDOs of persons acquitted of cases, in order to prevent inconvenience to the traveling public. The move came in view... Read more

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USAID sends relief supplies for evacuees to Zamboanga

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BY: JENNIFER C. TILOS WITH PR FROM US EMBASSY

Friday 13th of September 2013

DUMAGUETE CITY, Sept 13 (PIA)--The United States (US) Embassy in Manila through the US Agency for International Development (USAID) will deliver relief supplies today to Zamboanga City as it condemns the bombing in Zamboanga City.

In a statement from the US Embassy, essential supplies will be transported to assist the evacuees affected by clashes between the Moro National Liberation Front (MNLF) and government military forces.

It is said, the first batch of relief goods consisting of blankets, sleeping pads, toiletries, water buckets, baby diapers, bottled water and canned sardines is scheduled to arrive at 4:30 pm today.

The USAID will also install latrines or portable toilets and water tanks in the area to help provide evacuees with access to clean drinking water.

The US Embassy now expressed its readiness to provide relief assistance.

"I deplore this heinous crime that victimized ordinary travelers. Our condolences to the innocent deceased and wounded victims of this brutal attack," US Ambassador Harry Thomas, Jr., said in a press statement.

He expressed admiration for authorities in Zamboanga City and the Philippine National Police "who moved swiftly to aid persons wounded by the blast."

Members of the media interested in covering the delivery of aids are requested to assemble at the Command Center, Sangguniang Panglungsod Bldg., RT Blvd., Zamboanga City. (mbcn/JCT/PIA7-Negros Oriental)



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Foreign, local relief aids underway in Zamboanga standoff

September 14, 2013 3:17 pm

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Local and foreign institutions' relief assistance for thousands of displaced residents in the Zamboanga City standoff has started to arrive, while top government officials continued to work out establishing a truce in the siege staged Sunday by Moro National Liberation Front (MNLF) combatants loyal to MNLF founding chairman Nur Misuari.

The United States Agency for International Development (Usaid) and the International Committee of the Red Cross (ICRC) started bringing in relief goods through their local conduits Thursday, Usaid and ICRC officials said yesterday.

"Parcels containing enough food for 27,000 daily rations were provided to the local Red Cross branch in Zamboanga (Thursday)... to feed people sheltering in evacuation centers set up by the local authorities. The rations consist of basic food items like rice, oil, salt, sardines, soya sauce, sugar and coffee," ICRC's Alison Lopez said in a press statement.

ICRC Philippine delegation head Pascal Mauchle also sent in kitchen utensils and shelter tarpaulins for displaced residents, alongside ambulance units with 45 volunteers to treat weapon-injured and sick individuals, Lopez said.

"We call on those involved in the fighting to act with extreme caution to ensure civilian life and property would be spared at all times," Mauchle was quoted as saying.

For its part, the US Embassy through the Usaid dispatched on Thursday to Zamboanga City its "first batch" of relief goods consisting of blankets, sleeping pads, toiletries, water buckets, baby diapers, bottled water and canned sardines, the agency's media liaison Mikki Meru said in a separate statement.

Meru said Usaid workers also installed latrines (portable toilets) and water tanks in evacuation areas to spare evacuees from possible water-borne ailments.

Also on Thursday, line agencies of the Autonomous Region in Muslim Mindanao (ARMM) based here brought an initial 2,000 food packages to Zamboanga City followed Friday by three truckloads of shelter materials, Autonomous Regions in Muslim Mindanao (ARMM) Executive Secretary Laisa Masahud Alamia said on Saturday.

The distribution of relief assistance was personally supervised by ARMM Governor Mujiv Hataman, who went ahead to the sieged city Wednesday to help broker a truce in the standoff, regional chief of staff Amihilda Sangcopan told the Manila Times.

Defense Secretary Voltaire Gazmin and Local Government Sec. Mar Roxas had reportedly initiated talks with Wednesday with Misuari's camp and local authorities for a peaceful resolution of the standoff that had already left six people killed, scores injured and thousands displaced.

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President Benigno Aquino 3rd flew on Friday and addressed civilian and military workers involved in trying to avert a spillover of the Zamboanga City siege.

Vice President Jejomar Binay followed suit on Saturday, following his reported initial contact with Misuari for a possible ceasefire. Binay and Misuari are former classmates in the University of the Philippines.

Reports said Binay had informed the President through Sec. Gazmin about the negotiations by phone with Misuari.

Just as talks for a ceasefire were in the offing, a firefight broke out between state forces and guerrillas of the MNLF reportedly in the company of Abu Sayyaf renegades in Basilan, particularly in four villages of Lamitan City on Friday.

But local and foreign observers were hopeful that the Zamboanga City standoff would end peacefully, citing previous precedence.

Misuari had forged the MNLF final peace accord with the Ramos government in 1996 following talks with then Executive Secretary Ruben Torres, also a classmate in UP of the MNLF founding chieftain. **Moh I. Saaduddin**

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Exodus in Zamboanga

By Roel Pareño (The Philippine Star) | Updated September 14, 2013 - 12:00am

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President Aquino addresses troops at the Western Mindanao Command headquarters in Zamboanga City yesterday.

ZAMBOANGA CITY – The streets of Zamboanga started emptying yesterday as residents hurriedly packed belongings and left the besieged city.

Public and private vehicles filled to the rooftops with suitcases and boxes packed with personal and household items crowded the streets, streaming out of the city as government forces moved into position against rebels loyal to Nur Misuari, chairman of the Moro National Liberation Front (MNLF).

The government ordered a forced evacuation in four coastal villages where Misuari's men have been holed out since the hostilities erupted last Monday.

Mayor Ma. Isabelle Climaco-Salazar said the city council approved a resolution declaring some parts of the city as "no-man's land" where all residents must move out.

Salazar said the affected barangays included Rio Hondo, Sta. Barbara, Sta. Catalina, Talon-Talon, Casangyangan, Mariqui and Mampang.

Long lines of trucks, jeepneys and tricycles soon left these areas. Police were tasked to check identification papers to make sure no rebels would slip out.

Armed Forces of the Philippines (AFP) spokesman Brig. Gen. Domingo Tutaan Jr. announced the city government's order for a forced evacuation.

The evacuees are expected to swell the number of residents displaced by the fighting. Earlier, authorities counted 5,667 families or about 20,557 people already



housed in 17 evacuation centers in the city.

In the absence of a ceasefire, soldiers continued to flush out the MNLF rebels, whose occupation of several barangays has trapped hundreds of civilian residents.

Fighting continued into the fifth day, marked by exchanges of mortar and sniper fire.

In Sta. Barbara, government forces entered a school and a mosque vacated by the MNLF and recovered the corpses of at least two suspected rebels.

Some homes in nearby Sta. Catalina were ablaze after another firefight broke out between the troops and the rebels. Initial reports said 11 people were injured as the rebels fired rocket-propelled grenades at the advancing troops in Sta. Catalina.

Among the injured were five Red Cross volunteers, two policemen, a representative from the Commission on Human Rights, two soldiers and a military intelligence operative.

The explosion forced journalists and television news crews to scampers to safety and leave the area as the firefight intensified.

The rebels have since been pinned down in some areas, setting fire to houses while firing at government troops to keep them at bay. Zamboanga police spokesman Chief Inspector Ariel Huesca said the areas occupied by the MNLF were "shrinking."

"The soldiers are moving closer to the MNLF so as to limit the movements of the MNLF," he said.

Armed Forces public affairs chief Lt. Col. Ramon Zagala said at least 15 rebels were killed while 19 others either surrendered or were captured.

Zagala said six soldiers were wounded yesterday as government forces were trying to repel the rebel counterattack that attempted to occupy the satellite compound of the Department of Public Works and Highways (DPWH) of the Autonomous Region in Muslim Mindanao (ARMM), located just 300 meters from city hall.

A separate military report said the five-day fighting has left 22 dead and 52 others wounded. The fatalities include two soldiers, three policemen, two civilians and 15 MNLF rebels. Wounded were 28 soldiers, six policemen and 18 civilians caught in the crossfire.

"Our mission is to contain them. If there is movement by the rebels, we will undertake calibrated action," Zagala said.

Zagala said government forces had recovered advance positions formerly occupied by the rebels.

This developed as a Catholic priest held hostage by the rebels earlier this week was released yesterday.

Fr. Michael Ofana, one of the hostages used as human shield by the rebels since the fighting broke out, was released unharmed.

Ofana, clad in white shirt and denim jeans with a checkered scarf around his neck, walked to freedom at the intersection of Lustre and Sta. Catalina road.

Police chief Senior Superintendent Jose Chiquito Malayo led authorities in retrieving Ofana.

The priest told police that the rebels were still holding his sister and father hostage.

P-Noy visits Zambo

President Aquino flew to Zamboanga City yesterday and visited the wounded policemen and soldiers at a military hospital.

"I am here to help and sympathize, to the extent possible. I don't believe it's proper for me to spend all my time in Manila while you here have to go at it alone. This problem has taken long enough; I've been with you since the beginning, and I'll be here until the situation is resolved," Aquino told the wounded.

He also handed over boxes of relief goods to soldiers during a brief meeting at the Naval Forces Western Mindanao headquarters.

Aquino also planned to visit some evacuation centers to see the conditions of the affected civilians.

Accompanying Aquino were Armed Forces chief Gen. Emmanuel Bautista and Philippine National Police chief Director General Alan Purisima. They assessed the condition of the wounded soldiers before returning to the war room.

Various sectors are also pitching in to help the evacuees displaced by the five days of fighting.

Assistance for the displaced

The US government is giving assistance to those displaced by the fighting.

In a statement, the US embassy said \$600,000 or P26.4 million has been allocated for relief and emergency assistance for the affected residents.

"The United States has always been there for the Philippines in times of need, and we continue that tradition today for those suffering in Zamboanga," US Ambassador Harry Thomas Jr. said. "I want to commend the people in the local community who are banding together through social media and other means to help their friends and neighbors."

The assistance will be channeled through the United States Agency for International Development (USAID).

The first batch of relief goods, consisting of blankets, sleeping pads, toiletries, water buckets, baby diapers, bottled water and canned sardines was expected

yesterday.

USAID will also install portable toilets and water tanks to help evacuees get access to clean drinking water.

It has procured 5,000 bottles of water, 1,500 sleeping mats, blankets, toothbrushes, toothpaste, buckets, and canned goods for distribution. It expects to procure a total of 10,000 units of these items to meet the needs of evacuees. USAID is also supporting the construction of 40 portable toilets and is providing four 500-gallon water tanks to ensure better sanitation and access to water.

Truckloads of relief

On Thursday, the ARMM sent to Zamboanga City three truckloads of relief goods for distribution to displaced residents. Amihilda Sangcopan, chief of staff of the Office of the Regional Governor, said the supplies, consisting of thousands of hygiene kits and food packs, would be turned over to the office of the Zamboanga City mayor.

ARMM local government undersecretary Juni Ilimin said many of the evacuees were residents of Basilan, Sulu and Tawi-Tawi.

Sangcopan said ARMM Gov. Mujiv Hataman had mobilized the region's inter-agency Humanitarian Emergency Action and Response Team (HEART) contingent to help address the needs of thousands of displaced Zamboanga residents.

The relief supplies consisted of tarpaulins that can be used as tents and sleeping mats, Sangcopan added.

Hataman has also tasked the ARMM's health department to organize a medical team to assist the office of Salazar in attending to the health needs of the evacuees.

Sangcopan said they were coordinating with the police and military for the shipment of relief supplies. — With Jaime Laude, Sheila Crisostomo, Edith Regalado, John Unson, Evelyn Macairan

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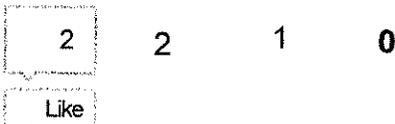
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Tulong para sa evacuees, bumubuhos na

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COTABATO CITY - Nagsimula nang bumuhos ang tulong mula sa iba't ibang institusyon, kabilang ang mga foreign aid organization, para sa libu-libong residente na naiipit sa bakbakan ng Moro National Liberation Front (MNLF) at puwersa ng pamahalaan sa Zamboanga City.

"Parcels containing enough food for 27,000 daily rations were provided to the local Red Cross branch in Zamboanga (Thursday)... to feed people sheltering in evacuation centers set up by the local authorities.

The rations consist of basic food items like rice, oil, salt, sardines, soya sauce, sugar and coffee," sinabi ni Alison Lopez ng International Committee of the Red Cross (ICRC).

Nagpalada rin ang ICRC Philippine delegation na pinangungunahan ni Pascal Mauchle ng mga gamit panluto at tent para sa mga nagsilikas na residente. Dumating din sa evacuation center ang mga ambulance unit na may kasamang 45 volunteer upang tumulong sa paggamot sa mga sugatan sa bakbakan at mga nagkakasakit na evacuee.

"We call on those involved in the fighting to act with extreme caution to ensure civilian life and property would be spared at all times," sinabi ni Mauchle.

Nagpadala rin ang US Embassy sa pamamagitan ng US Aid for International Development (USAID) ng mga relief good, kumot, sleeping pad, toiletries, balde, baby diaper, mineral water at sardinas, ayon kay Mikki Meru ng USAID.

Noong nakaraang Huwebes, nagpadala ang mga line agency ng Autonomous Region in Muslim Mindanao ng mahigit sa 2,000 food package at mga kagamitan sa pagkukumpuni ng temporary shelter, ayon kay ARMM Executive Secretary Laisa Masahud Alamia. – Ali G. Macabalang

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4 days ago NGOs, Embassy, Others Show Concern for Evacuees

Various Non Government organizations (NGOs) have shown concern for the welfare of the evacuees in Zamboanga.

The Philippine Center for Islam and Democracy (PCID) said it is alarmed by the events unfolding in Zamboanga City. They have asked the leaders of both sides to call for a ceasefire and avert the escalation of violence and avoid further loss of lives and damage to property. A "zero sum" mindset will not save lives, nor will it gain the capitulation of either side, they said.

"We ask all the parties of influence in the region to unite and work together for peace, instead of resorting to violence. We should focus on the improvement of the socio-economic and political condition of our people."

Meanwhile, the U.S. Embassy, in an expression of concern for the well-being of the people of Zamboanga, is responding to the immediate needs of some 14,000 citizens displaced by the ongoing crisis situation in several areas of the city by designating Pesos 26,400,000 (US\$600,000) to provide relief and emergency through the United States Agency for International Development (USAID).

According to U.S. Ambassador Harry K. Thomas, Jr., "The United States has always been there for the Philippines in times of need, and we continue that tradition today for those suffering in Zamboanga."

On the other hand, Globe Telecom set up a Libreng Tawag station in Zamboanga City in response to the clashes that swept four barangays.

The Libreng Tawag station is located at the Joaquin F. Enriquez

Memorial Sports Complex, an evacuation center in Barangay San Jose Cawa-Cawa currently housing 5,000 people or 800 families. Globe Telecom will be setting up four more Libreng Tawag stations over the next week in various evacuation centers and mobile hospitals, starting tomorrow at the Western Mindanao State University gym, where patients of Zamboanga General Hospital are temporarily evacuated.

Through these stations, evacuees can text and make local calls to all networks, as well as international calls, all for free. OIC for Globe Corporate Social Responsibility Fernando Esguerra says, "We are closely monitoring the situation in Zamboanga to determine other areas that need immediate assistance."

Since fighting erupted last September 9, flights to and from Zamboanga have been cancelled stranding commuters to and from the city.

As a result of this, Cebu Pacific (CEB) has announced that it is closely coordinating with the government for the re-accommodation of passengers affected by the Zamboanga Airport closure.

Last September 13, 2013, Friday, the Philippine Air Force started to ferry affected CEB passengers from Zamboanga to Cebu. They have also arranged for two special flights from Tawi-Tawi to Cebu to accommodate passengers who are travelling for the Hajj Pilgrimage. CEB's daily flights between Zamboanga and Tawi-Tawi have been suspended since September 9, 2013.

In Cebu, the passengers will be re-accommodated on scheduled CEB flights from Cebu to Manila on the same day.

Meanwhile, the Civil Aviation Authority of the Philippines (CAAP) has extended the suspension of Zamboanga Airport operations from September 13-16, 2013 due to the current security situation in the area.