



(GCP/RAS/269/GFF)

**“Strategies for trawl fisheries bycatch management”**  
BFAR/FAO/GEF/SEAFDEC/REBYC-II CTI PROJECT

**REPORT ON THE SEMINAR/REVIEW ON THE NATIONAL STOCK ASSESSMENT  
PROGRAM (NSAP) AND OTHER SURVEYS AND STUDIES  
ON THE FISHERIES OF SAMAR SEA**

Catbalogan City, Samar, Republic of the Philippines  
October 11-12, 2016

### **Summary**

The project “Strategies for trawl fisheries bycatch management” (REBYC-II CTI Project) is concluding. The significant result of the project in the Philippines is the Samar Sea Fisheries Management Plan (SSFMP) that is now functional through the Alliance of Local Government Units (LGU). Various studies, part of the project and outside the project, had contributed to the plan and its operationalisation. The seminar was to familiarise the stakeholders on the details of the studies that support the SSFMP. The National Stock Assessment Program of the BFAR with the National Fisheries Development and Research Institute (NFRDI) provided important stock estimates as a basis for the planning. The results of the oceanographic and demersal fishery survey of M/V DA-BFAR, the critical habitat study, gear catalogue and mapping of fishing areas and more importantly, the study on socio-economic status of trawlers in Samar Sea were shared. Results of some fishery studies done by the Samar State University were also discussed. It was concluded that such research studies need to be continued, and that the plan and implementation should continue to make use of the studies for effective management.

### **BACKGROUND / RATIONALE:**

- 1) The management of a particular fishing ground presents specific opportunities and challenges, thus requiring varying approaches. The REBYC-II-CTI Project entitled **“Strategies for trawl fisheries bycatch management”** has made great strides towards providing a more tangible management in the Samar Sea area. One major output of the project is the Samar Sea Fisheries Management Plan (SSFMP), providing the framework to the management of fisheries that would enable Local Chief Executives to collectively manage the area.

- 2) With the project culmination, the initiative to mainstream the SSFMP to the Local Government Units (LGUs) through the Samar Sea Alliance of LGUs for Fisheries Management and Development (SASAFMD), in coordination with BFAR is working. The plans and programs developed through this approach are the essential aspects for the implementing rules and regulations of the SSFMP.
- 3) The National Stock Assessment Program (NSAP) of the BFAR with the National Fisheries Development and Research Institute (NFRDI) as the overseer has been instrumental in providing tangible data and information towards management of the various fisheries in the country. While various strategies and specific measures have been put in place, the success of such measures will largely depend on how the data collected under NSAP is used.
- 4) The seminar/review was thus intended to convey and popularize to stakeholders the significance of NSAP and other survey activities as benchmarks and indicators as the SSFMP gets underway. The Prospectus of the Seminar/Review is attached as Annex 1.
- 5) The seminar/review was held at Maqueda Bay Hotel in Catbalogan City, Samar, Philippines, on November 11-12, 2016 and attended by 41 Fisheries Technicians, Municipal and Commercial Fisherfolk, Municipal Agriculturist Officers, Staff from the Provincial Agriculture/Fisheries Offices, Project TWG Member and Project Staff from BFAR Central Office. The list of participants is attached as Annex 2.

## **HIGHLIGHTS OF THE SEMINAR/REVIEW**

### **Opening Program**

- 6) Mr. Daniel Daguman, City Agriculturist of Catbalogan, delivered the message on behalf of Hon. Stephanie Uy-Tan. He emphasized that the provisions of the Samar Sea Fisheries Management Plan (SSFMP) would be realized if all stakeholders will play their part. He also highlighted that the SSFMP would guide or direct on how to manage the fisheries at municipality and local level. Considering the relatively high fish consumption in Samar Sea, he also stressed the need to take necessary steps to support the plan and enhance the living condition of Samareños.
- 7) He likewise emphasized that the incidence of malnutrition is very high and cannot be solved overnight by planning and decision-making. Thus, it is a big challenge for those present in the forum to look deeper in finding means to fully achieve their goals for a more sufficient and secured future for Samareños.
- 8) In his message, Engr. Rolando Ay-ay, representing BFAR Regional Fisheries Office 8 (RF08), regarded the seminar/review as an essential aspect for the implementation of the SSFMP and that this is a good initiative in mainstreaming the SSFMP to the BFAR and LGU Plans. He cited the importance of the NSAP in providing data and scientific

information towards the rational management of the various fisheries in the Philippines. Moreover, he stressed that scientific information, particularly stock assessment, had been very helpful in the policy formulation for the SSFMP and that NSAP would provide the benchmark and the current status of the Samar Sea.

## **PRESENTATIONS**

- 9) **Overview of the Seminar/Review.** Dr. Norberto T. Berida presented the overview of the workshop. He mentioned that NSAP through the National Fisheries Research and Development Institute (NFRDI) as well as the stock assessment conducted by the M/V DA-BFAR have played a major role in the formulation of various fisheries management plans in the country. Furthermore, he reiterated that the results of the studies related to stock assessment could provide the necessary benchmarks while showing the current status of the fishery resources in Samar Sea (Annex 3).
- 10) **REBYC-II-CTI Overview.** Mr. Ronnie O. Romero, project staff from NFRDI, presented the project overview and the latest updates on the project. He highlighted that the project ends in September, thus it is important for those present to discuss and provide inputs on the ways forward especially on measures towards project sustainability (Annex 4).
- 11) **Project Updates.** Dr. Jonathan O. Dickson, National Technical Officer of the project, presented the latest developments regarding the project as a result of their meeting in Bangkok, Thailand held last September 21-25, 2016. Accordingly, he said that among the five (5) participating countries, only the Philippines has come up with a detailed management plan. He also presented information on the future of trawl fisheries in Southeast Asian Region and mentioned that a 3<sup>rd</sup> Phase Project could be on the way. (Annex 5).
- 12) He highlighted the very important role of the project towards crafting up of the SSFMP and its major role in the institutionalization of a closed season in the area.
- 13) **NSAP in Samar Sea - Brief Overview.** Ms. Merian Amigo, BFAR RFO8 Technical Staff, presented the NSAP results of 2015, highlighting that trawl was the most dominant commercial fishing gear in Samar which produced 163.6 mt. Meanwhile, gill net was the most dominant municipal fishing gear with a production of 204.3 mt. The productions of both gears were observed to be declining from September to December. It was also noted that Danish Seine has the highest CPUE in commercial fishing at 652.8 kg/boat/day while gillnet remains to have the highest CPUE with 302 kg/boat/day in Municipal fishing.
- 14) Single pattern of recruitment was observed for shortfin scad, kawakawa, splendid ponyfish, ornate threadfin bream, short mackerel, Indian mackerel, bigeye scad, fringescale sardinella and Bali sardinella. These species were also found to have exceeded the ideal exploitation rate. Her presentation is attached as Annex 6.

- 15) **Biology and Population of Commercially Important Species in Samar Sea: Mr. Ronnie O. Romero**, REBYC-II-CTI Project Technical Staff presented the report of REBYC I Pilot Project. He explained that one of the objectives of the Pilot Project was to determine the population parameters and spawning season of major species caught in Samar Sea Project Site.
- 16) It was discussed that the peak fishing season of fish and shrimp trawls was during the summer months. With regard to the catch composition, the most abundant catch in shrimp trawl was lizardfish and that only 1% of the catch were shrimps while 14% were rejects. Moreover, majority of the major species sampled for population parameters had exceeded the ideal exploitation rate.
- 17) He emphasized that most of the commercially important fish species in Samar Sea were caught at early stage as indicated in the gonado-somatic index. He also highlighted the “no commercial fishing” zone in Samar Sea which needs to be managed accordingly. Among the important results of the several activities and outputs of the project, the conduct of the socio-economic study and the development of the Samar Sea Fisheries Management Plan need special mention.
- 18) The project results showed that April-August were the spawning months for the major fish species in Samar Sea. It was in this view that April to May and July to August of each year are proposed to be the closed seasons in order to allow the major fish stocks to replenish.
- 19) On a query of the OIC-MAO of Sto. Niño regarding the implementation of a closed season, Mr. Romero explained that there was a strong indication of resources decline for Samar Sea, such that certain measures like the closed season are needed to improve the situation, especially as the SSFMP is still in its initial "honeymoon" stage. While it was explained that theoretically matured fish when not caught will eventually die a natural death, catching them when they are gravid is not ideal, thus allowing them to spawn before eventually catching them is the most ideal option. His presentation is attached as Annex 7.
- 20) Mr. Rex Dasal also suggested that establishment of a marine protected area (MPA) in addition to the closed season can be a practical option to allow stock replenishment in Samar Sea, a suggestion which was welcomed by the body.
- 21) **Oceanographic survey of M/V DA-BFAR.** Mr. Joeren Yleana, CFD Technical Staff and Researcher of MV DA-BFAR, presented the topic. He highlighted on the distribution and range of sea surface temperature (SST). He explained that the entire sampling area indicated high temperature ranges, due also to the shallow depths of the entire sampling stations.
- 22) It was also stressed that a shallow mixed layer started at the surface down to 13 m while thermocline level started at 15 m until 30 m and that most of the stations are situated

within the thermocline layer. Chlorophyll and dissolved oxygen levels of the project site were further discussed. With regards to the fish larvae densities, higher densities were observed at surface tow with 924 individuals/1000 m<sup>3</sup> (mean density 48.63/1000 m<sup>3</sup>) compared to oblique tows, having a total density of 608 individuals/1000 m<sup>3</sup> (mean density 32/1000 m<sup>3</sup>) (Annex 8).

**23) Demersal fisheries survey of M/V DA-BFAR.** Mr Yleana, continued on to present the results of the survey. He revealed that the estimated demersal fish biomass of Samar Sea was 1.8 mt/km<sup>2</sup> based on the study conducted by the University of the Philippines 1979-1981 (Armada et al., 1983). A higher biomass was observed in 2013 at 2.8 mt/km<sup>2</sup>; however, this was way below the initial findings in 1948 with 6.03 mt/km<sup>2</sup>. It was also explained that this estimate was relatively higher compared to the adjacent Visayan Sea. While that there was an apparent increase of biomass, he also stressed that the diversity of fish (or the number of observed species) was less than 100, which was low compared to previous studies in the area (Annex 9).

**23) Critical Habitat in Samar Sea. Mr. Efren V. Hilario,** REBYC-II-CTI Project Technical Staff, presented the topic. He explained the survey techniques used in the study including fish visual census, manta tow and line intercept transect.

24) He provided details on the nineteen (19) sites in 6 municipalities/cities that were covered in the survey, most of which were with good condition, with live coral cover ranging from 20-60%. Baras Reef in Sto. Nino showed the highest coral cover at 50.2% while Tigdaranaw Goti Reef in Tarangnan had the highest fish density at 1.1/m<sup>2</sup>.

25) Bad coral reef conditions also were observed in some areas, with dead corals ranging from 5-60%. The estimated fish density ranged from 0.08 to 1.1 fish/m<sup>2</sup>; relatively low compared to the average density for good condition coral reef areas. His presentation is attached as Annex 10.

**26. Gear Catalogue and Fishing Mapping.** Mr. Napoleon Salvador J. Lamarca, Project Technical Staff, discussed the result of the fishing gear catalogue and fishing ground mapping in Samar Sea. He mentioned that this was a result of the concerted efforts of stakeholders involved in the project.

26) He informed the body that the catalogue is now in press and the published copy would be available soon. The catalogue would include fishing gear dimensions, seasonality of operations, most dominant fish caught, and areas operated.

27) He also presented the map indicating the distribution of the various fishing gears in Samar Sea. He noted that the map is relevant in designating fishing zones as envisioned in the SSFMP. His presentation is attached as Annex 11.

**28) Socio- economic Status of Trawlers in Samar Sea.** One of the major works of the project, which is often not given much attention in many technical projects, is gathering baseline information on the socio-economic status of the fisherfolk. The study “**Socio-**

**economic Status of Trawlers in Samar Sea"** of the REBYC-II CTI Project was presented by **Mr. Ronnie O. Romero**, project technical staff.

- 29) The socio-economic survey covered both commercial trawls (fish and shrimp trawls) and municipal trawls (shrimp and squid trawls). It was reported that a total of 517 respondents (majority of whom were male: 99% in commercial fish trawls and 92.5% in commercial shrimp trawls) have responded to the questionnaire. Most of the fishermen were between 25 and 44 years of age. For municipal shrimp trawls, only 1% of the respondents were females while squid trawling was an exclusively male occupation. Older fishers are engaged in municipal trawls with shrimp trawls dominated by the age bracket 35-44 years. Fifty percent (50%) of squid trawl respondents were between 55-64 years. In general, fishers' education was inadequate with many only with elementary level education.
- 30) Trawl fishers, similar to other types of fishers, were in general, only educated to elementary level (37%). Only 17% studied but dropped out of high school and only 11% graduated. Most respondents were not members of any organization but those that were listed "membership of fisherfolk association" as the most common type. Extended families exist among the respondents. In all types of trawls both commercial and municipal, the son, daughter and wife are the primary household members who stay with the respondents.
- 31) Fishing was the most dominant source of livelihood of household members. Farming, teaching, carpentry, overseas Filipino worker, fish processing, aquaculture, livestock rearing, fish brokering and ancillary fishing occupations were among the household members' livelihood sources. Access to credit is very low corresponding with low membership in associations. There is a need for training on basic safety of life at sea as very minimal equipment and life-saving materials are onboard. His presentation is attached as Annex 12.
- 32) **Studies Undertaken by Samar State University (SSU).** Several studies were undertaken by the SSU as presented by Prof. Renato Diocton. He informed that at least three (3) ongoing projects are being conducted by the SSU through the College of Fisheries and Marine Sciences. These are a) Mussel R&D Program, Oyster R&D Program and the Integrated Multitrophic Aquaculture (IMTA). The school is conducting Participatory Coastal Resource Appraisal (PCRA) of the Local Government Units (LGUs) in Samar Sea.
- 33) Prof. Diocton also presented eight (8) priority researches by the university such as selectivity studies for small trawls, fish maturity and ichthyoplankton studies and modelling of top 20 species with commercial importance in Samar Sea, test fishing of *lambaklad* (otoshi-ami; set net), application of IMTA, development of waste by-product for post harvest technologies, relaying and depuration of shellfishes of commercial importance, socio-economic and governance towards EAFM and vulnerability assessment of coastal areas. His presentation is attached as Annex 13.

- 34) During the discussion, Mr. Romero suggested for SSU to collaborate with BFAR as they have initiated development of a national program and technical guidelines for *lambaklad* projects in the Philippines. He also suggested to test the viability of pound net (chokami) considering this is cheaper compared to usual *lambaklad*. The gear can be an alternative to trawl should they find this feasible as they can also use the polyethylene nets used in trawls.
- 35) Moreover, he also suggested to collaborate with NFRDI regarding the development of waste by-product as part of postharvest technologies as the Institute has also been conducting similar studies.
- 36) **Management Strategies in Samar Sea under the SSFM/EAFM Context.** Dr. Norberto T. Berida, Chief, BFAR 8 Training Division, presented the BFAR's Roadmap for Samar Sea (2016-2022) and discussed its potential as Samar Sea has an estimated area of 198 km<sup>2</sup>. He cited that Samar Sea is experiencing overfishing and degradation of significant marine resources and habitats which are the main reasons for the need to implement the SSFMP.
- 37) He enumerated some potential projects to be implemented, including the provision of shellfish and mariculture projects. The goals and objectives of the roadmap are poverty reduction, improvement of food security and sustainable fishing industry development and management, all of which are anchored under the Samar Sea Fisheries Management Plan (SSFMP). One of the major highlights of the roadmap was the implementation of the SSFMP using the EAFM approach and context. Moreover, such measure would include the rehabilitation and improvement projects on inland and coastal habitats and establishment of LGUs and fishing communities to enforce sustainable management of fishery and coastal resources.

#### **WAY FORWARD:**

- 38) Six priority issues were identified in finding ways forward, facilitated by Dr. Norberto T. Berida. Sustaining research activities was identified as the priority issue to be addressed. Also identified were capacity building, law enforcement, implementation of the SSFMP and support to potential future projects on sustainable trawl fisheries in Southeast Asia. It was explained that these specific recommendations should be included in the workplan for the Alliance.
- 39) Likewise, one of the major issues was regarding the designation of a Focal Persons/Action Officers. While the Executive Director of the Alliance has the overall responsibility, the role of focal persons under the Alliance was considered important to coordinate on the ground projects and activities relevant to the implementation of the SSFMP. In this regard, the meeting suggested Mr. Marcos Sabido and Juan Meniano as Focal Persons, subject to a later formal designation from the Alliance. The meeting was also informed of the designation of Ms. Angelica Realino as the Interim Executive Director of the SASAFMD by the Alliance Chair, Mayor Ronaldo Aquino of Calbayog City

- 40) With regard to the implementation of the SSFMP, the endorsement of the SSFMP was scheduled in late November during the quarterly meeting of the Alliance. A major activity/concern on this issue was the sourcing of funds aside from the regular contributions from the members of the Alliance. In this regard, the Office of the Provincial Agriculturist pledged an already regular contribution of approximately 1 Million Pesos to the Alliance. The Bureau of Fisheries and Aquatic Resources likewise stressed that most of its activities in Samar Sea municipalities have already been mainstreamed to the SSFMP through its Samar Sea roadmap.
- 41) During the open forum, it was acknowledged that there is a need for member municipalities/cities to be more active. Thus, Prof. Diocton encouraged the cohesiveness of the alliance so as to be able to identify possible strategies on how the alliance can work better. On fishery related issues, Mr. Virgilio Tomnob, acting as the Interim CEO of the Alliance, informed that the REBYC TWG would act as the advisory group and that the Provincial Agriculture Office would collaborate with the Alliance.
- 42) It was also announced that the Alliance has been registered with the Securities and Exchange Commission (SEC) and can now issue receipts for contributions paid by the members. It was also informed that one alternative being considered to provide manpower for the Alliance was for member-LGUs to designate one staff each to work for the Alliance with salary paid by their respective municipalities. It was also informed that the primary competency consideration for the staff to be assigned to the Alliance is the ability to draft resolutions and prepare project proposals. Meanwhile, Prof. Diocton volunteered to assist in proposal preparation.
- 43) Lastly, among other agencies to be included in the SSFMP was the Department of Natural Resources (DENR) as they are in charge of the marine protected areas, mangrove reforestation and critical habitats.
- 44) In closing the seminar/review, Dr. Jonathan Dickson, Project NTO, commended the exceptional accomplishment of the project. He conveyed his appreciation to those who contributed and supported the implementation of the project, particularly the TWG members, and stakeholders from the various sectors who in one way or other assisted in making the project a success and worthy of emulation by the other participating countries. He further expressed confidence that the Alliance can move forward the management measures and other activities initiated by the project. Finally, he expressed his appreciation to FAO and SEAFDEC for the continuous support.



## **Annex 1: Provisional Prospectus**



**(GCP/RAS/269/GFF)**

**BFAR/FAO/GEF/SEAFDEC/REBYC-II CTI PROJECT**

### **SEMINAR/REVIEW ON THE NATIONAL STOCK ASSESSMENT PROGRAM (NSAP) AND OTHER CONTEMPORARY SURVEYS AND STUDIES ON THE FISHERIES OF SAMAR SEA**

Catbalogan City, October 11-12, 2015

## **PROVISIONAL PROSPECTUS**

### **1) BACKGROUND / RATIONALE**

The management of a particular fishing ground presents specific opportunities and challenges, thus requiring varying approaches. The REBYC II-CTI Project entitled “Strategies for trawl fisheries bycatch management” have made great strides towards providing a more tangible management in the Samar Sea area. One major output of the project is the Samar Sea Fisheries Management Plan (SSFMP), providing the framework and science to the management of fisheries that would enable Local Chief Executives to collectively manage the area.

With the project culmination, the initiative to mainstream the SSFMP to the BFAR and LGU plans and programs are the essential aspects for the implementing rules and regulations of the SSFMP.

The National Stock Assessment Program of the BFAR with the NFRDI as the overseer has been instrumental in providing tangible data and information towards management of the various fisheries in the country. While various strategies and specific measures have been put in place, the impact of such measures will be largely measures according to data collected under NSAP. As the SSFMP gets under way, this seminar/review of the status of the Samar Sea based on NSAP and relevant surveys/studies would provide benchmark and current status of the fishery resources of Samar Sea as well as to describe and convey the significance of NSAP and other survey activities to stakeholders.

### **2) OBJECTIVES**

- a) To provide NSAP brief overview and its importance in the management of Samar Sea;
- b) To provide updates/initial NSAP results for Samar Sea;

- i) Data coverage; time-series catch and effort by landing site
  - ii) Catch, (species) composition and catch-per-unit effort variations fishing gears/methods
  - iii) Annual catch estimates and CPUE trends
  - iv) Population parameters; biological data and related information
  - v) Candidate Reference Points (RPs) for major species
- c) To review on the result of critical habitat survey conducted;
  - d) To review spawning seasonality and hotspot areas;
  - e) To review results of M/V DA-BFAR assessment survey;
  - f) To present the Fishing Gear Catalogue of Samar Sea; results of fishing ground mapping;
  - g) To recommend actions to improve the science/data gathering for managing Samar Sea.

### **3) EXPECTED OUTPUT**

- a) Consolidated scientific fisheries information of Samar Sea on status of stock, biology, fishing gears and methods, status of critical habitat and seasonality of major species in Samar Sea
- b) Better understanding and appreciation of participants on NSAP and survey activities and their importance to Samar Sea fisheries management

### **4) PROCESS**

- a) As part of the seminar/review, responsible staff will present various scientific findings (Annex 1: Program of Activities);
- b) A workshop to determine future actions to sustain and improve project initiatives will also be conducted;
- c) The TWG members will continue filling-up required data and information to complete implementing guidelines of the SSFMP.

### **5) DATE AND VENUE:**

- a) Inclusive dates: October 11-12, 2016

b) Venue: New Maqueda Hotel Conference Hall, Catbalogan City

**6. PARTICIPANTS (40):**

- a) Eleven (11) LGU representatives
- b) Three (3) representatives from Office of the Provincial Agriculturist
- c) Three (3) representatives from the Academe
- d) Five (5) representatives from BFAR Regional Office No. VIII
- E) Ten (10) Technical Working Group
- f) Five (5) project staff
- g) Three (3) Rapporteurs/ Secretariat/ Administrative Staff

**7) CONTACT PERSONS:**

**Dr. Jonathan O. Dickson ,DFT**

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**SEMINAR/REVIEW ON THE NATIONAL STOCK ASSESSMENT PROGRAM (NSAP) AND  
OTHER CONTEMPORARY SURVEYS AND STUDIES ON THE FISHERIES OF SAMAR SEA**

Maqueda Bay Hotel Conference Hall, Catbalogan City, Samar

October 11-12, 2016

**TENTATIVE PROGRAM**

<b>Date/Time</b>	<b>Activity</b>	<b>Responsible Officer/Staff</b>
Day 1 (October 11, 2016)		
8:30 AM	<b>Registration</b>	Secretariat
<b>OPENING PROGRAM</b>		
9:30 AM	Prayer  National Anthem  BFAR Hymn   Welcome Address    Message    Photo Op	Hon. Stephany Uy-Tan City Mayor, Catbalogan  or  Mr. Daniel Daguman CAO, Catbalogan City TWG Member  Dr. Juan D. Albaladejo Director, BFAR VIII
<b>Snacks</b>		



Date/Time	Activity	Responsible Officer/Staff
2:00 PM	Results of Oceanographic survey of M/V DA-BFAR	Researcher, M/V DA-BFAR
2:30 PM	Results of demersal fisheries survey of M/V DA-BFAR	Researcher, M/V DA-BFAR
3:00 PM	Status of Fish Larvae, Bycatch and discards in Samar Sea	Renato Diocton Samar State University Project TWG Member
3:30 PM	Snacks	
4:00 PM	Status of Major Habitats in Samar Sea;  Gear Catalogue and Fishing Mapping	Efren V. Hilario Project Technical Staff  Napoleon S.J. Lamarca National Technical Adviser
4:30 PM	Socio- economic Status of Trawlers in Samar Sea	Ronnie Romero NFRDI
5:00 PM	Open Forum	
Day 2 (October 12, 2016)		
<b>ACTION PLANNING &amp; WAY FORWARD</b>		
8:30 AM	Other Studies Undertken by Samar	c/o Prof Diocton

<b>Date/Time</b>	<b>Activity</b>	<b>Responsible Officer/Staff</b>
	State University	
9:30 AM	Management Strategies in Samar Sea under the SSFM/EAFM Context	Norberto T. Berida Project TWG Co- Chairman
10:00 AM	Way Forward	Alliance Members and Project TWG
<b>Lunch</b>		
4:00 PM	Closing Program	
5:00 pm	Departure of Participants	

**Annex 2:** Attendance Sheet

**Review on the National Stock Assessment (NSAP) and Other Related Surveys/Studies of Samar Sea**

October 11-12, 2016

<b>Name</b>	<b>Address</b>	<b>Designation</b>
1. Renaro J. Fuentes	Daram, Samar	Fishery Coordinator
2. Cecilio N. Talagon	Catbalogan	FLDT Supervisor
3. Arlene Reyes	Tarangnan	AT Fishery
4. Matt Alcantara	Tacloban City	NSAP Project Leader
5. Renato Diocton	Catbalogan	Professor
6. Katherine Pacampara	Catbalogan	Research Assistance
7. Constantino Ginay	Sta. Margarita	AT
8. Rex Dasal	Catbalogan	ACC-1
9. Vilma Alaga	Tacloban	TS II
10. Juan Meniano	Catbalogan	PAFC Coord/TWG
11. Daniel Daguman	Catbalogan	CA
12. Danilo Maraya	Pagsanghan	
13. Simon Conejos	Catbalogan	Aqua II
14. Elizabeth Montanes	Catbalogan	AT
15. Lorna Lopeña	Catbalogan	FLDT

16. Leodelyn A. Conejos	Tacloban	Aqua II
17. Eulogio Cariño	Catbalogan	Special Agent
18. Rolando Ay-Ay	Catbalogan	PFO
19. Domingo Analag	Catbalogan	AT II
20. Marcos Sabido	Calbayog	Aqua II
21. Marian F. Amigo	Tacloban	NSAP Data Analyst
22. Alejandro Bitbit	Zumaraga	MAO
23. Geraldo Malinao	Daram	Chairperson
24. Argie Muncada	Sto. Nino	MA
25. Norberto Berida	Tacloban	Chief-RTD
26. Joeren Yleana	Q.C	Aqua I
27. Napoleon Lamarca	Q.C	Aqua II
28. Efren Hilario	Q.C	Aqua II
29. Ronnie Romero	Q.C	MES
30. Jonathan Dickson	Q.C/Makati	NTO
31. Seth Yulo	Gandara	
32. Rogelio Leyte	Tagapul-an	MAO
33. Gilbert Sarco	Tagapul-an	AT
34. Marcelo Camarines	Sta. Margarita	TWG
35. Alfred Alerdin		
36. Maridel Bulawit	Sta. Margarita	TWG
37. Myrna Ramos	Q.C	Technical Staff
38. Apolinario Cataros	Calbayog	TWG/
39. Rogelio Mondido	Tacloban	Driver
40. Arnold Abrera	Q.C	Driver
41. Cyrill Gaylon	Q.C	Driver



### Annex 3: Seven-Year Samar Sea Road Map Plan



2016-2022 SAMAR SEA ROADMAP  
2016

Photo credits: PANGCORAL Proj. spp.

#### SAMAR SEA: at a Glance



- ◆ Area of 198 km<sup>2</sup> or 150 miles<sup>2</sup> fishing grounds with an average depth of 15 fathoms
- ◆ 11 Coastal municipalities/city
- ◆ 464 coastal brgy.s.
- ◆ 12,753 registered fisherfolk (BFAR FishR), 37,567 in all of Samar Province comprised about 5% of the population (<http://samar.ku-ph.com>)
- ◆ 1,666 Boat Registration (as of Aug. 2016)
- ◆ Indicated a biomass of 2.88 Wkm<sup>2</sup> and the catch belonging to 107 genera, higher than Visay an Sea (MV DA-BFAR, 2013).
- ◆ Experienced overfishing and significant degradation of marine resources
- ◆ Before 1981, 50 commercial fish species found within 10 y ears reduced to only 10 due to overfishing & destructive fishing methods
- ◆ Average daily catch reduced from 30 kg/day in the 1960's to 8 kg/day in 1981, to 3.5 kg /day in 1991 (Saege, 1993)

#### SAMAR SEA: Its POTENTIAL



- Capture fisheries**  
(198 km<sup>2</sup> or 150 miles<sup>2</sup> fishing area)
- Shellfish Project**  
(oyster, mussel, nylon shell)  
- Major expansion area outside Maqueda Bay
- Mariculture Projects**  
(fish cages culture of High-value species of fin fishes & seaweed farming)

#### GOALS & OBJECTIVES:



- Reduce poverty of fisherfolk
- Improve food Security
- Sustainable Fishing Industry development & Management

**SAMAR SEA FISHERIES MANAGEMENT PLAN (SSFMP)**

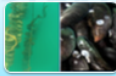
#### TARGETS

Capture Fisheries	Aquaculture	Coastal Resource Management (EAFM)
<ul style="list-style-type: none"> <li>Creation of Alliance Fishery Law Enforcement Team (AFLET)</li> <li>Establish Closed Season (science-based study/assessment of fish population)</li> <li>Provision of viable alternative livelihood project especially for displaced fishers</li> </ul>	<ul style="list-style-type: none"> <li>Utilize expansion areas for Shellfish farming along the 7 municipalities identified under the WSDP</li> <li>Develop Seaweed farming potential areas estimated around 100 has. for the next 6 years</li> <li>Identify specific areas for fish cage operation</li> <li>To tap undeveloped brackishwater esp. with mun. of Sta. Margarita areas</li> </ul>	<ul style="list-style-type: none"> <li>Implementation of SSFMP in the context of EAFM</li> <li>Rehabilitation/improvement projects inland/coastal habitats</li> <li>FARMC in the Municipal/Brgy. level</li> </ul>

#### STRATEGIES

- Creation of Alliance Fishery Law Enforcement Team (AFLET).**
  - Crafting and approval of a resolution for the Establishment of AFLET
  - Collaborative Seaborne Patrol Operation (Alliance/BFAR/CG/PN)
- Establish Closed Seasons**
  - Provide support to science as basis for mgmt.
  - 30% growth increment fish biomass every year using a 4 month long (to be open in between 2 months)
- Provision of viable alternative livelihood project**
  - Provision of at least 1,000 units motorized FG Boats to fisherfolk
  - Distribution of sustainable and environment friendly fishing gears/paraphernal thru 'palit-lambat' approach.

## STRATEGIES



### Utilize identified areas for Shellfish Farming Expansion

- Establish 2,000 units of mussel/oyster modules.
- Sustainably harvest wild stocks such as nylon shell, pen shell and other commercially imppt. mollusk.



### Develop Seaweed Farming potential

- Putting up of seaweed nurseries to produce certified seedlings for culture
- Organize selected farmers to be a 'consolidator' of the produce to facilitate marketing process.



### Establish fish cages operations in viable areas

- Identify/train fisherfolk on fish cage technology
- Adopt resilient technology such as 'submersible fish cages' from Japan



### To tap undeveloped brackishwater areas

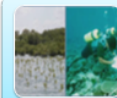
- Utilization of more than 7,000 has. of Fishpond for culture of bangus (fingerlings production), *vannamei* (shrimp) & mudcrabs using aquasilviculture method.

## STRATEGIES



### Implementation of SSFMP in the context of EAFM

- Continue what the REBYC-II Project had started in terms of implementation, monitoring & evaluation in collaboration with stakeholders thru on-going IEC, workshops/consultations.
- Strengthen partnership with involvement of academe and other institutions.



### Rehabilitation/Improvement Projects

- Fish Sanctuary – BFAR assistance to LGUs
- Mangrove refo. – under PNAP activities
- Stock Enhancement ( inputs from BFAR8 Production Center)



### FARMC in the Municipal/Brgy. level.

- Establish capability of LGUs & fishing communities to enforce sustainable mngt. of fishery & coastal resource.

## STRATEGIES



**V A L U E - A D D I N G**

41 units Community Fish Landing Center

Island-based community Fish Solar Dryer (floating type)

Establish marketing mechanisms and support facilities

88 units Fish Stall

22 units Chest Freezer

Seaweed dryers

## FUNDS & SOURCES



Field of Interventions	Budget Estimates	Source of Fund
<b>Capture Fisheries</b>	147.0M	BFAR/Alliance (LGUs)/other NGAs
- AFLET activities (Cost-shared)	12.0M	
- Assessment/Policy implementation on Closed Season	6.0M	
- Provision of Motorized FG Boats & Gears	129.0M	
<b>Aquaculture</b>	287.2M	BFAR (Regular Fund, SAAD Fund, FishCORAL, BUB, REBYC-II) Fisherfolk Beneficiaries (in-kind)
- Shellfish Projects	30.0M	
- Seaweed Project	7.2M	
- Fish cages	100.0M	
- Fishponds/Aquasilviculture	150.0M	

## FUNDS & SOURCES




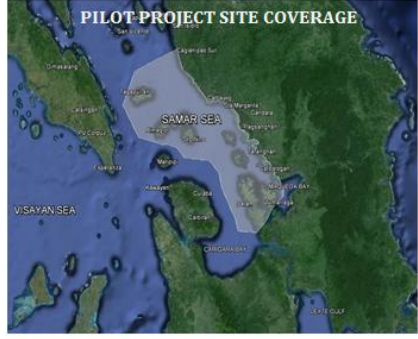
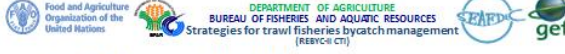
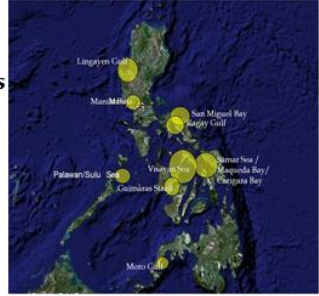
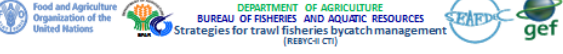

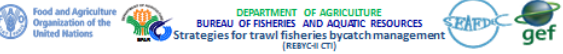



Field of Interventions	Budget Estimates	Source of Fund
<b>CRM (EAFM)</b>	52.6M	Alliance (LGUs)/BFAR/FishCORAL, BUB/REBYC/Fisherfolk Councils (in-kind)
- Workshops/consultation's/IEC activities	3.0M	
- FS/MPA rehab	33.0M	
- Mangrove Refo.	10.0M	
- Mun./Brgy. FARMC capability bldg. and organizations	6.6M	
	<b>TOTAL=486.8M</b>	<b>UNFUNDED</b>
<b>Market Mechanism &amp; Support Facilities</b>	<b>TOTAL=41.86M</b>	<b>Funded by BFAR</b>
- CFCLC (w/ fish stalls/chest freezers/vacuum sealer)	37.56M	
- Island-based Solar Fish dryer w/ packaging area.	1.0M	
- Community-based Seaweed Dryer/land-based nurseries	3.3M	



Thank you for listening!

## Annex 4: Overview on the REBYC-II CTI Project

<p>  </p> <p style="text-align: center;"><b>Introduction</b></p> <p> <b>REBYC-II CTI project will contribute to more sustainable use of fisheries resources and healthier marine ecosystems in the Coral Triangle and Southeast Asia waters by reducing bycatch, discards and other impacts of trawl fisheries</b> </p> <p style="text-align: center;">  </p> <p style="text-align: center;"><b>OVERVIEW AND UPDATES OF REBYC-II CTI PROJECT</b></p>	<p>  </p> <p style="text-align: center;"><b>PILOT PROJECT SITE COVERAGE</b></p> 
<p>  </p> <ul style="list-style-type: none"> <li>▪ <b>Trawl Fisheries in the Philippines</b> <ul style="list-style-type: none"> <li>▪ Municipal</li> <li>▪ Commercial</li> </ul> </li> <li>▪ <b>Trawl Fishing Grounds</b> <ul style="list-style-type: none"> <li>▪ Samar Sea</li> <li>▪ Visayan Sea</li> <li>▪ San Miguel Bay</li> <li>▪ Lingayen Gulf</li> <li>▪ Ragay Gulf</li> <li>▪ Carigara Bay</li> <li>▪ Guimaras Strait</li> <li>▪ Manila Bay</li> <li>▪ Moro Gulf/ Sibuguey Bay</li> </ul> </li> </ul> 	<p>  </p> <ul style="list-style-type: none"> <li>▪ <b>National Policy Frameworks</b> <ul style="list-style-type: none"> <li>▪ Fisheries Code of 1998 (Republic Act 8550) as amended by RA 10654</li> <li>▪ Local Government Code of 1991 (RA 7160)</li> <li>▪ Agriculture and Fisheries Modernization Act of 1997 (RA 8435).</li> </ul> </li> </ul>
<p>  </p> <p><b>Institutions Involved</b></p> <ul style="list-style-type: none"> <li>▪ <b>National Government Agencies</b> <ul style="list-style-type: none"> <li>▪ Bureau of Fisheries and Aquatic Resources-Central Office</li> <li>▪ Regional Fisheries Office No. VIII</li> <li>▪ Philippine National Police/ PNP-Maritime</li> <li>▪ Philippine Coast Guard</li> </ul> </li> <li>▪ <b>Local Government</b> <ul style="list-style-type: none"> <li>▪ Province of Samar</li> <li>▪ Samar Sea Alliance of Local Government for Fisheries Management</li> </ul> </li> <li>▪ <b>Academe</b> <ul style="list-style-type: none"> <li>▪ Samar State University</li> </ul> </li> <li>▪ <b>Private Sector</b> <ul style="list-style-type: none"> <li>▪ Fish Dryer/ Processor</li> <li>▪ Fishing Companies</li> <li>▪ Fish Vendor</li> <li>▪ Fishermen</li> <li>▪ Aquaculture</li> </ul> </li> <li>▪ <b>Civil Society Organizations</b> <ul style="list-style-type: none"> <li>▪ NAPC</li> <li>▪ PAFC</li> <li>▪ FARMC</li> </ul> </li> </ul>	<p>  </p> <p><b>Main issues facing trawl fisheries</b></p> <ul style="list-style-type: none"> <li>▪ Problems on Bycatch and Discards</li> <li>▪ Conflicts With Other Resource Users</li> <li>▪ Demand from Aquaculture for Trashfish</li> <li>▪ Role of Trashfish/ Low Value Fish to Food Fish Consumption</li> <li>▪ Lack of Socio Economic Data to Support Fisheries Management</li> </ul>

 Food and Agriculture Organization of the United Nations
  DEPARTMENT OF AGRICULTURE BUREAU OF FISHERIES AND AQUATIC RESOURCES
  Strategies for trawl fisheries bycatch management (REBYC-CTI)
 

### The Project Goals & Objectives

- Goals:**
  - contribute to more sustainable use of fisheries resources, healthier marine habitat & ecosystems, and secured livelihoods
- Objectives:**
  - improve trawl fisheries management
  - promote sustainable fishing practices
  - minimize the catch of juveniles
  - minimize species at risk
  - minimize discards
  - avoid capture of protected species
  - avoid destructive impact on habitats
  - seek balance between environmental well-being and human well-being
  - increase resilience of coastal livelihoods
  - evaluate the costs and benefits of a change



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  Strategies for trawl fisheries bycatch management (REBYC-CTI)
 

### Overall Summary





- Successful implementation of the Project Components
- Co- management of Samar Sea
- Mainstreaming of SSFMP to the BFAR National Program
- EAFM was useful in the development of SSFMP
- Socioeconomic data from the project was used in the implementation of SSFMP
- Strengthened working relationship with BFAR, Law Enforcement Agencies and Other Key Stakeholders
- EAFM sensitized the stakeholders on fishery issues

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  Strategies for trawl fisheries bycatch management (REBYC-CTI)
 

### Component 1: Policy, Legal and Institutional Frameworks

#### What were achieved..


- REBYC Phils. representatives participated in the APFIC regional workshop to develop a regional guidelines on bycatch management and reduction of discards
- The Samar Sea Fisheries Management Plan adheres to international guidelines on bycatch management and the reduction of discards.
- The Samar Sea Fisheries Management Plan (SSFMP) finalized after its presentation to stakeholders/TWG, BFAR Regional Fisheries Office Staff, Public (General), the Members of the Samar Sea Alliance of Local Government Units (LGUs) and the National Advisory Group.

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### Component 1: Policy, Legal and Institutional Frameworks

#### What were achieved..

- Socio economic studies carried out under project, used in determining local level management measures and feature as a chapter in the SSFMP.
- Implementation Guidelines of the SSFMP completed
- Philippines study of policies and legal framework for trawl fisheries in progress.
- Fisheries Administrative Order 237, (regulation on use of JTED), is in place and complied by commercial trawler operators in the Samar Sea pilot area.



REBYC-CTI: Lessons Learned Workshop  
Centre point Hotel, Silom, Bangkok, Thailand





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  Strategies for trawl fisheries bycatch management (REBYC-CTI)
 

### Component 1: Policy, Legal and Institutional Frameworks

#### What were achieved..

- Unified ordinance for the 4 month closed season approved by 11 coastal municipalities
- Establishment of the project National Advisory Group (NAG). April 29, 2013 (BFAR), Quezon City. Two meetings conducted.
- REBYC CTI TWG pilot site established
- Consultative group and stakeholder participation to plan, coordinate and monitor project activities
- Establishment/integration of local management council (Alliance of Samar Sea Local Government Units / LGUs) for Samar Sea management.

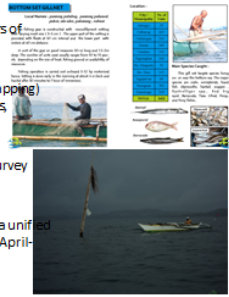


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  Strategies for trawl fisheries bycatch management (REBYC-CTI)
 

### Component 2: Resource Management and Fishing Operations

#### What was achieved?

- Completion of Catalogue of Fishing Gears of Samar Sea
- Coral reef surveys (for critical habitat mapping) covered 19 sites in 6 municipalities/cities completed.
- The SSU ichthyoplankton and by-catch survey completed.
- The SSFMP supports the formulation of a unified ordinance for a 4-month closed season (April-July) in Samar Sea.



### Component 2: Resource Management and Fishing Operations

What was achieved?

- Fishing grounds and critical habitats in Samar Sea mapped.
- Training/workshop on the inventory of fishing gears and boats
- Inventory of trawl and other fishing gears in 11 municipalities, Samar Sea, followed by a workshop to review and consolidate data.
- Establishment of monitoring scheme incorporated in the SSFMP
- Provision of alternative livelihood



### Component 3: Information and Management Communications

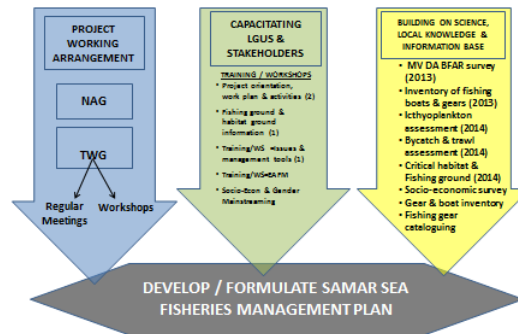
- Established a website for the project
- Baseline data on socioeconomics of trawl fisheries in the pilot site
- Technical paper on the socioeconomic survey

### Component 4: Awareness and Knowledge

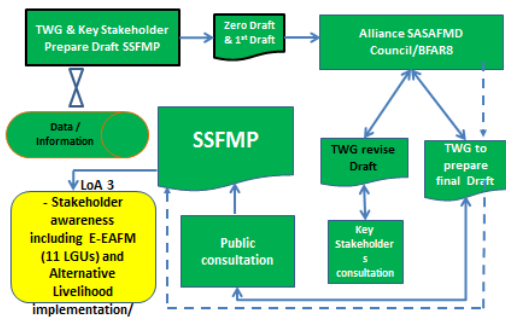
What was achieved?

- Training on EAFM Socioeconomics Writeshop/ Workshop Training on Fishing Gear Construction
- Seminar/Consultations in Pilot Site (Samar Sea)
- Public consultations on SSFMP
- Training/workshop on fisheries management and BRDs
- Participation in EAFM LEAD workshop
- Public Consultation focused on the SSFMP management measures including proposed closed season of Samar Sea (April-July) to protect the juveniles during the spawning season.
- Livelihood/Training Needs Assessment for displaced fishermen during proposed closed season
- Training/workshop on the inventory of fishing gears and boats. June 27-29, 2014.
- Training/workshop on EAFM completed.
- Socio-economic training/workshop on indications & data gathering

### IN A NUTSHELL... WHAT HAVE BEEN DONE ?





### WHERE ARE WE ?



Thank you

## Annex 5: Latest Developments of the Project

 <h3>ACHIEVEMENTS OF REBYC-II CTI PROJECT - PHILIPPINES</h3> <p>REBYC-II CTI project will contribute to more sustainable use of fisheries resources and healthier marine ecosystems in the Coral Triangle and Southeast Asia waters by reducing bycatch, discards and other impacts of trawl fisheries</p> 	
<h3>PROCESS... WHAT HAVE BEEN DONE?</h3> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid gray; padding: 5px; width: 30%;"> <p><b>PROJECT WORKING ARRANGEMENT</b></p> <p>NAG</p> <p>TWG</p> <p>Regular Meetings</p> <p>Workshops</p> </div> <div style="border: 1px solid gray; padding: 5px; width: 30%;"> <p><b>CAPACITATING LGUS &amp; STAKEHOLDERS</b></p> <p>TRAINING / WORKSHOPS</p> <ul style="list-style-type: none"> <li>Project orientation, work plan &amp; activities (2)</li> <li>Fishing ground &amp; habitat ground information (1)</li> <li>Training/WS - issues &amp; management tools (1)</li> <li>Training/WS-EAFM</li> <li>Socio-Econ. &amp; Gender Mainstreaming</li> </ul> </div> <div style="border: 1px solid gray; padding: 5px; width: 30%;"> <p><b>BUILDING ON SCIENCE, LOCAL KNOWLEDGE &amp; INFORMATION BASE</b></p> <ul style="list-style-type: none"> <li>MV DA BARAR survey (2013)</li> <li>Inventory of fishing boats &amp; gears (2013)</li> <li>Ichthyoplankton assessment (2014)</li> <li>Bycatch &amp; trawl assessment (2014)</li> <li>Critical habitat &amp; Fishing ground (2014)</li> <li>Socio-economic survey</li> <li>Gear &amp; boat inventory</li> <li>Fishing gear cataloging</li> </ul> </div> </div> <p style="text-align: center;"><b>DEVELOP / FORMULATE SAMAR SEA FISHERIES MANAGEMENT PLAN</b></p>	<h3>WHERE ARE WE ?</h3> 
<h3>Pilot Project Area</h3> 	<h3>INSTITUTIONS INVOLVED</h3> <ul style="list-style-type: none"> <li><b>National Government Agencies</b> <ul style="list-style-type: none"> <li>Bureau of Fisheries and Aquatic Resources- Central Office</li> <li>Regional Fisheries Office No. VIII</li> <li>Philippine National Police/ PNP-Maritime</li> <li>Philippine Coast Guard</li> </ul> </li> <li><b>Local Government</b> <ul style="list-style-type: none"> <li>Province of Samar</li> <li>Samar Sea Alliance of Local Government for Fisheries Management</li> </ul> </li> <li><b>Academe</b> <ul style="list-style-type: none"> <li>Samar State University</li> </ul> </li> </ul>

## INSTITUTIONS INVOLVED

### Private Sector

- Fish Dryer/ Processor
- Fishing Companies
- Fish Vendor
- Fisherfolk
- Aquaculture

### Civil Society Organizations

- NAPC
- PAFC
- FARMC

### Main issues facing trawl fisheries

- Problems on Bycatch and Discards
- Conflicts With Other Resource Users
- Demand from Aquaculture for Trashfish
- Role of Trashfish/ Low Value Fish to Food Fish Consumption
- Lack of Socio Economic Data to Support Fisheries Management

- Establishment of the Project Team and
  - Project Technical Working Group
  - National Advisory Group



- Socio economic studies carried out under project, used in determining local level management measures and feature as a chapter in the SSFMP

- Samar Sea Fisheries Management Plan (SSFMP) was finalized after presentation to stakeholders/TWG, BFAR Regional Fisheries Office Staff, Public, the Members of the Samar Sea Alliance of Local Government Units (LGUs) and the National Advisory Group



### Component I Policy, Legal and Institutional Framework

- Consultative group and stakeholder participation to plan, coordinate and monitor project activities



- Establishment/Integration of local management council (Alliance of Samar Sea Local Government Units / LGUs) for Samar Sea management.



### Component I Policy, Legal and Institutional Framework

- Completion of Catalogue of Fishing Gears of Samar Sea

- Coral reef surveys (for critical habitat mapping) covered 19 sites in 6 municipalities/cities, completed.

- Ichthyo-plankton and by-catch survey completed.

- Fishing grounds and critical habitats in Samar Sea mapped.

- Training/workshop on the inventory of fishing gears and boats



### Component II Resource Management and Fishing Operations

- Inventory of trawl and other fishing gears in 11 municipalities, Samar Sea

- Workshop to review and consolidate data.

- Establishment of implementation, monitoring and evaluation scheme for the SSFMP

- Provision of alternative livelihood



### Component II Resource Management and Fishing Operations

- Established a website for the project

- Baseline data on socioeconomics of trawl fisheries in the pilot site

- Technical paper on the socioeconomic survey

- Catalogue of Fishing Gears in Samar Sea (In Press)



### Component III: Information and Management Communications

- Training on EAFM Socioeconomics Writeshop/ Workshop/Training on Fishing Gear Construction

- Seminar/Consultations in Pilot Site (Samar Sea)

- Public consultations on SSFMP

- Training/workshop on fisheries management and BRDs

- Participation in EAFM LEAD workshop

- Training/workshop on EAFM completed.



### Component IV: Awareness and Knowledge

- o Public Consultation focused on the SSFMP management measures including proposed closed season of Samar Sea (April-July) to protect the juveniles during the spawning season.
- o Livelihood/Training Needs Assessment for displaced fishermen during proposed closed season
- o Training/workshop on the inventory of fishing gears and boats. June 27-29, 2014.
- o Socio-economic training/workshop on indications & data gathering



**Component IV: Awareness and Knowledge**



**Spawning months of selected commercial species as basis for the 4 month Close Season**

Species	J	F	M	A	M	J	J	A	S	O	N	D
Slupege ( <i>Ventrusca spp.</i> )								1, 2				
Kaliso ( <i>Squilla sp.</i> )												
Saramulyas												
Tambong ( <i>Leptochirus saxatilis</i> )								1, 2				
Maga-Maga ( <i>Procambarus spp.</i> )								2				
Lawayan ( <i>Leptochirus spp.</i> )												2
Agumaa ( <i>Brachyura spp.</i> )				1, 2	1							
Calungong ( <i>Decapoda spp.</i> )												1, 2
Mawa												
Mawa ( <i>Brachyura spp.</i> )												
Mumaha ( <i>Brachyura spp.</i> )												
Mawa ( <i>Brachyura spp.</i> )												
Mawa ( <i>Brachyura spp.</i> )												
Mawa ( <i>Brachyura spp.</i> )												
Mawa ( <i>Brachyura spp.</i> )												
Mawa ( <i>Brachyura spp.</i> )												

**Source :**  
 1 Result of study during REBYC I, 2008-2008  
 2 Result of assessment conducted by SDI, 2010-2014  
 1 Month of high proportion of matured (stage 210)  
 2 Anticipated high occurrence of juvenile






# Annex 6: National Stock Assessment Program of Samar Sea



**National Stock Assessment Program (NSAP)**

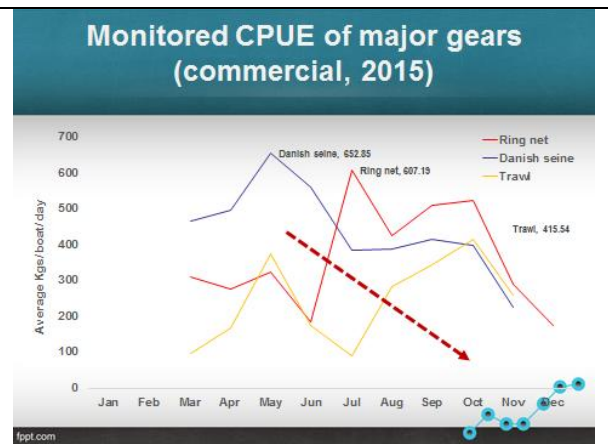
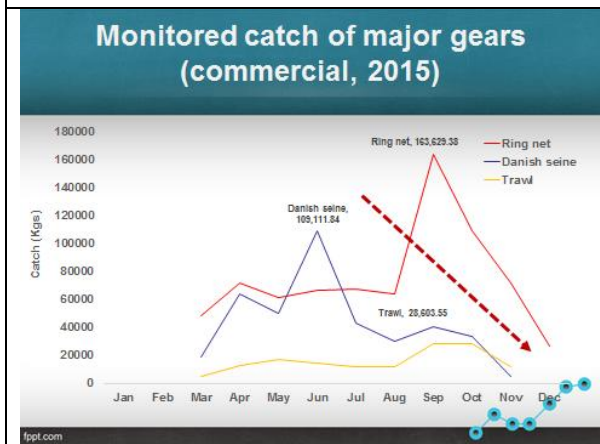
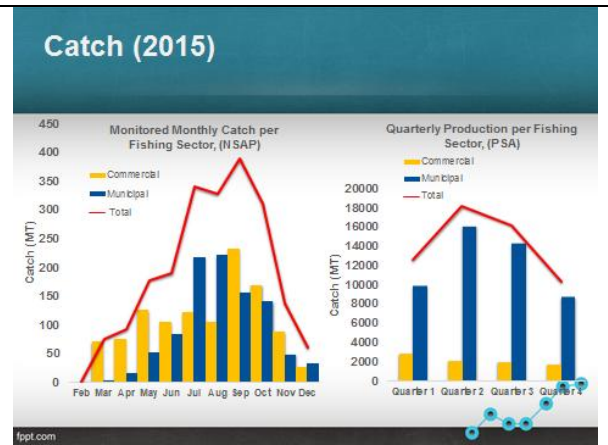
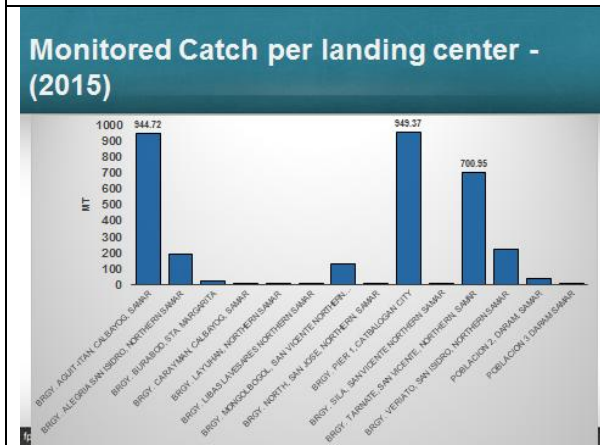
Matt T. Alcantara,  
Miriam C. Francisco – Amigo

Bureau of Fisheries and Aquatic Resources  
Regional Office No. 8

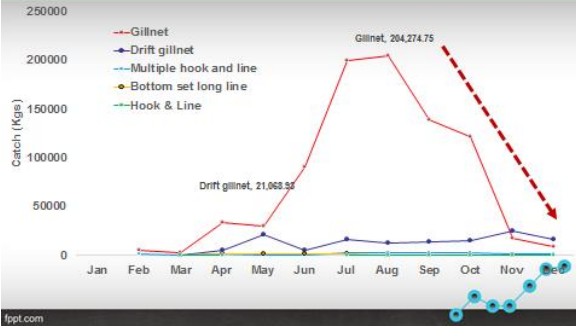


**Municipalities surrounding Samar Sea covered under NSAP Expansion**

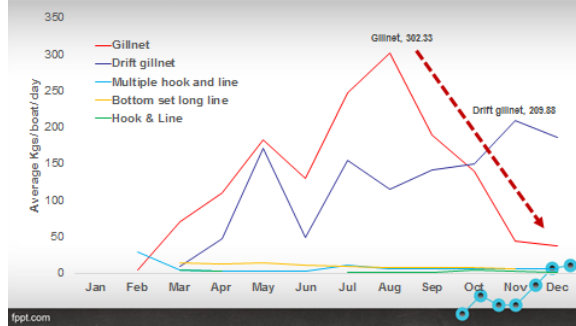
- 14 landings sites
  - 6 Major landing sites
  - 8 Minor landing sites



### Monitored catch of major gears (municipal, 2015)

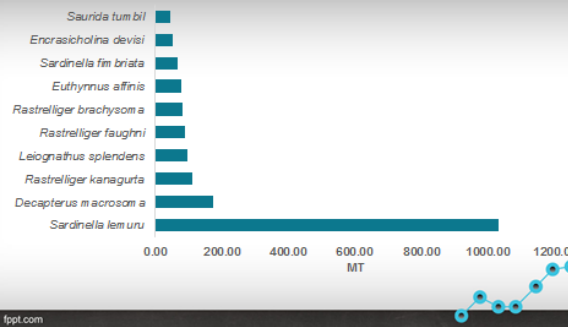


### Monitored CPUE of major gears (municipal, 2015)

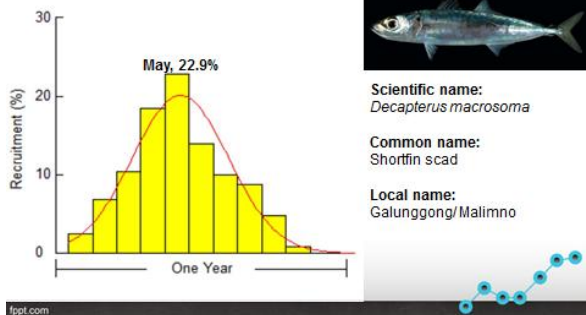


### Dominant Species (Top 10) and their population Parameters

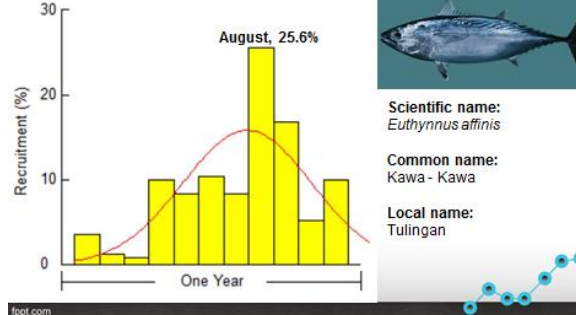
### Dominant Species (Top 10)



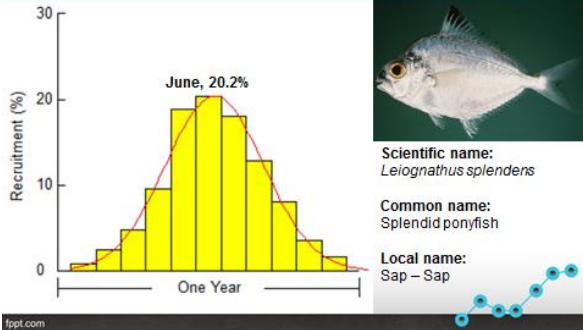
### Recruitment Pattern



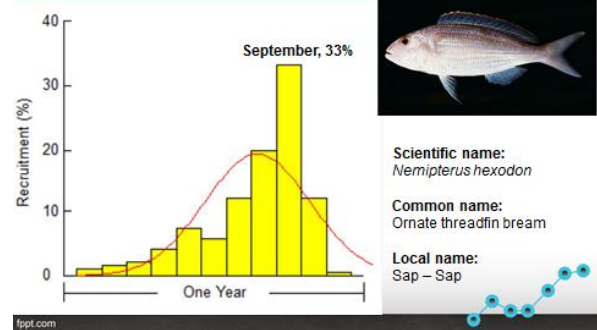
### Recruitment Pattern



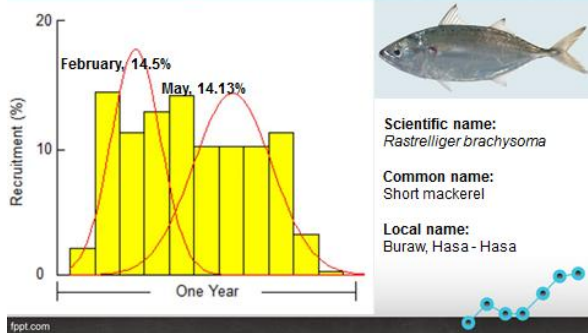
## Recruitment Pattern



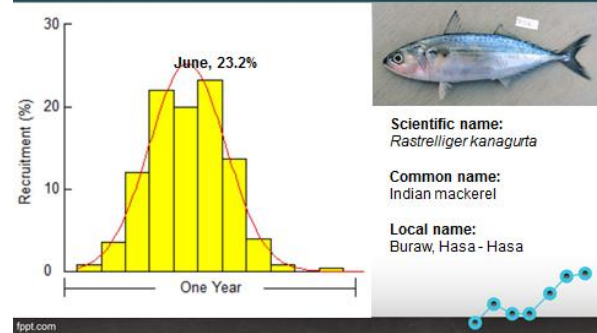
## Recruitment Pattern



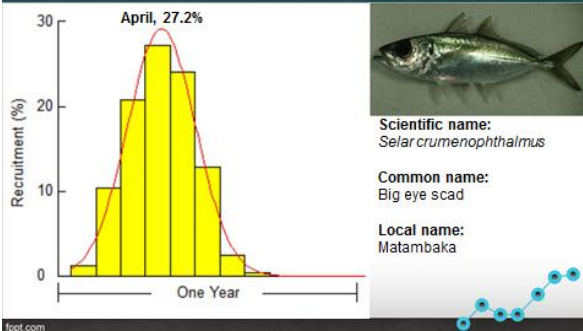
## Recruitment Pattern



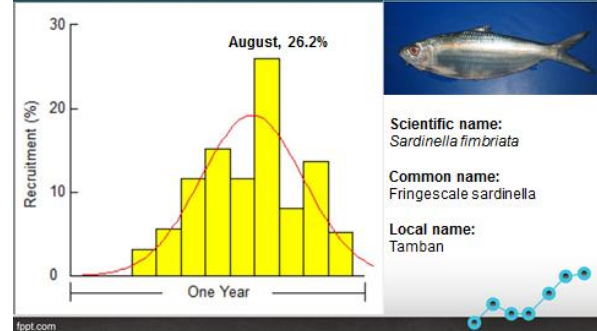
## Recruitment Pattern



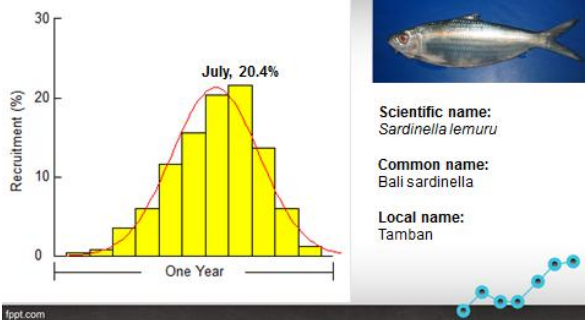
## Recruitment Pattern



## Recruitment Pattern

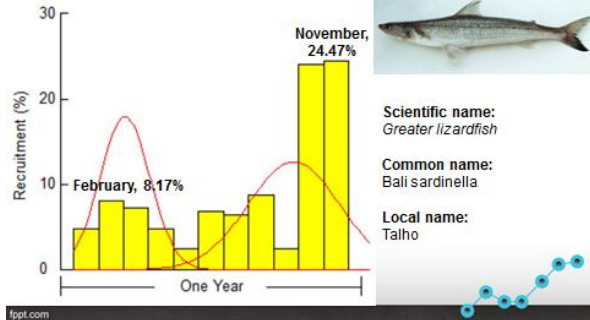


## Recruitment Pattern



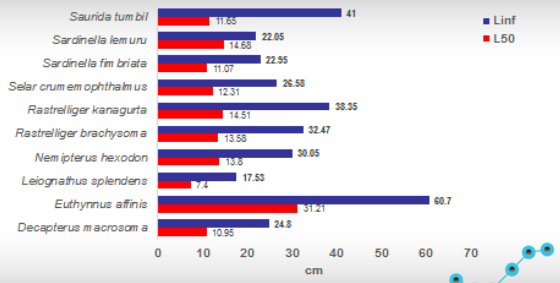
fppt.com

## Recruitment Pattern



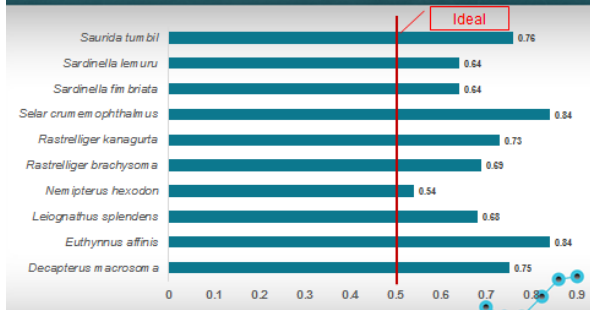
fppt.com

## Lengths at which 50% of the stocks were caught (L-50) vs L at infinity (Linf)



fppt.com

## Exploitation values



fppt.com

## Annex 7: Biology and Population of Commercial Important Species

### Population and Biology of Major Commercially Important Fishes in Samar Sea

RONNIE O. ROMERO  
NFRDI

NSAP Review in Samar Sea  
Catbalogan City, Samar  
October 11-12, 2016a

#### Sampling Boats



Shrimp trawl, Manila Bay

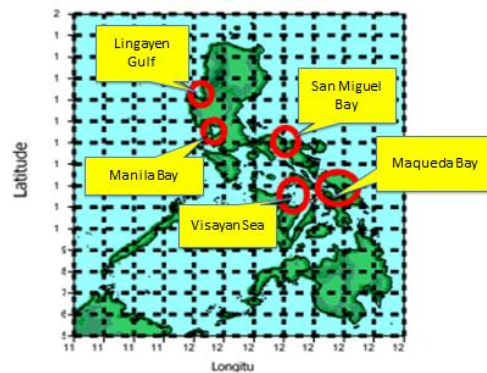


Shrimp trawl, Maqueda Bay

#### JTEDs



#### Fishing Grounds



#### PILOT PROJECT COVERAGE



#### Objectives:

1. To determine the efficiency and select the most appropriate among JTED variations/designs
2. To reduce the incidence of juveniles and rejects by 40%
3. To assess the resource (production, species & size), impact of trawl with JTED;
4. To determine population parameters and spawning season of major species caught
5. To demonstrate and gain experience process of implementation a micro (local) level
6. To develop a national policy on JTED

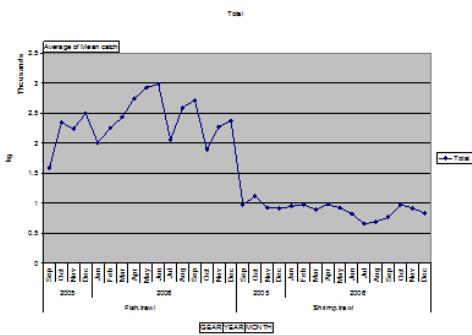
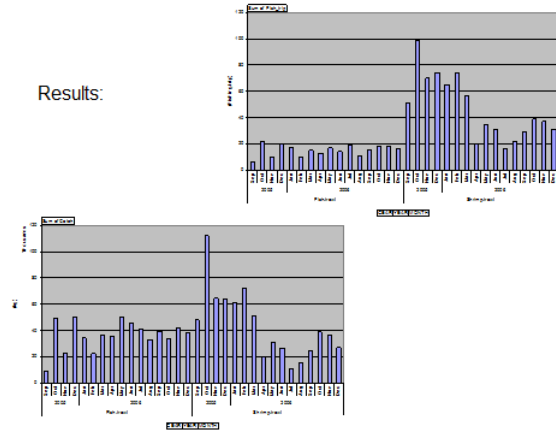
Methodology:

**Fishing Effort:  
Landed Catch  
Number of Trips**

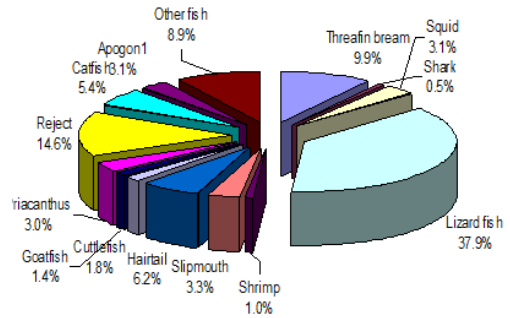
**Sexual Maturity:  
Onboard observation  
Gonad maturity**

Population  
FiSAT  
Length Frequency

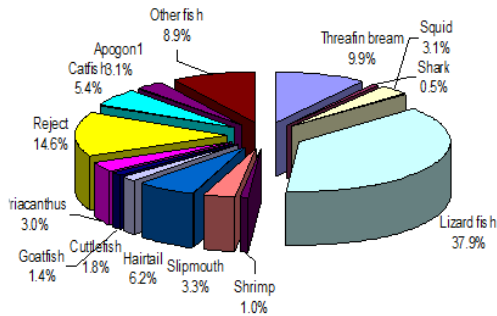
Results:



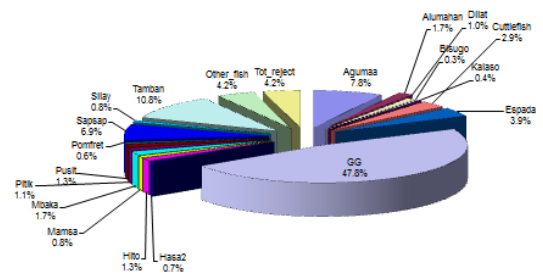
Catch Per Unit Effort



Catch composition of shrimp trawl

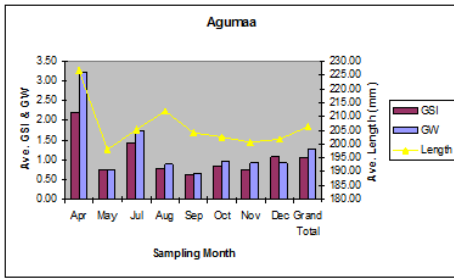


Catch composition of shrimp trawl



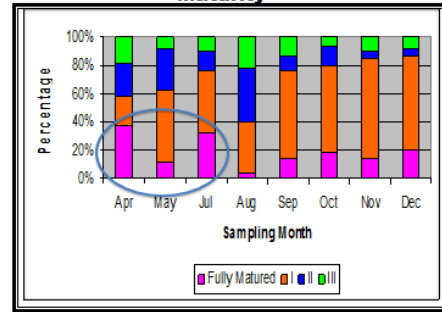
Catch composition of Fish trawl

### Maturity



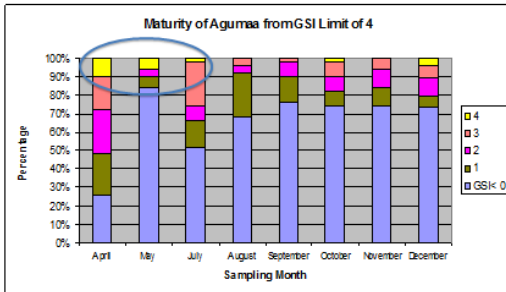
*Rastrelliger kanagurta* (Agumaa, Indian Mackerel)

### Maturity



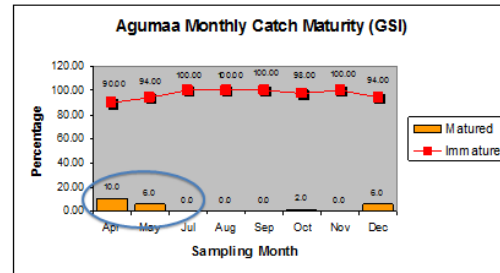
*Rastrelliger kanagurta* (Agumaa, Indian Mackerel)

### Maturity



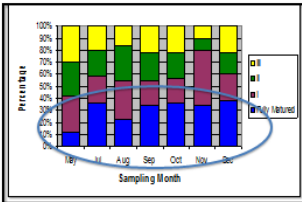
*Rastrelliger kanagurta* (Agumaa, Indian Mackerel)

### Maturity

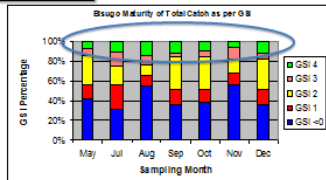


*Rastrelliger kanagurta* (Agumaa, Indian Mackerel)

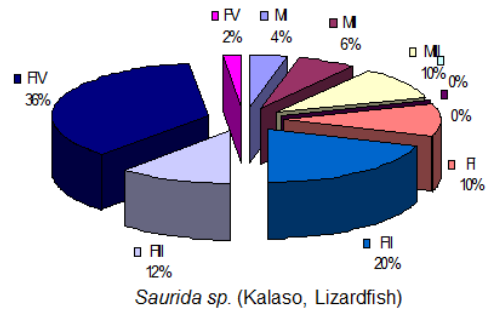
### Maturity



*Nemipterus sp.*  
Bisugo, Threadfin Bream

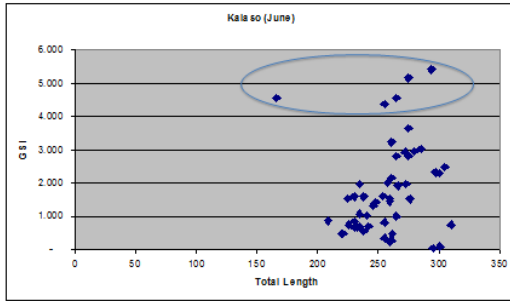


### Sexual Maturity



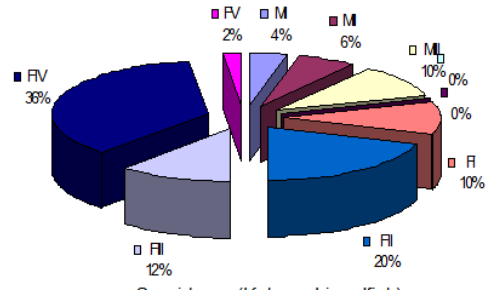
*Saurida sp.* (Kalaso, Lizardfish)

### Length at First Maturity



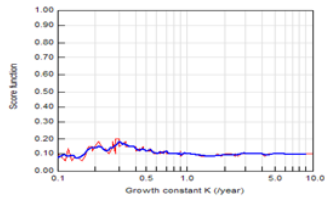
*Saurida sp.* (Kalaso, Lizardfish)

### Maturity

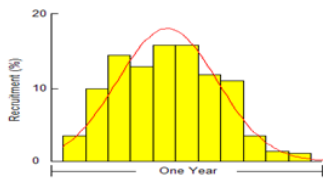


*Saurida sp.* (Kalaso, Lizardfish)

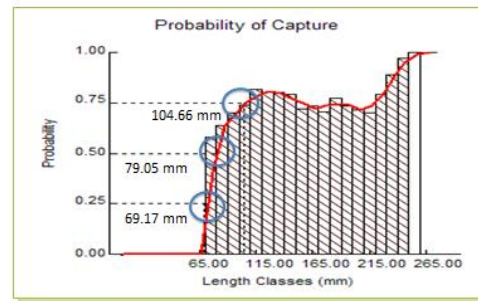
### Growth and Recruitment



*Saurida sp.*  
(Kalaso, Lizardfish)

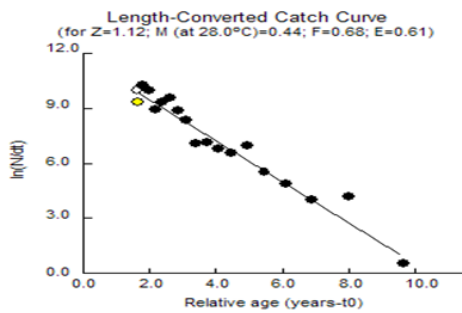


### Capture Probability



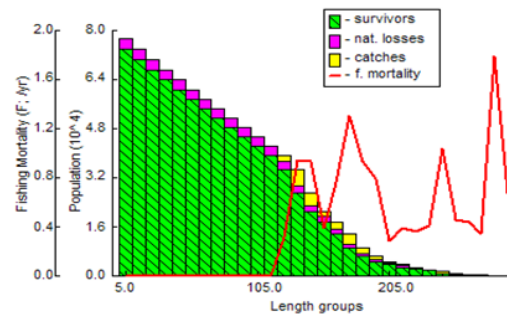
*Saurida sp.* (Kalaso, Lizardfish)

### Mortality and Exploitation



*Saurida sp.* (Kalaso, Lizardfish)

### Mortality and Exploitation



*Saurida sp.* (Kalaso, Lizardfish)



### Spawning Season of Major Fishes in Samar Sea

Species	J	F	M	A	M	J	J	A	S	O	N	D
<b>Bisugo</b> ( <i>Nemipterus spp.</i> )								1,2				
<b>Kalaso</b> ( <i>Saurida sp.</i> )												
<b>Saramulyete</b> ( <i>Upeneus sp.</i> )							1,2			1		
<b>Tambong</b> ( <i>Leiognathus equulus</i> )							2					
<b>Baga-baga</b> ( <i>Priacanthus spp.</i> )							2					
<b>Lawayan</b> ( <i>Leiognathus</i> )												2
<b>Agumaa</b> ( <i>Rastralliger faughni</i> )				1, 2	1							
<b>Galunggong</b> ( <i>Decapterus spp.</i> )												1, 2
<b>Hairtail</b>				2, 2								
<b>Hasa-hasa</b> ( <i>Rastrelliger brachysoma</i> )					2							
<b>Alumahan, Burao</b> ( <i>Rastrelliger kanagarta</i> )				2	2	2						
<b>Matambaka</b> ( <i>Selar crumenophthalmus</i> )							2					

### Population Parameters of Major Fishes in Samar Sea

Species Local Name	Parameters						Capture Probability (in.)		
	$L_{\infty}$ (in)	k	Z	M	F	E	25%	50%	75%
Agumaa (R. brachysoma)	11.35	0.445	1.1	0.50	0.6	0.55	5.84	6.11	6.48
Bisugo (Nemipterus sp.)	12.19	0.32	1.12	0.44	0.68	0.61	4.63	4.75	5.04
Dilat (P. tayenus)	11.37	0.33	0.84	0.46	0.38	0.45	3.08	3.29	3.59
Galunggong Babae (D. maruadi)	11.37	0.44	2.01	0.56	1.46	0.72	3.89	4.19	4.48
Matambaka (S. crumenophthalmus)	10.97	0.735	2.32	0.78	1.54	0.66	7.43	7.68	7.98

**Salamat Po..**

## Annex 8: Oceanographic Survey of M/V DA-BFAR



### JOEREN S. YLEANA

Fisheries Biologist/Technologist  
BFAR – Capture Fisheries Division  
Quezon City



Demersal (trawl) Fisheries Survey of Visayan Sea and Samar Sea,  
16-30 April 2013  
Salient Results



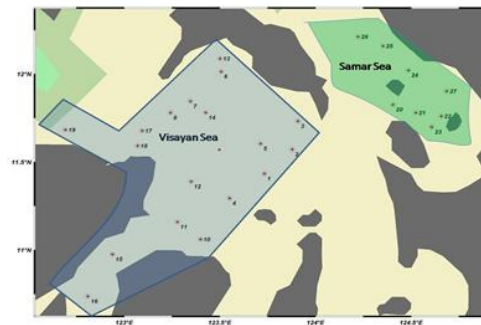
### Salient Results

- Physical Conditions of Waters of the Visayan and Samar Seas
- Comparative Study of Ichthyoplankton of Visayan Sea and Samar Sea
- Composition, Distribution, and Abundance of Phytoplankton along the Waters of Visayan and Samar Sea
- Sex Ratio, Gonad Maturity and Size Composition of *Nemipterus tambuloides* and Other Dominant Commercial Species in Samar Sea

### Salient Results

- Physical Conditions of Waters of the Visayan and Samar Seas
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Physical Conditions of Waters of the Visayan and Samar Seas



**Physical Conditions of Waters of the Visayan and Samar Seas**



**Salinity (psu)**

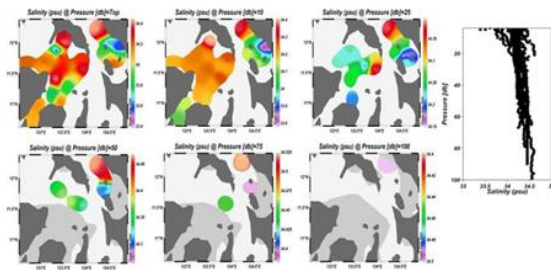


Figure 3. Spatial and vertical distributions of salinity (psu) with depth (m).

**Salinity (psu)**

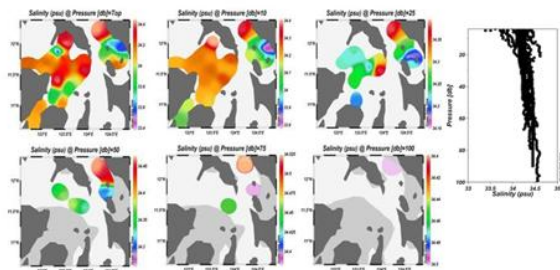


Figure 3. Spatial and vertical distributions of salinity (psu) with depth (m).

**Dissolved Oxygen (mL/L)**

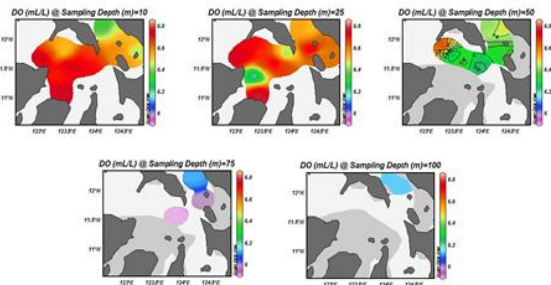


Figure 12. Dissolved oxygen concentration at depths of 10m, 25m, 50m, 75m and 100m.

**Comparative Study of Ichthyoplankton of Visayan Sea and Samar Sea**

**Fish egg Density (tails/1000m<sup>3</sup>)  
Visayan Sea**

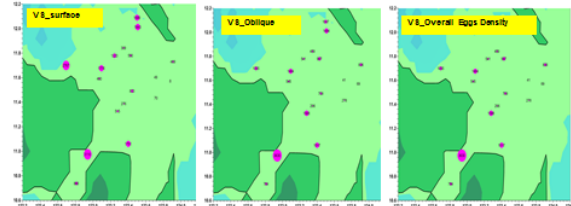


Figure 8. Fish Egg Density/1000m<sup>3</sup> Visayan Sea (surface, oblique and overall Density)

**Fish eggs Density (tails/1000m<sup>3</sup>)**

**Samar Sea**

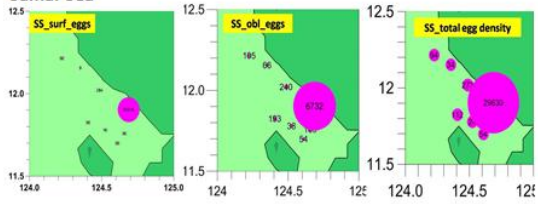


Figure 8. Fish Eggs Density/1000<sup>3</sup>m<sup>3</sup> Samar Sea (surface, oblique and overall Density)

**Fish Larvae Density (tails/1000m<sup>3</sup>)**

**Visayan Sea**

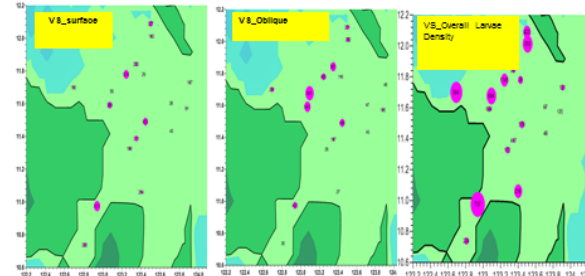


Figure 7. Fish Larvae Density/1000<sup>3</sup>m<sup>3</sup> Visayan Sea (surface, oblique and overall Density)

mean density 445.34/1000<sup>3</sup>m<sup>3</sup>

**Fish Larvae Density (tails/1000m<sup>3</sup>)**

**Visayan Sea**

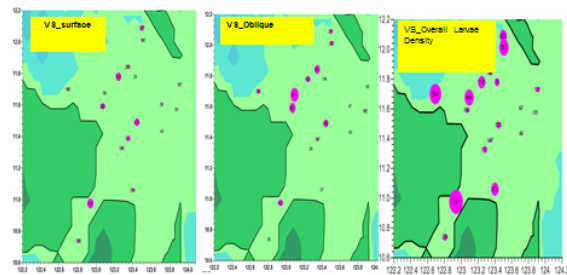
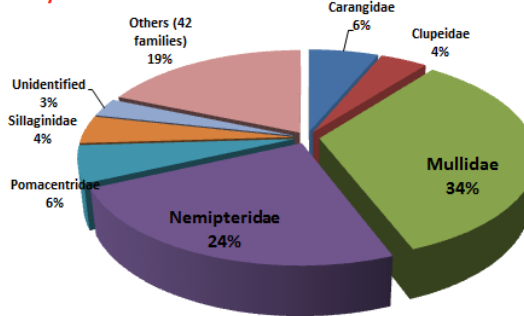


Figure 7. Fish Larvae Density/1000<sup>3</sup>m<sup>3</sup> Visayan Sea (surface, oblique and overall Density)

mean density 445.34/1000<sup>3</sup>m<sup>3</sup>

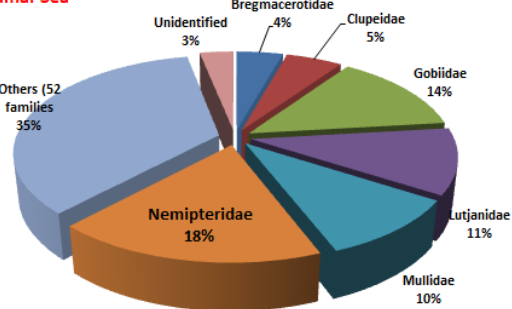
**Dominant Families**

**Visayan Sea**



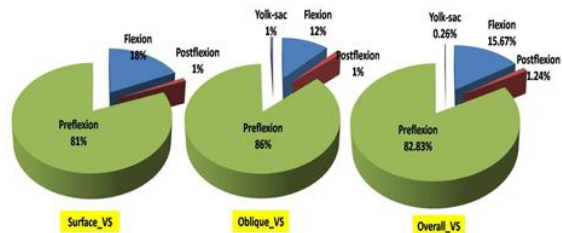
**Dominant Families**

**Samar Sea**

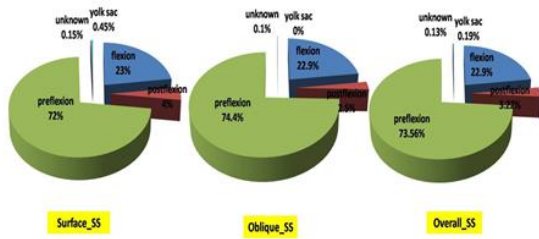


**Stages**

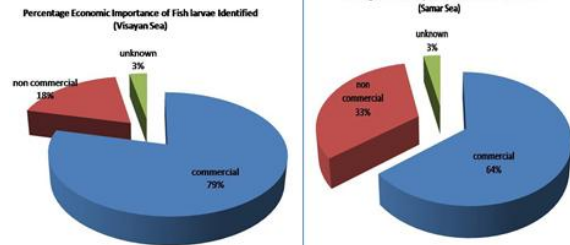
**Visayan Sea**



**Stages**  
**Samar Sea**



**Economic Importance**



**Composition, Distribution, and Abundance of Phytoplankton along the Waters of Visayan and Samar Sea**

**Phytoplankton Density**

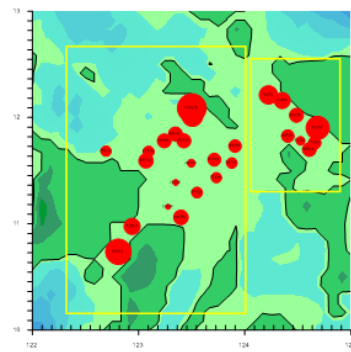
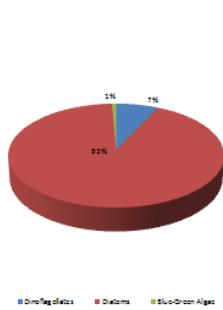


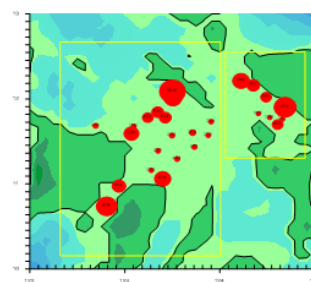
Figure 17. Total Phytoplankton Density along Visayan and Samar Sea

**Composition**



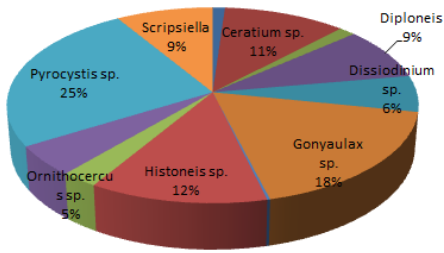
<b>Dinoflagellata:</b>		
Alexandrium sp.	Cyanodina	
Ceratium sp.	Lagodonlindius sp.	
Dinophysis sp.	Lophosyllium	
Diatoms:	Walsbya sp.	
Diazidium sp.	Planozostoma sp.	
Gonyaulax sp.	Rhabdonella sp.	
Gymnodium sp.	Rhizolenia sp.	
Walsbya sp.	Skeletonema sp.	
Noctiluca sp.	Thalassiosira sp.	
Oryzoea sp.	Thalassiosira sp.	
Pseudois sp.	Thalassiosira sp.	
Solenella	Trombidium sp.	
<b>Diatoms:</b>		
Acanthamoeba sp.		
Amphioxys sp.		
Bacillaria sp.		
Bacteriosira sp.		
Biddulphia sp.		
Chaetoceros sp.		
Ceratium sp.		
Cocconeis sp.		
Coscinodiscus sp.		
Cryptosira sp.		
Diadema sp.		
Eucampia sp.		
Glebocera sp.		
<b>Bluegreen Algae:</b>		
Thalassiosira sp.		

**Dinoflagellate Density**

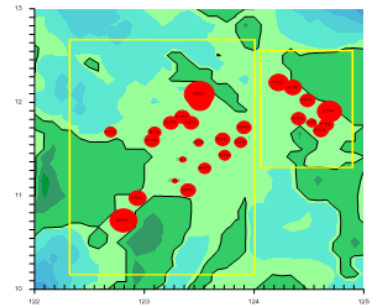


Highest in station 13 (11,448 cells/l)... lowest in station 21 (2,016 cells/l)...9% identified phytoplankton species belonging to class *Dinophyceae*.

**Dinoflagellate Composition**

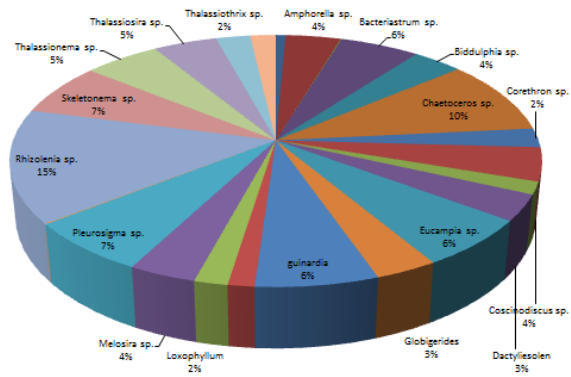


**Diatoms Density**

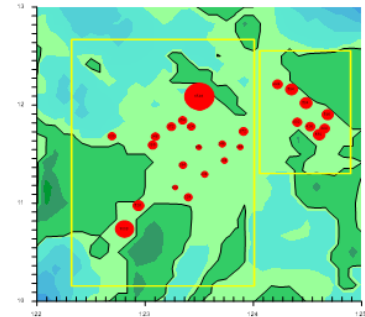


Highest diatom density was observed in station 13 (96132 cells/l), while the least diatom density was noted in stations 11 (37248 cells/l).

**Diatoms Composition**



**Blue Green Algae Density**



Highest blue-green algae density was noted in station 13 (1746 cells/l), while the lowest density was observed in station 11 (132 cells/l).

**Sex Ratio, Gonad Maturity and Size Composition of *Nemipterus tambuloides* and Other Dominant Commercial Species in Samar Sea**



### Trawl Composition

Species	Composition*
<i>Leiognathus splendens</i>	17.6%
<i>Selar boops</i>	10.8%
<i>Leiognathus bindus</i>	10.4%
<i>Fistularia petimba</i>	9.1%
<i>Trichurus lepturus</i>	7.2%
<i>Leiognathus equulus</i>	7.0%
<i>Rastrelliger brachysoma</i>	3.3%
<i>Sphyraena barracuda</i>	2.9%
<i>Photololigo duvaucelli</i>	2.8%
<i>Saurida undosquamis</i>	2.8%
<i>Saurida tumbil</i>	2.5%
<i>Lutjanus bojar</i>	2.5%
<i>Scomberomorus commerson</i>	1.4%
<i>Nemipterus tambuloides</i>	1.2%
<i>Neotrygon kuhlii</i>	0.9%



### Catch Rate and Composition

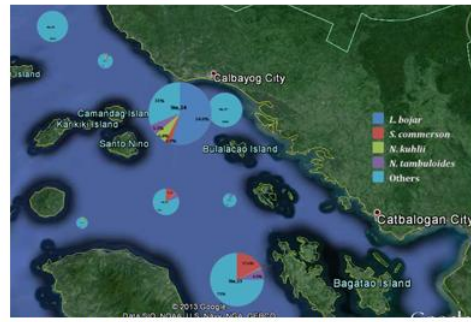


Figure 23. Catch rate and composition in Samar Sea.

### Sex-and-Maturity

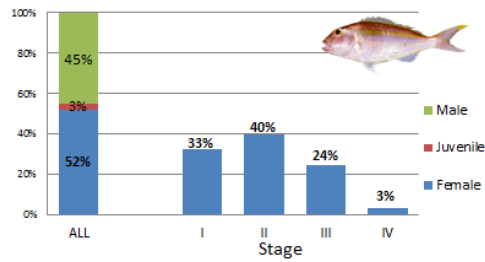


Figure 24. Sex and maturity composition of five-lined threadfin bream.

### Size Distribution

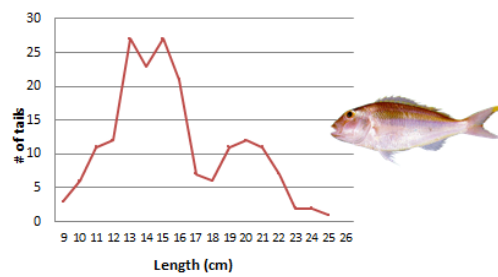


Figure 25. Length and weight frequency distribution of *Nemipterus tambuloides*.

Salamat po...

## Annex 9: Demersal Fisheries Survey of M/V DA-BFAR



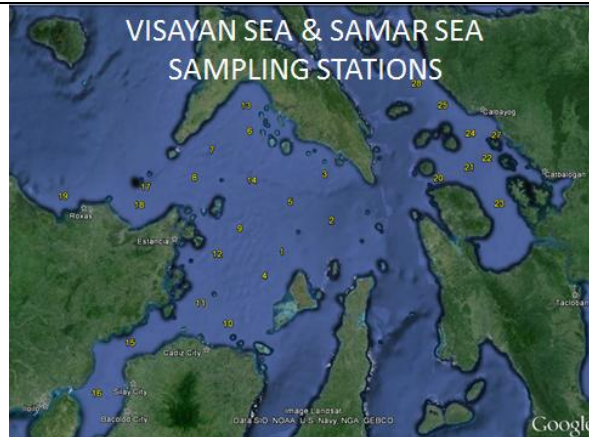
Demersal (trawl) Fisheries Survey of Visayan Sea and Samar Sea,  
16-30 April 2013  
Preliminary Results



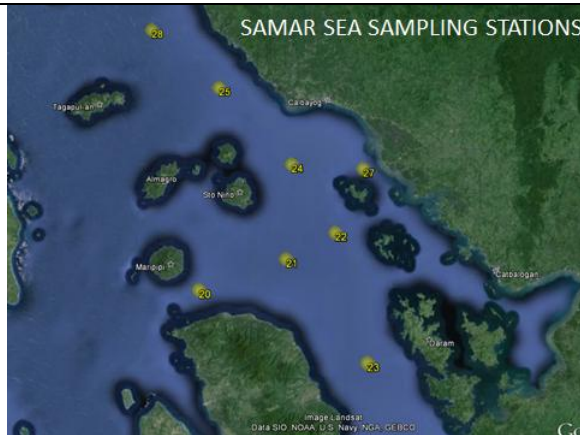
### DEMERSAL BIOMASS FROM SELECTED STUDIES

FGround	Year	Biomass (t/km <sup>2</sup> )	Authors
Lingayen Gulf	1978-79	1.33	Villosio and Aprieto, 1983
Lingayen Gulf	1987-88	0.57	Ochavillo et al, 1989
San Miguel Bay	1979-80	2.13	Vakily, 1982
San Miguel Bay	1992-93	1.96	Cinco et al, 1995
Ragay Gulf	1981-83	1.58	Federizon, 1993
Manila Bay	1949-52	4.61	Silvestre et al, 1987
Manila Bay	1968-72	1.71	Silvestre et al, 1987
Manila Bay	1992-93	0.47	Armada et al, 1994
<b>Samar Sea</b>	<b>1979-80</b>	<b>1.88</b>	<b>Armada et al, 1983</b>
San Pedro Bay	1994-95	1.73	Armada et al, 1996
Visayan Sea	1948	6.03	Warfel & Manacop
Visayan Sea	2003	2.40	MV DA-BFAR & GTZ
Visayan Sea	2007	1.80	MV DA-BFAR / UPV

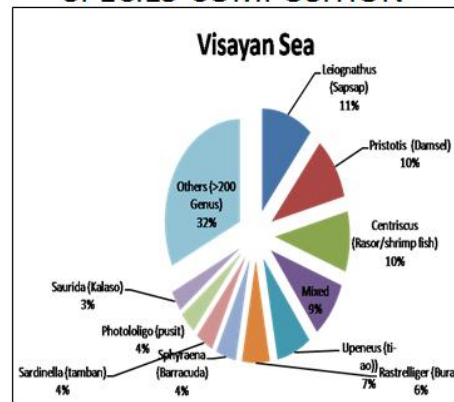
### VISAYAN SEA & SAMAR SEA SAMPLING STATIONS



### SAMAR SEA SAMPLING STATIONS

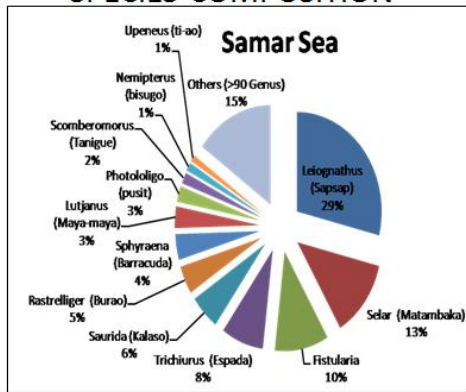


### SPECIES COMPOSITION

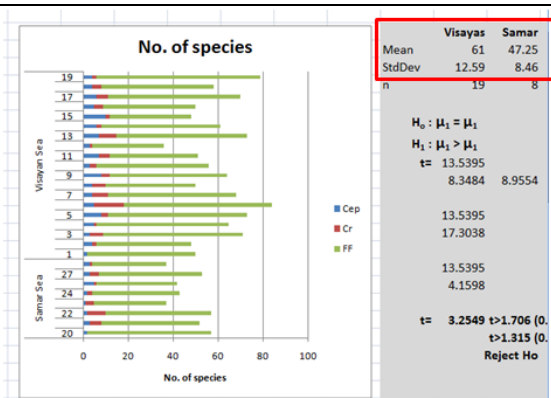
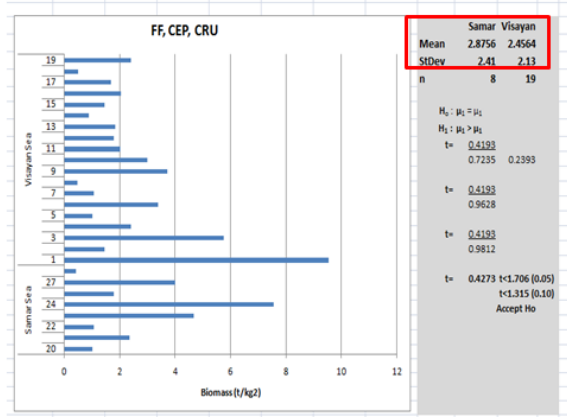
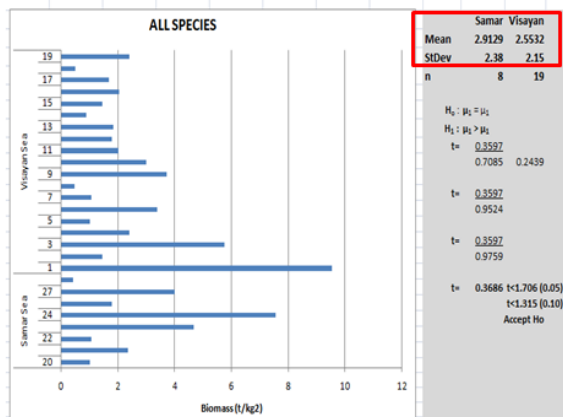


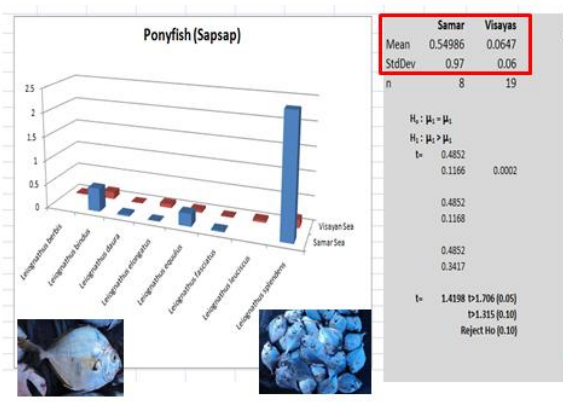
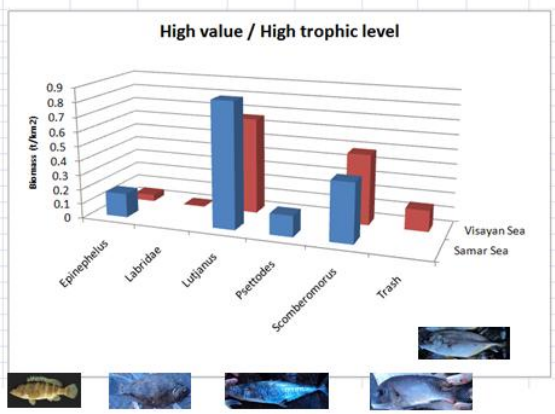
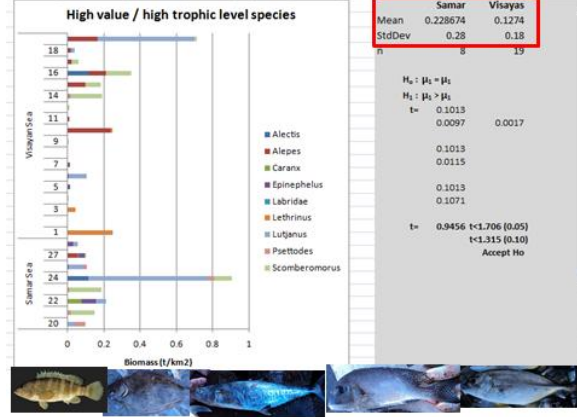
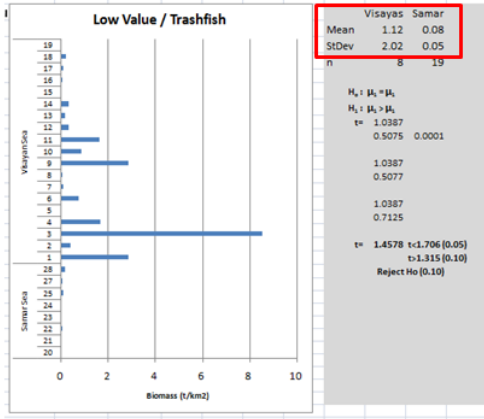


## SPECIES COMPOSITION



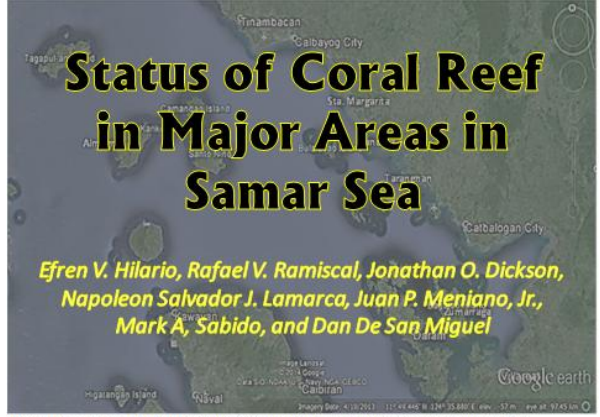
## ALL SPECIES





Salamat po...

## Annex 10: Critical Habitat survey in Samar Sea

 <p><b>Status of Coral Reef in Major Areas in Samar Sea</b></p> <p><b>Efren V. Hilario, Rafael V. Ramiscal, Jonathan O. Dickson, Napoleon Salvador J. Lamarca, Juan P. Meniano, Jr., Mark A. Sabido, and Dan De San Miguel</b></p> <p><small>Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Samar Sea Macuoda Bay Hotel, Catbalogan City, October 11-12, 2016</small></p>	<h3>INTRODUCTION</h3> <p>Nowadays, the ecosystem of coastal and Island biodiversity was significantly deteriorating caused by damaging fishing practices, destructive fishing methods and the impact of climate change in our ecosystem. This ecosystem has a very important role in the life cycle of every marine biodiversity such as breeding ground, spawning and nesting ground, and nursery areas for commercially important species.</p> <p>The uncontrolled fishing ground is the very significant reason why habitats were deteriorating and destroyed because of the intrusion of commercial size fishing boats into municipal waters. The ineffective implementation of fishery law enforcement system in the local level is most prevalent and apparently need to address by enhancing the cooperation with the law enforcement agency's (PNP Maritime, Coast Guard, etc.) and Bantay Dagat volunteers in both local government unit (LGU) and the province to ensure the effective implementation of the law for the sustainability of fishery resources.</p> <p><small>Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Samar Sea Macuoda Bay Hotel, Catbalogan City, October 11-12, 2016</small></p>
<h3>RATIONALE</h3> <p>The protection and management of marine coral reef areas, poverty alleviation, increase awareness among fisheries users, and the responsible use of fishery resources at community level. To effectively address the issue on the utilization of fishery resources in Samar Sea, it is necessary to identify the critical habitat areas for proper management and create an appropriate management approach.</p> <p><small>Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Samar Sea Macuoda Bay Hotel, Catbalogan City, October 11-12, 2016</small></p>	<h3>RATIONALE</h3> <p>As a component activity of the REBYC II-CTI project, it is expected to provide management action to prevent further damage of coastal fisheries habitats and loss of stocks. One solution is to provide information, education and communication (IEC) campaign on fisheries conservation to local community and the need for their participation to restore important marine habitats and rebuild fishery stocks.</p> <p>The local users have an important role in preserving the natural habitat to attain sustainability of the resources through the use of responsible fishing gears and methods. <i>Furthermore</i>, the habitats may be restored through establishment of fish <i>refugia</i>, fish sanctuaries, coral seeding and elimination of coral predators and can be done in a controlled reef area where there are existing local group or cooperative of fishers established.</p> <p><small>Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Samar Sea Macuoda Bay Hotel, Catbalogan City, October 11-12, 2016</small></p>
<h3>OBJECTIVES</h3> <p>The main objective is to provide data and information on critical habitat and fishing ground mapping in Samar Sea</p> <ul style="list-style-type: none"> <li>❖ To conduct rapid assessment and survey of coral reefs and fishing grounds in Samar sea,</li> <li>❖ To provide information to the local government units (LGUs) on fishing ground of the municipal and commercial fisheries, and</li> <li>❖ To introduce management measures to local fisheries policy makers and government offices on the conservation of fishery resources.</li> </ul> <p><small>Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Samar Sea Macuoda Bay Hotel, Catbalogan City, October 11-12, 2016</small></p>	<h3>MATERIALS AND METHODS</h3> <ol style="list-style-type: none"> <li>1. <b>Consultation/Workshop</b></li> <li>2. <b>Determination of the survey area</b></li> <li>3. <b>Coral Reef Survey</b> <ul style="list-style-type: none"> <li>❖ Line Intercept Transect (LIT) method through the Fish Visual Census (FVC) technique</li> <li>❖ Manta Tow method</li> <li>❖ Snorkling</li> </ul> </li> </ol> <p><small>Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Samar Sea Macuoda Bay Hotel, Catbalogan City, October 11-12, 2016</small></p>

## RESULTS

- ❖ The team covered nineteen (19) sites in 6 municipalities/cities. Most of the sites surveyed have good coral conditions with live coral covers ranging from 20-60%. *However*, there are some sites having bad coral conditions with dead corals ranging from 5-60%.
- ❖ The estimated fish density ranges from 0.08 to 1.1 fish/m<sup>2</sup> which is relatively lower than the average density of fish in coral reef areas

Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Sema Sea  
Maezuda Bay Hotel, Calabogon City, October 11-12, 2016

## RESULTS

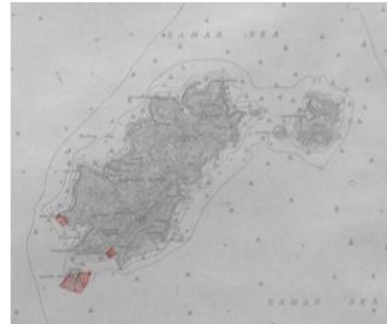
The site survey and observation were subsequently the sites with diverse corals and high impact on human illegal fishing activities with the use of explosives and cyanide fishing. *On the other hand*, there are coral predators such as crown of thorns (COT) starfish observed in many assessed/observed sites which are considered as a big problem in maintaining the healthy reef environment.

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Maezuda Bay Hotel, Calabogon City, October 11-12, 2016

## SURVEY SITES

City/ Municipality	Site	Type reef	Estimated Total Area (m <sup>2</sup> )	LIT Surveyed Area (m <sup>2</sup> )	Coral Reef Cover (%)	Estimated Fish density (m <sup>2</sup> )
Almagro	Cabilosan Reef	Fringing Reef	400,000	500	50.05	0.658
	Malobago Reef	Fringing Reef	60,000	500	40.05	0.99
	Poblacion Reef	Fringing Reef	50,000	500	45.15	N.A.
Calbayog	Biatungan Reef	Fringing Reef	40,000	250	35.15	0.076
	Malajog Reef	Fringing Reef	40,000	250	20.1	0.152
	Sailag Reef	Fringing Reef	40,000	250	45.1	0.152
	Tinambacan Point Reef	Fringing Reef	40,000	250	40.2	0.216
	Qanbarwan Goti Reef	Fringing Reef	80,000	500	55	0.55
Cabalogan	Lutoo Reef	Atoll Reef	100,000	500	45	0.326
	Sampotian Reef	Fringing Reef	30,000	500	40	0.792
	Tagapu-an	Baguiv Reef	Fringing Reef	40,000	500	50.05
Tagapu-an	Lahang Baybay Reef	Fringing Reef	60,000	500	45.05	0.268
	Lipot Baybay Reef	Fringing Reef	60,000	500	60	0.428
	Sugod Reef	Fringing Reef	60,000	500	60	N.A.
	Tarangnan	Lilucan Dacu Reef	Fringing Reef	1,000,000	500	50.15
Tarangnan	Rama Reef	Fringing Reef	80,000	500	25.3	0.156
	Tigdarasan Goti Reef	Fringing Reef	180,000	500	50.1	1.104
	Sto Niblo	Baras Reef	Fringing Reef	40,000	500	50.2
Sto Niblo	Bijan Cove Reef	Fringing Reef	1,000,000	500	40.25	0.56

## MUNICIPALITY OF ALMAGRO



Three (3) Sites surveyed:  
**Poblacion Bay,**  
**Cabilosan Island (light-house),**  
**and Malobago waters**

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Maezuda Bay Hotel, Calabogon City, October 11-12, 2016

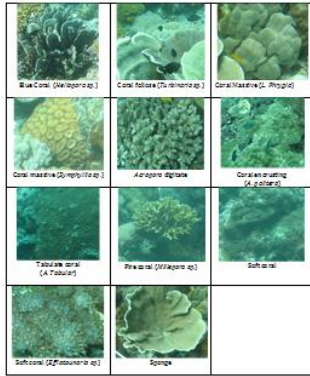
## ALMAGRO

Site	Hard Coral (%)	Soft Coral (%)	Dead Coral (%)	DCA (%)	Sand (%)	Rubble (%)	Rock (%)	Others
Cabilosan Reef	25	10	15	10	15	10	5	10
Malobago Reef	20	5	15	5	25	25	0	5
Poblacion Reef	5	10	30	15	15	10	0	15

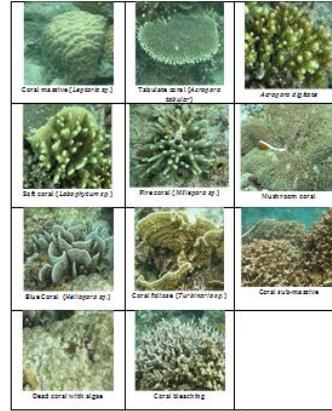
In Poblacion area were castigated caused by illegal fishers using explosives, various forms of fishing and coral predators. *However*, according to the office these two areas nowadays were under control by the LGU for future management plan purposes and recommended to monitor and control the used of explosives for assessment after two years.

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Maezuda Bay Hotel, Calabogon City, October 11-12, 2016

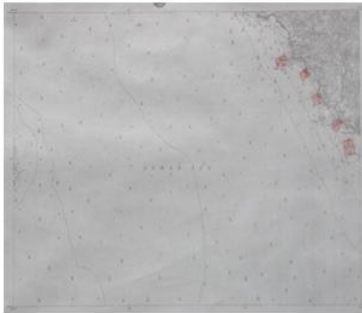
### CABILOSAN



### Malobago



### CITY OF CALBAYOG



Five (5) sites covered: **Saljag point, Malajog point, Tinambacan point and Tinambacan reef**

Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Samar Sea Mactan Sea HOJ, Calbayog City, October 11-12, 2016

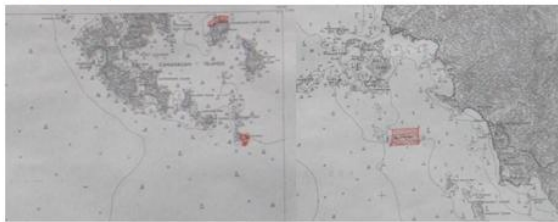
### CITY OF CALBAYOG

Site	Hard Coral (%)	Soft Coral (%)	Dead Coral (%)	DCA (%)	Sand (%)	Rubble (%)	Rock (%)	Others
Biatungan Reef	20	5	10	15	25	15	10	0
Malajog Reef	10	5	5	10	30	15	25	0
Saljag Reef	20	10	15	10	20	15	10	0
Punta Tinambacan Reef	15	15	10	20	30	10	0	0

Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Samar Sea Mactan Sea HOJ, Calbayog City, October 11-12, 2016

### CITY OF CATBALOGAN

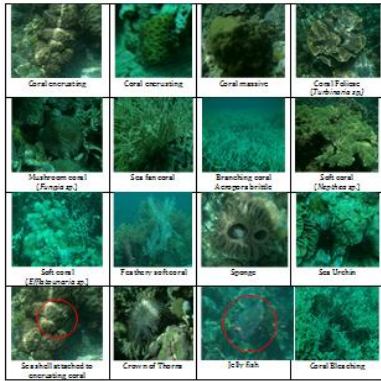
Sites Surveyed: **Canhawan Gutti Island, Lutao Reef, and Sampotan Islands**



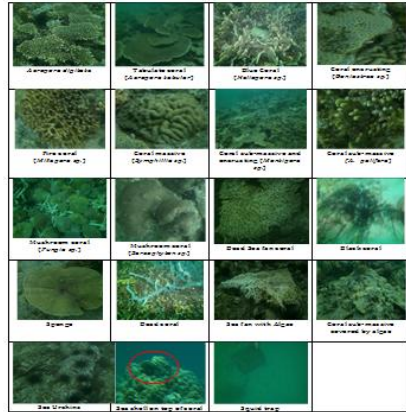
Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Samar Sea Mactan Sea HOJ, Calbayog City, October 11-12, 2016

Site	Hard Coral (%)	Soft Coral (%)	Dead Coral (%)	DCA (%)	Sand (%)	Rubble (%)	Rock (%)	Others
Canhawan Gutti Reef	35	10	10	0	20	15	10	0
Lutao Reef	20	5	20	0	5	0	50	0
Sampotan Reef	15	15	10	0	30	0	30	0

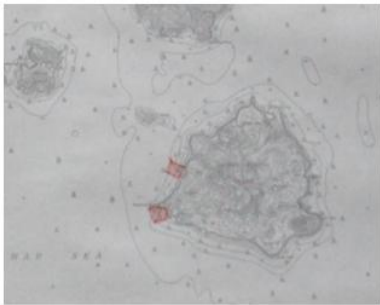
**Canahawan Gutti**



**Lutao Reef**



**STO. NINO**



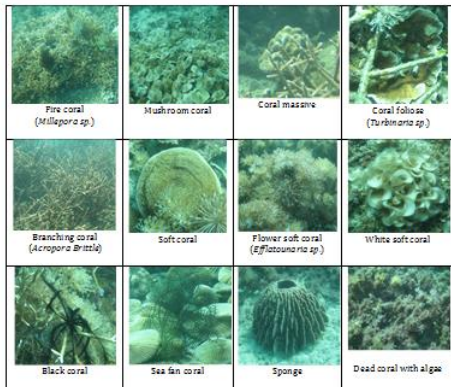
Sites:

**Bgy. Baras and Bgy. Ilijan Cove**

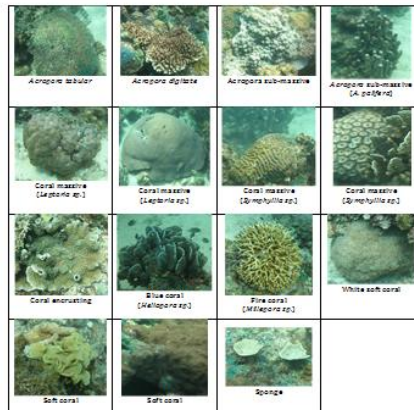
Site	Hard Coral (%)	Soft Coral (%)	Dead Coral (%)	DCA (%)	Sand (%)	Rubble (%)	Rock (%)	Others
Baras Reef	10	15	25	15	15	10	0	10
Ilijan Cove Reef	15	5	20	25	20	0	0	15

Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Some Sea Mussels Bay, Negros Occidental, October 11-12, 2014

**Sitio Langoyon, Baras**



**Bgy. Ilijan Cove**



### MUNICIPALITY OF TAGAPUL-AN

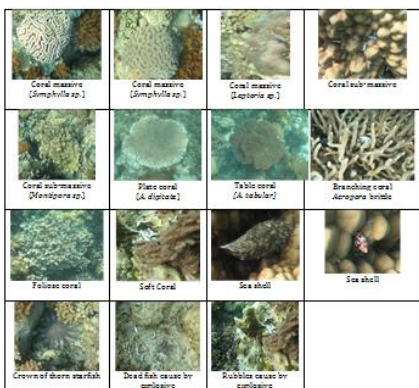


Sites:  
**Baquiw,  
Luthang  
Baybay,  
Lipot  
Baybay, and  
Sogod.**

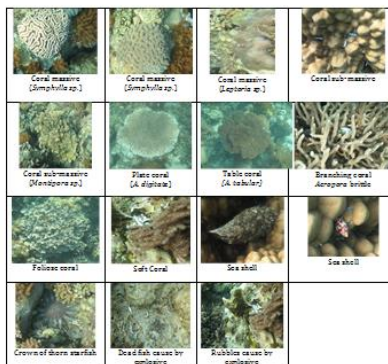
Site	Hard Coral (%)	Soft Coral (%)	Dead Coral (%)	DCA (%)	Sand (%)	Rubble (%)	Rock (%)	Others
Baquiw Reef	30	10	10	5	20	0	15	10
Labang Baybay Reef	20	15	10	5	20	0	20	10
Lipot Baybay Reef	5	40	15	0	15	0	25	0
Sugod Reef	5	40	15	0	15	0	25	0

Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Samar Sea  
Maunula Bay Hotel, Calatagan City, October 11-12, 2016

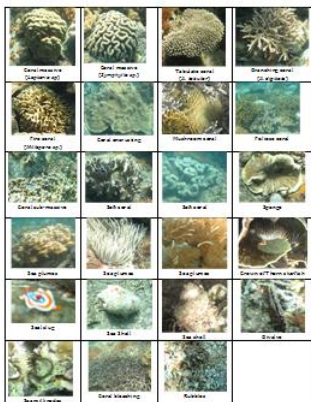
### BGY. Baquiw



### BGY. Baquiw



### Lipot Baybay



### MUNICIPALITY OF TARANGNAN

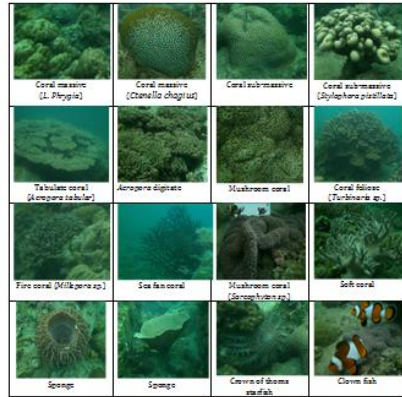


Sites:  
**Barangay  
Rama,  
Barangay  
Libucan Dacu,  
and  
Tigidarawan  
Guti.**

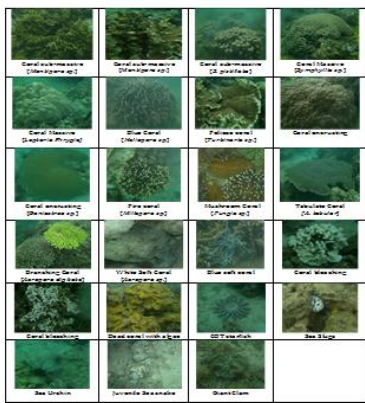
Seminar/Review on the National Stock Assessment Program (NSAP) and other Contemporary Surveys And Studies on the Fisheries of Samar Sea  
Maunula Bay Hotel, Calatagan City, October 11-12, 2016

Site	Hard Coral (%)	Soft Coral (%)	Dead Coral (%)	DCA (%)	Sand (%)	Rubble (%)	Rock (%)	Others
Libucan Dacu Reef	20	10	20	15	20	0	10	5
Rama Reef	15	0	10	30	25	0	20	0
Tigdaranaw Goti Reef	35	5	10	10	40	0	0	0

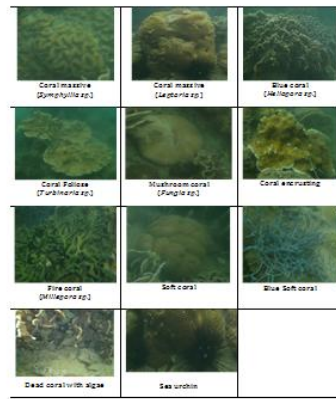
**Libucan Dacu**



**Sitio Baras, Bgy Rama**



**Tigdarawan Gutti**



**DISCUSION**

- ❖ The information collected in several coral reef areas were basically devastated by illegal use of fishing methods and practices, and affected by phenomenal situation that causes the physical destruction and bleaching of corals in the area.
- ❖ The surveyed areas with good coral conditions were Ilijan Cove (Sto. Nino), Libucan Dacu, Napalisan Island revealing a potential management area and as a pilot site for fish sanctuary/refugia.

**DISCUSION**

- ❖ The types of substrate observed in the areas were dominated by dead corals caused by diverse and high impact of human activities and use of fishing methods and practices, eaten by predators, siltation especially near the river mouths and affected by climate change.
- ❖ The result is a visible bleaching of the existing corals, the death of polyps and the disappearance of commercially important species in the area may be a result of the climate change in the region. However, the most significant challenges in coral reef conservation and contributes high damage to biodiversity are the negative effects on the illegal human activities.



<p style="text-align: center;"><b>DISCUSION</b></p> <ul style="list-style-type: none"> <li>❖ Most of the surveyed reef areas are communal fishing ground for spear fishing, pot fishery, line fishing, gillnets, and other gears to utilize its resources both resident and transient species. <i>Therefore</i>, these types of fishing gear should be maintained and discourage fishermen to use illegal fishing methods.</li> <li>❖ During the actual survey, the average coral reef cover is estimated of about 44.57% for 19 areas dominated by tabular, digitate and mushroom corals.</li> <li>❖ The average fish visual count per square meter was estimated at 0.43 fish/m<sup>3</sup> which is far below the average level of healthy fish stocks, and dominated by damsel fish, <i>plutosidae</i>, <i>apogon</i>, fusilier, and angel fish.</li> </ul>	<p style="text-align: center;"><b>CONCLUSION</b></p> <ul style="list-style-type: none"> <li>❖ Practical management measures among communal users and commercial fisheries on the use of illegal fishing methods and practices should be addressed and promote sustainable fishing practices in Samar Sea.</li> <li>❖ The impact of explosive fishing in coral reef areas is damaging the habitat and causing death of juvenile fish and cause of overfishing. <i>Therefore</i>, the use of explosives should be banned in local area.</li> </ul>
<p style="text-align: center;"><b>RECOMMENDATIONS</b></p> <p>The crucial role of the Local Government Executives in the management of fishery resources as well as the fishing capacity of Samar Sea is very important to regain the pristine character of coral reef areas and richness of fishery resources for the benefit of the next generation.</p> <p>The management capacity of local chief executives should be strengthened and enhanced its basic understanding on the use of fishery resources and adopt the Ecosystem Approach to Fisheries Management (EAFM) for the Samar Sea which will be crucial on the sustainability of resources for future generation.</p>	<p style="text-align: center;"><b>RECOMMENDATIONS</b></p> <p>Ban the use of explosives and cyanide fishing to prevent the loss of commercially and important fish species and important habitats especially in coral reef areas. Therefore, conservation measures in the different sites should be in place such as destroyed coral reefs and the need for rehabilitation of existing fish sanctuaries in all surveyed areas is highly recommended, strengthened and enhanced the management capacity of local fishers, councils, and local fishery organizations/cooperatives to minimized further destruction of important habitats, which contribute negative effects to our biodiversity</p>
<p style="text-align: center;"><b>RECOMMENDATIONS</b></p> <p>The conservation and management laws are in place, where the national, local government and stakeholder involvement on the initiative in the protection of fishery resources, fishing ground, coral reefs and other environment. It is recommended to strengthened fishery law enforcement which will enforce the fishery laws for the sustainability of resources. Support the promotion of responsible fishing methods and practices for the conservation and management of fishery resources.</p>	<p style="text-align: center;"><b>RECOMMENDATIONS</b></p> <p>Predators in the coral reef areas which one the major causes of dead corals should be eliminated to prevent loss of good live corals in the area.</p> <p>Provide technical support to organized local organizations and cooperatives to put up marine sanctuaries or <i>refugias</i> especially in the Island Barangays.</p>

<p><b>THANK YOU</b></p>	
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## Annex 11: Result of the Study/Survey conducted by the Samar Sea State University

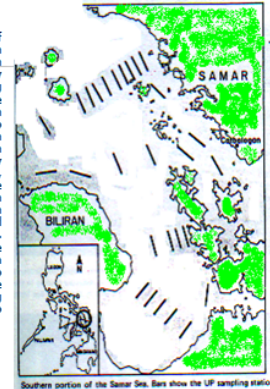
<p style="text-align: center;"><b>REVIEW OF THE SHRIMP TRAWL FISHERY IN SAMAR SEA AND MAQUEDA BAY, SAMAR, PHILIPPINES</b></p>  <p>Diocson R.C. and Berida, N.T. 2003. Review of the Shrimp trawl fishery in Samar Sea and Maqueda Bay, Samar, Philippines; A paper presented during the training on "Juvenile and trash Fish Extruder Device (JTEDs)", Bacoor Cavite, Philippines, November 10-20,2003</p>	<h3 style="text-align: center;">Introduction</h3> <ul style="list-style-type: none"> <li>• This present all pertinent activity of the shrimps fishery in Samar Sea and Maqueda Bay area.</li> <li>• This is a compilation of the research made of the shrimps trawl fishing since 1949 to present. A total of 203 VD trawl were and considered the most dominant among the active fishing gear used in the area.</li> <li>• These gear are mini-otter trawl used in the municipal waters of Zumarraga, Catbalogan, Daram and Taranganan. In some cases, they encroached into shallower waters of San Sebastian, Jiabong, Calbiga, Pinabacdao and Villareal. They are operated year round to target highly price penaeid shrimps/prawns, blue crabs, squids and octopus.</li> <li>• Mean municipal landing of shrimp trawls for the period of 1992 to 1995 was about 812.25 tons/year.</li> <li>• This implies that each shrimps trawl landed about 40.0 tons/year on the average or 0.333 tons/ month or 15.16 kg/day. During the survey, seven species of shrimps belonging to three genera, i.e., <i>Penaeus</i>, <i>Metapenaeus</i> and <i>Trachypenaeus</i>, were identified of high commercial value. The <i>Penaeus merguensis</i> locally known as "puti" were the most abundant and dominated landing among the genus <i>Penaeus</i>. The catch per unit effort of 1.39 kg/haul for this species was already at low level. Other penaeid shrimps identified were the <i>Penaeus semiculatus</i> (bulik), <i>P. latisulcatus</i> (tigbason) <i>P. monodon</i> (lukon), <i>Metapenaeus ensis</i> (guludan) <i>Metapenaeus endeavouri</i> and <i>Trachypenaeus fulvus</i> (bangkigan).</li> </ul>
 <ul style="list-style-type: none"> <li>• This study aims to documents some of the experience and records of trawl fishery activity in the area after World War II up to the present. This review of literature and wall to wall survey can shed light on the current status as historical trends of the shrimps trawl fishery in the Samar Sea and Maqueda Bay area. Such records has been retrieve from archive from Samar Provincial library and other offices.</li> </ul>	<h3 style="text-align: center;">Brief History and Results of trawl fishery in Samar Sea and Maqueda Bay</h3>  <ul style="list-style-type: none"> <li>• The first attempt at otter trawling was made about 1900 when an English steam trawler was brought to the island to explore likely grounds from Manila Bay to Visayas (Warfel &amp; Manacop, 1949). After World War I, the Japanese began using beam trawl called the "Utase", although they had used some modification of the gear as early in 1900 in the Philippines (Umali,1932).</li> <li>• The first of these craft were sail- driven, but in the 1920's power was used, and the nets made larger. In 1940, the Philippines Bureau Fisheries had experimented with the otter trawl for a short time, during World War II, the Japanese used "otter trawls" and "paranzilla trawls" in the islands. After the liberation of the Philippines , trawling was resumed by Filipino fishermen.</li> <li>• The first post war operators used utase, but in 1947 one operator rigged an otter trawl which fished in Manila Bay and Visayas waters. As this gear became known and its advantages recognized, other adopted it, so that by 1948 new vessel were being built for otter trawl. During that time, there are three types of craft engaged in otter trawling:</li> <li>• The smallest, a motor launch 30 to 40 feet long, of 5 to 10 gross tons; next, a small sampan type, 40 to 65 feet long of 10 to 30 gross tons; and largest, a boat of 65 to 85 feet long of 30 to 80 gross tons. The gear also is widely variable, and since the trawling industry is interested in both fish shrimps. The most effective gear is shrimp-type net stout enough to fair quantities of fish. The mesh usually small (1 to 1½ inch), but the cutting and hanging ratio are typical of nets used in the west coast trawler of the US. Some cases, the Japanese utase gear were simply provided with wings and other wise reinforced for otter trawling. Such a rig called a " mestizo".</li> </ul>
<h3 style="text-align: center;">The Warfel and Manacop (1949) exploratory otter trawl survey</h3>  <ul style="list-style-type: none"> <li>• The survey was conducted in August 1949 on board Theodore N. Gill a US Navy vessel converted into an experimental trawl which was operated near Catbalogan, Samar. From the six complete drags made, the average catch per hour was 92 pounds ( kilograms) of marketable size of fish. The highest yield, 248 pounds ( kg) in one hour, was obtained on the 20 fathom contour. It consisted of cutlasses fish, turbot, nemipterids, lizard fish, crevalles, and an insignificant amount of shrimps. Shrimps are usually taken in fair quantities by commercial trawlers. One local trawler and four from Manila are reported to be operating in this. Before the waa, there were from six to eight trawlers operating in the sea most of the time.</li> </ul>	<h3 style="text-align: center;">The Legasto, Del Mundo and Carpenter (1975) socio-economic and hydrology survey in Maqueda Bay and vicinity</h3>  <ul style="list-style-type: none"> <li>• Experimental trawling and fish biology on board a baby trawl were performed that resulted the following: The first station was outer Maqueda Bay after 50 minutes of dragging, we caught 3.19 kilograms as total catch with glassfish, squid, grunt, slipmouth, shrimps and crabs as the dominant species. Most of the catch were immature stage except in some glassfishes which has no commercial value and aarused only a fish meal.</li> <li>• The second tow was made inside Maqueda Bay that too k about 52 minutes dragging that hauled 3.21 kilos with mullet and sardines and cavalla as the common species. All the mullets, sardines as the most common species. All the mullets, sardines and cavalla were under mature stages, with the exception of the flatfishes and some slipmouths.</li> <li>• The Zumarraga channel sampling made it one hour dragging experiments yielded 7.75 kilos was caught, which basically predominated by croakers, squids, crabs and squid were however immature. While Villareal Bay for one hour dragging got 3.02 kilos was caught with slipmouth as dominant catch, followed by squids, croaker and gobies. Another one hour sample was made and only 0.5 kilo was caught and there were three gravid shrimps, fishes were immature except for goatfish.</li> </ul>

**The Samar Sea Trawl Survey (SSTS) 1979-1980 by University of Philippines in the Visayas and the German Agency for Technical Cooperation (GTZ).**

- A total of 226 different species, belonging to 132 genera and 82 families were identified by Viloso and Hermosa (1980). Several species have been found to the previously unrecorded in Philippines waters by Herre (1950).
- During the sampling month of March, April and May 1979, the mean biomass for all depth was found to be 1.52 tons/km<sup>2</sup> with mean biomass of 1.21 t/km<sup>2</sup> in depth range of 10.59 m.
- This depth range, which comprises about 60% of the whole survey area and fishing grounds, is to considered as the main trawling area for both large and small commercial trawlers as well as for the municipal fishery using a variety of gear including motorized outriggers (banca) suitable for trawling.
- These value indicate that the complains about decreased catches seemed to be justified indeed, especially if the values are compared with the biomass of virgin stock or untapped fishing grounds ranges generally between 5.0 to 6.0 ton/km<sup>2</sup> in the continental shelf region.
- It also generally agreed that the potentials maximum sustainable yield (MSY) in Southeast Asian shelf area is about 3-5 tons/km<sup>2</sup>/yr.

**Figure 1. Sampling station of Samar Sea Trawl Survey 1979-1980**

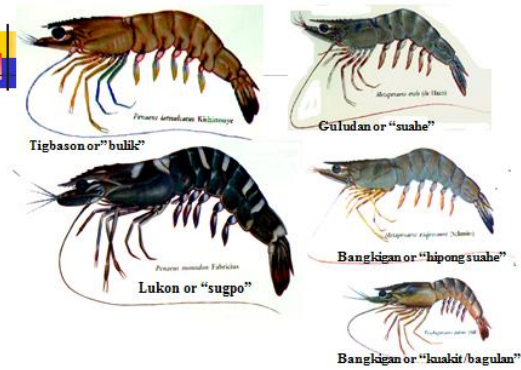
- In spite of the ongoing activities of the small trawlers (shrimp-fish trawler) the biomass of the fish in the Samar Sea increased constantly during the survey period. During March, April and May 1980, the mean biomass of all depth categories combined increased to 3.09 tons/km<sup>2</sup>. That means that in one year the biomass over all depth doubled, while the most seriously affected depth range, 10-59 m, recovered to the extent that the biomass increased by more than 100%. The catch composition remained more or less unchanged during the investigation period. This result clearly shows that the imposition of a trawling ban is a suitable tool in tropical waters to protect the vital interest of the sustenance fishing by helping heavily exploited fish stocks to recover.



**DOMINANT FISHING GEAR**

**Shrimps trawls or baby trawl (VD or Vigneron Dahl)**

Mean municipal landing of shrimp trawls for the period of 1992 to 1995 was about 812.25 tons/year. This implies that each shrimps trawl landed about 40.0 tons/year on the average or 0.333 tons/month or 15.16 kg/day. During the survey, seven species of shrimps belonging to three genera, i.e., *Penaeus*, *Metapenaeus* and *Trachypenaeus*, were identified of high commercial value. The *Penaeus megistos* locally known as "puti" were the most abundant and dominated landing among the genus *Penaeus*. The catch per unit effort of 1.29 kg/haul for this species was already at low level. Other penaeid shrimps identified were the *Penaeus semiculatus* (bulik), *P. laticulatus* (tigbason), *P. monodon* (lukon), *Metapenaeus ensis* (guludan), *Metapenaeus endaeavouri* and *Trachypenaeus fulvus* (bangligan).



**Conclusions and Recommendations**

- The present rate of fishing exploitation in Samar Sea and Maqueda Bay by the artisanal fishermen, particularly the baby trawler, medium trawlers is not only wasteful, but also counter productive. They all using fine-mesh nets which are catching very small juveniles. These are considered trashfishes or rejects and composed around 50% thrown away to save space on board for ore valuable species. These fishermen do not realize the biological importance of these very small individuals. These are young recruits, which would replace those which have been caught, in order to maintain fish production in the Bay at productive level.

**Present studies of SSU-COFMAS**

1. National Mussel R & D program (funded by DOST-PCAARRD).
2. National Oyster R & D program (funded by DOST-PCAARRD)
3. Integrated Multi-Trophic Aquaculture (IMTA) funded by IECLI-LGU Catbalogan City-Tandaya Inc.
4. PCRA of LGUs in Samar Sea

### Future priority research for SSU

1. Fishing gear selectivity (e.g. square mesh windows for small trawl for shrimps).
2. GSI and ichthyoplankton studies and modeling of top 20 species with commercial importance
3. Test fishing for Otoshi ami (Japanese set net ) Lambaklad.
4. Developmental Aquaculture (application of Integrated Multi-trophic aquaculture IMTA)
5. Development of waste bi-product for post harvest technologies
6. Relaying and depuration shellfishes with commercial importance (e.g. mussel, osyter, surf clam, pen shell etc.
7. Socio-economic and governance towards EAFM (gender main streaming).
8. Vulnerability Risk Assessment of Coastal Areas