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The Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP) - Cambodia

REPORT OF THE NATIONAL TRAINING COURSE ON MARINE BIOLOGY, MARINE ECOLOGY, SAFETY AT SEA AND MCS

Koh Rong Samloem, Koh Rong Sangkat, Preah Sihanouk Province, Cambodia
18-23 December 2010

For the Regional Fisheries Livelihoods Programme for the South and Southeast Asia
Cambodia Component

Fisheries Administration / Marine Conservation Cambodia

January 2011

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18-23 December 2010

Report prepared for the
(GCP/RAS/237/SPA)

by

Paul Ferber - Managing Director, Marine Conservation Cambodia
Marine Skopal-Papin - ICM Project Coordinator, MCC

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ABSTRACT

Cambodia has rich marine resources and habitats have and are being seriously damaged by human activities including excessive fisheries exploitation, illegal and destructive fishing, habitat conversion, habitat loss and pollution. High population growth and increasing demand for marine fisheries products for both the local and international markets have caused a drastic decrease in fisheries resources and greatly affected the small-scale fishing communities depending on these resources

The field activities in Cambodia have been undertaken in coastal fishing communities in all four coastal provinces of the country: Koh Kong, Kampot, Kep and Kampong Som (Preah Sihanouk). Attended by over 45 representatives from the four coastal province Fisheries Cantonments, Inspectorate, FiA Central, Marine Police and Royal Cambodian Navy, a training course on Marine Biology, Marine Ecology, Safety and MCS (Monitoring, Control and Surveillance) was held on the island of Koh Rong Samloem, Koh Rong Sangkat, Preah Sihanouk Province, from the 18th to the 23rd of December 2010. The Training was organized by the Regional Fisheries Livelihoods Programme (RFLP) of the Food and Agriculture Organization of the United Nations (FAO), the RGC Fisheries Administration (FiA) and non-profit business Marine Conservation Cambodia (MCC).

The training program was designed for the purpose of providing awareness and knowledge whilst enthusing participants to become more involved in co-management and the protection of Cambodia's marine environment. The training focused on combining conventional presentations with directly related practical activities and training. The training course was designed to highlight and raise awareness on these key points of understanding:

- The importance of Fisheries Laws enforcement; how illegal fishing directly affects fisheries resources and the links between destructive fishing and the decline in fisheries stocks in turn leading to increased poverty.

- The need for co-management with local communities and its benefits; increased local knowledge of ecosystems, the importance of commercial and endangered species and habitats inter-relationships.

- Safety at sea, with emphasis on the practical skills involved in lifesaving and in water rescue.

- The importance of MCS knowledge in decision making process: MCS knowledge gives policy makers and supervisors the information they need to make decisions and legislation for the benefit of Cambodia's fisheries resources.

- The need for MPA's, their benefits and the need for MCS in order to create and then monitor and protect the MPA's.

- A greater understanding of the role of officers within the fisheries sector and a deeper understanding of potential coastal conflicts and how to avoid them.

- How to apply this knowledge and integrate the concepts learnt into daily work activities.

ACKOWLEDGEMENTS

Marine Conservation Cambodia (MCC) has been working on Conservation and Community Livelihoods in collaboration with the Royal Government of Cambodia Fisheries Administration (RGC FiA), local authorities and local communities since 2008. Close collaboration with the FiA and the FAO Regional Fisheries Livelihoods Programme (RFLP) proved that MCC is now respected and credited as a leader in conservation and community work in Cambodia. As such, we are grateful to have received the opportunity to organize the National Training Course on Marine Biology, Marine Ecology, Safety at Sea and MCS.

Our deep thanks go to the FiA, RFLP Regional, RFLP CMB and FAO for the assistance, cooperation and support that made this training so productive and successful.

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CFA	Community Fishing Area
CFi	Community Fisheries
CPR	Cardiopulmonary Resuscitation
DFA	Department of Fisheries Affairs
EFR	Emergency First Response
FAO	Food and Agriculture Organization
FiA	Fisheries Administration
FiAC	Fisheries Administration Cantonment
MaFReDI	Marine Fisheries Research and Development
MAFF	Ministry of Agriculture Forestry and Fisheries
MCC	Marine Conservation Cambodia
MPA	Marine Protected Area
MFMA	Marine Fisheries Management Area
NGO	Non-Governmental Organization
PPRUA	Phnom Penh Royal University of Agriculture
RFLP	Regional Fisheries Livelihood Programme
RGC	Royal Government of Cambodia

I. INTRODUCTION

1. General

The National Training Course on Marine Biology, Marine Ecology, Safety at Sea and MCS was held at Marine Conservation Cambodia facilities in Koh Rong Samloem, Koh Rong Sangkat, Preah Sihanouk Province, Cambodia from the 18th to the 23rd of December 2010. The Training was organized by the Regional Fisheries Livelihoods Programme (RFLP), the Fisheries Administration (FiA) and Marine Conservation Cambodia (MCC).

2. Participants

The Training was attended by representatives from the Central Fisheries Administration (FiA), the FiA Inspectorate and FiA Cantonment of the four coastal provinces (Sihanoukville, Kampot, Kep and Koh Kong), Phnom Penh Royal University Of Agriculture (P.P.R.U.A.), Preah Sihanouk Police, Navy, Marine Inspectorate and Koh Rong Sangkat. They were 42 participants, among which 37 were men and 5 were women. The list of participants has been attached in **Appendix 1**.

3. Objectives of the training

The objective of the training is to provide awareness and knowledge on the concept of Marine Biology and Ecology, Safety and MCS. A good knowledge of these subjects is essential for FiA inspectorate and Cantonment officers to be able to efficiently implement national fisheries goals and action plans. The training focuses on practical training in order to bridge the gap between theoretic information and on-site practical applications. The prospectus of the training has been attached in **Appendix 2**.

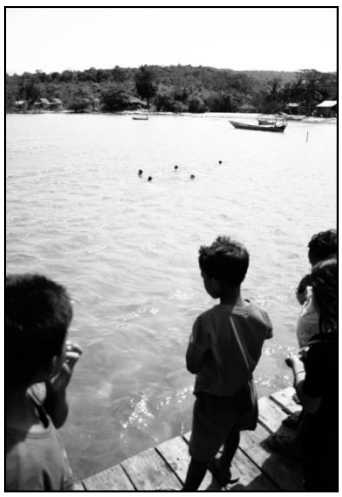
4. Training Site

The choice of the training site was influenced by the need to link the theory given through the presentations with practical applications on the field. Koh Rong Samloem was chosen for several reasons:

- M'Pai Community Fishery (CFi) (**Photo 1**) illustrates a working model of collaboration between local communities, local authorities and Fisheries Officers and would allow the Participants to witness the benefits of such cooperation.

- M'Pai Bei Community Fishing Area (CFA) includes the main ecosystems found in Cambodia: coral reefs, sensitive benthic habitats, seagrass and mangroves. This would constitute an opportunity for the Participants to observe, understand and develop a passion to protect these ecosystems.

- The chosen location was isolated and contained this gave the participants an opportunity to socialize together during and after each training day and led to a much more comfortable and open atmosphere during the course. The change from the



1 – Koh Rong Samloem

normal venues combined with the relaxed atmosphere led to many sensitive issues being raised and discussed in a positive and constructive way, helping to find solutions rather than just focusing on the problems themselves. Outside of the main objectives this also led to opportunities for internal conflict resolution and strengthened co-operation and collaboration between different sectors.

The choice of Koh Rong Samloem as training site proved to be a successful choice as the Participants appreciated to be taken out of usual air-conditioned training rooms and experience the results of a successful ongoing model of fisheries co-management: *"Thanks to the FAO for organizing the training workshop in Koh Rong Samloem: it is a beautiful place which may not be forgotten"; "Please follow this type of training to reach CFi and other stakeholder levels"; "Please continue this kind of training course to provide more knowledge to us as Fisheries Cantonment Officers"*.

II. OPENING OF THE TRAINING

The training was firstly welcomed by Mr. Yos Chanthana, Consultant in Fisheries Co-Management (RFLP/FAO). Secondly, by Mr. Oum Sokun, Deputy Directr of Marine Fisheries Administration Inspectorate, and officially opened by Mr. Ouk Vibol, Head of FiA Conservation Department (**Photo 2**). The opening speeches of the training are attached in **Appendix 3**.

2 – Opening of the training: Mr. Ouk Vibol, Mr. Oum Sokun and Mr. Yos Chanthana (left to right).

III. TECHNICAL PRESENTATIONS

The Main topics of Marine Biology, Marine Ecology, Safety at Sea and Monitoring, Control and surveillance were covered throughout the four-day training course. There were 6 main presentations and after a request from the participants an extra presentation was given on the location and work of MCC, altogether this made a total of 7 presentations. Questions & Answers (Q&A) sessions followed every presentation and lead to very open discussions. The topics are summarized below:

1. Safety at Sea (**Appendix 5**)

Safety at Sea was presented by Mr. Chan Sokha, Safety at Sea Consultant for the RFLP-FAO. Mr. Sokha apologized for not translating the presentation in Khmer as the terms would better explained in English and the illustrations would make it easier for the Participants to understand the technical terms and meanings. He added that the Training Course was hosted in order to improve safety at sea and vulnerability reduction, reduce accidents and their causes, improve logistics and equipment, firefighting, prevention, fishing operation, navigation safety (lights) and rules of navigation.

One of the main issue mentioned was the lack of Safety at Sea training among fishers: an estimated 24,000 fatalities per year makes fishing the most dangerous activity in the world. Several other points were raised such as:

- Lack in data collection.
- Lack in safety equipment, and lack of stores or agencies to provide the equipment.
- Lack of training in engine safety and maintenance.
- Lack of training centers for crew members; traditional practices/beliefs leading to accidents.
- Lack in rescue system: absence of proper Rescue Teams.

The presentation emphasized on small-scale fisheries including boat design and construction, equipment and operation, primary safety equipment including anchor, first aid kit, tool box and safety lights, as well as navigation equipment (compass, maps, etc.) and rules illustrated by many diagrams (see Annex 5).

2. Marine Ecology (**Appendix 6**)

Marine Ecology was presented by Mr. Ouk Vibol, Acting Director of Department of Fisheries Conservation, FiA. Mr. Vibol stressed the fact that his presentation was not about telling the Participants about their role and importance in marine conservation as they were already well aware of it. He also stated that (Cambodia's) Marine Ecology Systems including coral, seagrass and mangrove have to date declined 30%. This presentation aimed at learning

and sharing knowledge and experiences about Marine Ecology, Marine Conservation and its value, about seagrass, coral reefs, mangrove, MPA's establishment and management and fisheries law enforcement on endangered species and protected habitats.

Participants were given general knowledge about the components of the Marine Ecosystem including Coral Reef, Seagrass and Mangrove, about their economic value as well as their main threats. The presentation emphasized on the need for the establishment of Conservation Areas and discussed the different terminologies and types: Marine Protected Areas (MPA's), Fisheries Management Areas (FMA) and Marine Fisheries Management Areas (MFMA's). Protection of endangered fisheries resources constituted another major topic of the presentation that lead to a final discussion related to planning: "What should we do to protect the marine ecosystem"? Conservation plans/projects from the different provinces were presented as case studies.

The Q&A session that followed the presentation raised concerns about various subjects such as the costs and benefits of ecosystem rehabilitation (mangroves especially), interests concerning coral reef biology and life cycle and concerns about possible conflicts between conservation areas (MPA's, MFMA's) and CFi's. Satellite imagery and GIS along with scuba-diving were mentioned as complementary tools to assess marine habitats and resources in order to design proper zoning of the conservation areas and avoid such conflicts.

3. Marine Conservation Cambodia: History and Activities (**Appendix 7**)

MCC: History and Activities was presented by Mr. Paul Ferber, Managing Director of Marine Conservation Cambodia, following a last-minute request from participants. Mr. Ferber shared his experience of the establishment of the CFi on Koh Rong Samloem, the creation of a conservation area within the CFi boundaries and MCC's activities in collaboration with local authorities and M'Pai Bei Community.

Mr. Ferber demonstrated how a tourism business can generate revenues to support conservation and insisted on the primary importance of Community involvement and collaboration with authorities. "*Conservation could not be done without participation from the local community and the community couldn't work on conservation without support from local and national authorities*" "*It must come from the ground up and the top down*". Revenue generated by foreign visitors acting as volunteers has allowed a significant improvement in Community's livelihoods along with the implementation of education and health care programs. Marine Research and Monitoring have been ongoing for over two years focusing not only on seahorses but coral bleaching, mapping, implementing of sustainable fishing techniques and Community patrolling, MCC has focused on eco-tourism to assist the community, local authorities and the FiA in conservation and alternative livelihoods, MCC is currently assisting in data collection for the creation of the Governmental MFMA's.

The Q&A session that followed the presentation showed a great interest in the rapid improvement of the Community's livelihood and also asked for details concerning the type of resource destruction observed in the area.

Mr. Ferber explained that during day time, illegal activities were easy to tackle but the main issue was during the night time. The CFi Sangkat representative added: *"When MCC was not here, we were having problems with our livelihoods. When MCC came they help us a lot on*

livelihoods, education and health. In regards to trawlers and illegal fishing, it doesn't matter what time it is: if we tell him, he will go with us".

4. Marine Biology, Cambodian Commercial Species and Endangered Species (**Appendix 8**)

Marine Biology, Cambodia Commercial Species and Endangered Species was presented by François Dufour, Conservation and Research Coordinator for Song-Saa Private Island company. After a rapid introduction on Bang Paa-Oun island (renamed Song-Saa Private Island by the foreign owners) and a general introduction on the Cambodian Marine Ecosystem, Mr. Dufour presented the biological features and behavior of the main commercial and endangered species observed in Cambodia including blood cockle, squid, blue swimmer crabs, shrimp, grouper, seahorse, dugong, etc. His presentation also focused on the main threats faced by these species, their conservation status and recommendations for their sustainable management.

Many questions were asked during the long Q&A session that followed the presentation, mostly asking for details concerning biological features and behaviors. Many of the questions asked showed an in-depth knowledge of specific species by some participants.

The presenter had confused some information concerning laws, conservation programs and measures already in place in Cambodia and this raised critics from many Participants, *(e.g.: "Are you sure when mentioning that there is no effort made to conserve the blue swimming crab? There are crab bank throughout the coastal communities and Prakas were established by the MAFF to limit the size of fishing gear.").*

The Q&A for this presentation lasted nearly two hours and lead to many interesting comments and highlighted some sensitive issues that would not necessarily have been discussed had there not been the mistakes within the presentation. It was one of the most positive Q&A's for the participants, allowing them to passionately voice their ideas and opinions on a wide range of subjects and topics.

5. Monitoring (**Appendix 9**)

Monitoring was presented by Dr. Chea Phala and Mr. Chea Tarith from the Marine Fisheries Research Institute, FiA. The presentation highlighted the importance of monitoring focusing on the size of fishing fleets and type of vessels, number of fishers, types of fishing gears and data collected within fishing communities but also stressed on the importance of catch monitoring (quantities, types of species caught and their location, estimation of CPUE etc.) for fisheries management and the sustainable use of fisheries resources. Methodologies were presented along with existent lacks and gaps in fisheries research and data collection in Cambodia.

Following the presentation, the Q&A session focused on precise explanations of the terminologies used such as "fisheries assessment", "CPUE" and questions concerning the methods used for different types of monitoring and their costs. Participants showed a real interest in the topic and how to set up and implement the first step of fisheries monitoring in their area.

6. Control and Surveillance (**Appendix 10**)

Control and Surveillance was presented by Mr. Oum Sokun on behalf of Mr. Pom Sotha who apologized for not being able to attend the training. The presentation reviewed articles of the National Fisheries Law yet it was not about telling officers what to do, but rather showing applications of the Law used as a practical tool and examples on how proper law enforcement can benefit to all stakeholders at all levels. The presentation highlighted the issue of destructive and illegal fishing with a focus on trawling in inshore areas and the necessity to crackdown on this activity. The importance of collaborative work between local communities, local authorities and FiA cantonment and inspectorate officers was mentioned, along with successful examples of ongoing collaboration.

The Q&A session that followed the presentation lead to very open discussions on sensitive law enforcement issues, current weaknesses and lack of resources. Participants shared experiences and discussed solutions on how to improve inspection and law enforcement.

7. Marine Monitoring (Reef Check and Marine Survey Techniques) (**Appendix 11**)

The Marine Survey Presentation was presented by Mr. Paul Ferber, Managing Director of Marine Conservation Cambodia. Mr. Ferber stood in as a replacement for Coral Cay Conservation representatives who failed to attend the training to give their presentation.

The Presentation showed the basic methodology for "Reef Check" Surveys that has been briefly used in Cambodia in the past and is currently being used to collect data for use in the creation of MFMA's. Mr. Ferber highlighted the need for Cambodia specific methodologies to be designed. "*There are many scientific marine survey methodologies in use around the world and the right one must be chosen or designed depending on what information you require".* "*Marine Surveys are very useful to both local communities and national government as the results from these types of surveys can be used for monitoring the health of the marine environment and for future planning and policy making*"

IV. PRACTICAL ACTIVITIES: HABITATS, SPECIES AND ACTIVITIES LOCATION EXERCISE (Appendix 12 and 13)

1. Formulation of group discussions

During practical sessions Participants were separated into their cantonments and were asked to use large maps of their cantonment areas to mark the Habitats, Species and Marine Activities within their area, identifying and assessing the marine ecosystem, its threats, their current activities in protection and future ideas on problem solving (**Photo 3**). This activity was aimed at evaluating the participants' knowledge and possible gaps in the understanding of their marine environment and related activities to allow further improvements in the management of coastal areas and marine resources.

3 – Participants from Koh Kong working on their cantonment area

The first exercise focused on habitats commercial species and endangered species. This exercise was aimed at getting participants to view their areas as a whole ecosystem linked in every way with every activity having an effect. The first session on habitats and marine species began after the presentations on Conservation Ecology and Marine Biology it was a nice gentle start in identifying important habitats within each cantonment and in which habitats we find endangered species and commercially viable species. The importance of habitat protection was emphasized. A new concept was introduced during this session highlighting the need to protect the inshore areas (from shore to the 20m depth) as they are an important breeding ground and habitat for many commercial and endangered species. At the end of the session the current FiA maps were shown on projector to highlight the need to update the existing maps as the local knowledge showed a clear difference to the FiA maps which had been created in 2002. In addition to just placing markers on the maps and drawing using their local knowledge each participant had to work together to outline the importance of each habitat and species, the threats they face, the measures in place to protect and monitor them and then to discuss new ideas on how to solve existing problems. A large emphasis was put on problem solving rather than just focusing on the problems themselves.

The second map exercise was conducted after the presentations on Monitoring, control and surveillance and involved participants placing markers of all activities that are undertaken within their cantonment areas, this included many different activities including tourism, development, sustainable and destructive fishing and illegal fishing (**Photo 4**). During this exercise participants were asked again to write down and discuss solutions to possible conflicts and destructive activities that had been highlighted during the exercise.

4 – Highlighting Participants' knowledge of their local area

At the end of each map exercise each cantonment was asked to give a presentation on their findings and discussions from the map exercise.

2. Outcomes of group discussions

The activity itself was a great success and lead to very open discussions on current problems and allowed shared experiences to lead to new problem solving ideas.

The atmosphere and openness lead to participants feeling very comfortable to discuss delicate subjects of law enforcement and current problems faced. Many problems were raised but always with the focus on solutions. A very important aspect that surfaced was the lack of understanding that benthic habitats within the inshore areas are very important areas to be protected as it showed many endangered and commercial species were found there. It also

highlighted the large amount of illegal trawling within the inshore areas it was agreed by each cantonment to be a major problem that needed addressing. The clear focus on solutions helped to maintain a positive involvement in the exercises and lead to many sensitive issues being raised and discussed.

There were four main points that recurred in each cantonments exercises and presentations:

1. A clear need for visual demarcation of CFi and conservation areas.

2. A need to speed up the zoning process and the creation of proper Management/protected areas.

3. The need for more resources and implementation of law enforcement with regards to illegal fishing.

4. Dissemination of information regarding CFi boundaries and Fisheries Law to outside fishers who use the CFi areas

V. PRACTICAL TRAINING FOR SAFETY AT SEA AND MARINE ECOLOGY

All participants were assessed on their water skills then given swimming, snorkeling and scuba diving sessions allowing them to become more comfortable in the water. All participants were taught basic lifesaving skills in first aid, CPR and in water rescue training, thus giving them greater confidence in their own ability to assist themselves or someone else in need. By the end of the training, all participants got the opportunity to experience scuba diving and see the beauty of the underwater world, hence giving everyone a different perspective on why we need to protect Cambodia's marine environment.

1. Swimming, snorkeling and diving (**Appendix 16**)

The exercise on scuba diving and snorkeling (**Photo 6 and 7**) was only a very small part of the training but had a very positive effect on the overall training results, it was arranged as an extra activity to enthuse the participants to want to learn about the ocean in regards to Ecology and biology and to want to work harder in their efforts of protection and law enforcement (Monitoring, Control and Surveillance). This exercise was of great benefit to the training and kept participants focused on the course topics and has since lead to an increased activity from the marine inspectorate in their patrols and the results from this part of the training will have a direct beneficial result for all CFi's in improved livelihoods as all cantonments and inspectorate now have more enthusiasm to tackle illegal and destructive fishing which will lead to an increase in resources for all CFi's.

5, 6 and 7 – From learning how to swim and snorkel to a first experience in scuba diving

Swimming lessons (**Photo 5**) were part of the safety at sea training sessions and from the initial feedback forms it was clear that many participants had little or no swimming skills, due to the large amount of time spent on and around the coastal waters it is an important self-rescue skill (**Figure 1**). Practical activities have been highlighted in the feedback as one of the most important aspects of the training.

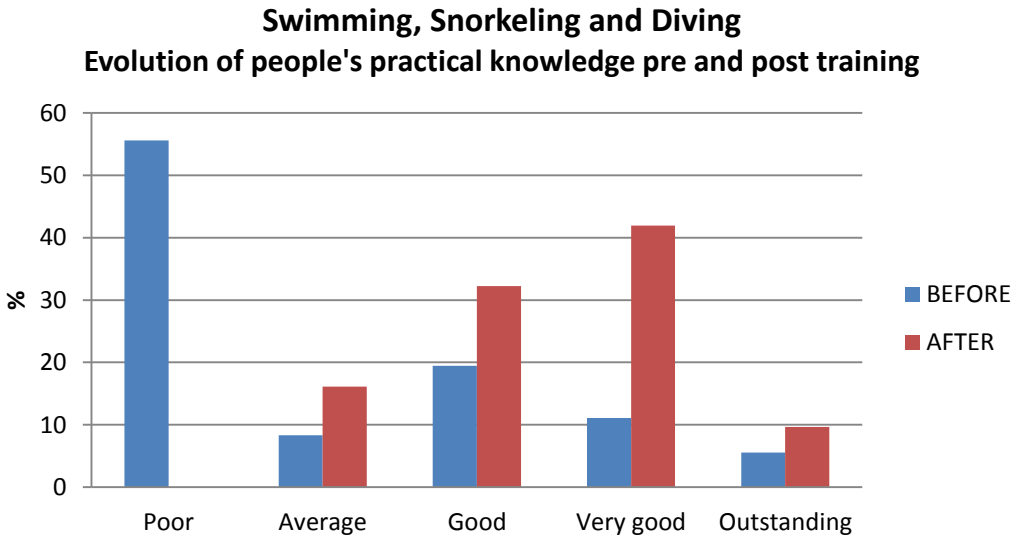


Figure 1: Evolution of people's practical knowledge of swimming, snorkeling and diving

2. Emergency First Response (EFR), CPR, in water rescue techniques (**Appendix 14 and 15**)

8 – How to manage a bleeding wound, EFR training

In regards to Safety at Sea (**Figure 2**), after the presentation on how to avoid accidents at sea, practical techniques on in water rescue and lifesaving skills were given to participants. This practical training has given the confidence to many participants to be able to correctly respond to a real emergency at sea. Linking presentations to practical activities has been highlighted in the feedback as a very important aspect of the training (**Photo 8 to 11**).

9, 10 and 11 – CPR (Cardio Pulmonary Resuscitation) training.

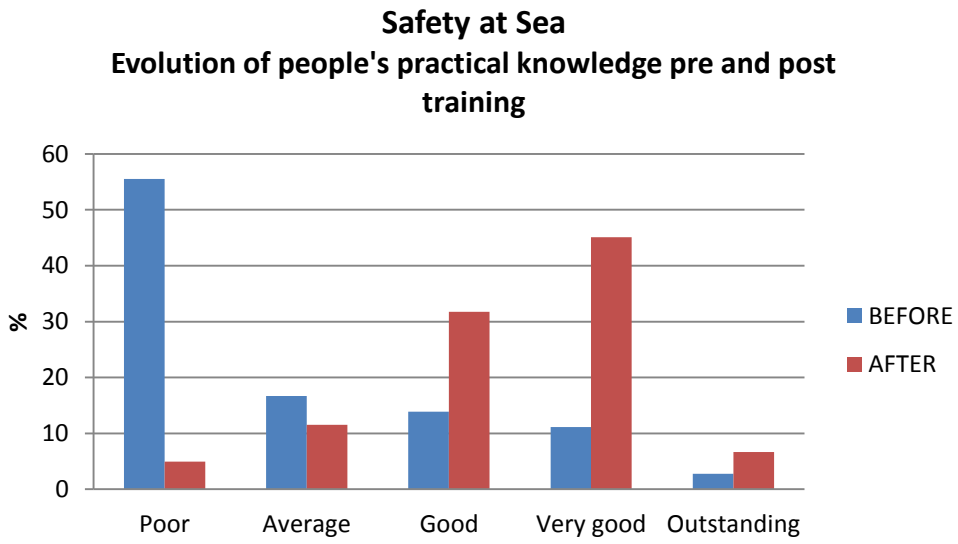


Figure 2: Evolution of people's practical knowledge of Safety at Sea

3. General feedback on inclusion of practical activities (**Figure 3 to 5**)

As this training course differed from most previous training courses, being focused more on practical sessions and group work, Participants were asked to comment on the practical side of the training (**Appendix 18**). The Comments and overall feeling of participants to want to learn more and directly apply what they have learnt show the importance of practical training in the field.

"The best way that we can make changes and learn is to directly practice at the local level"

"Real practice has helped us to see things clearly and directly relate this training to our activities"

"Practical training makes it quicker to catch up with the main ideas and presentations"

"The next training should follow this style. Should also add some topic's like Project Management, SPSS (data analysis)"

"I will use this knowledge to mentor my colleague, especially to fishers and local authorities on what I have learnt for them to follow and practice in their daily life"

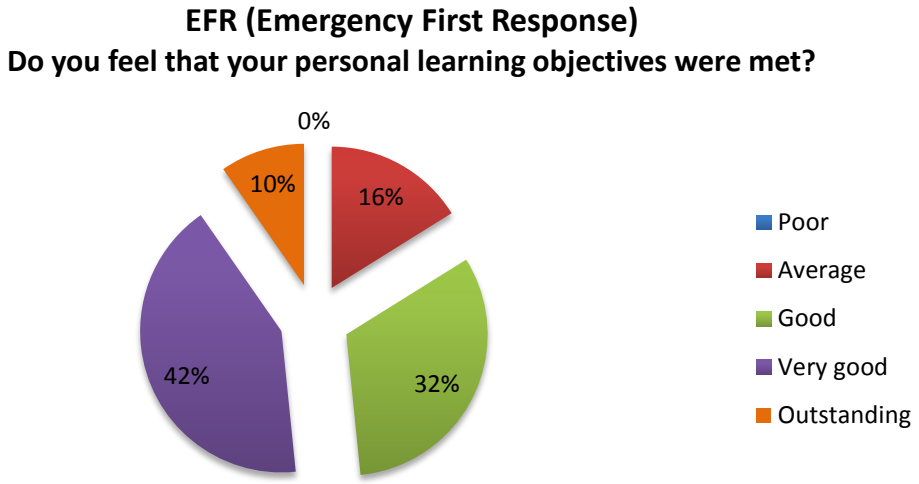


Figure 3: Survey showing the degree of achievement in Participants' learning objective related to EFR

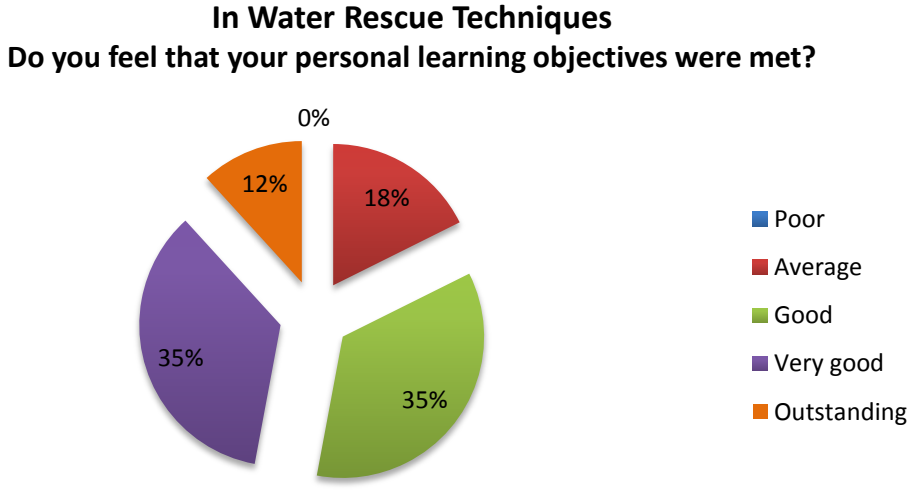


Figure 4: Survey showing the degree of achievement in Participants' learning objective related to in water rescue techniques

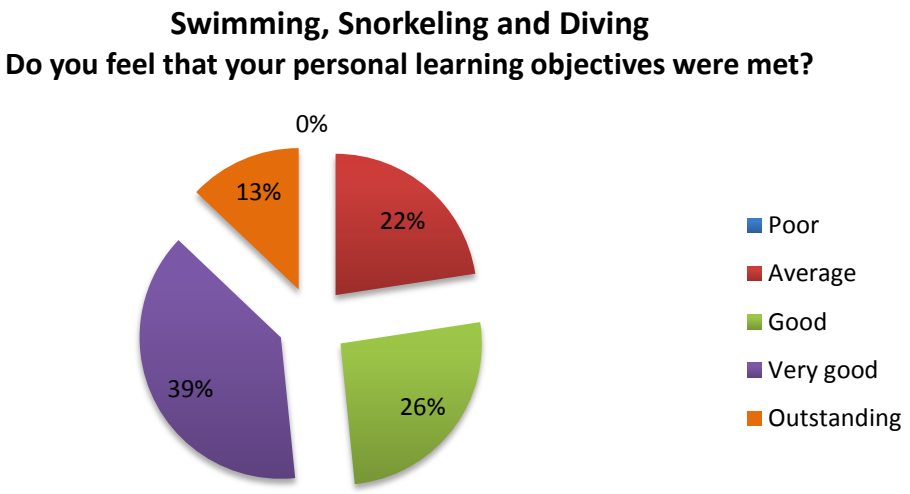


Figure 5: Survey showing the degree of achievement in Participants' learning objective related to in swimming, snorkeling and diving

VI. FEEDBACKS: A MAJOR ACHIEVMENT

1. Marine Ecology and Biology Presentations

a. Feedback and Assessment Prior to Training

Prior to the beginning of the training presentations on Marine Ecology and Marine Biology most participants noted on their initial feedback forms (**Appendix 17**) that their understanding of Ecology was poor to average (**Figure 6)**.

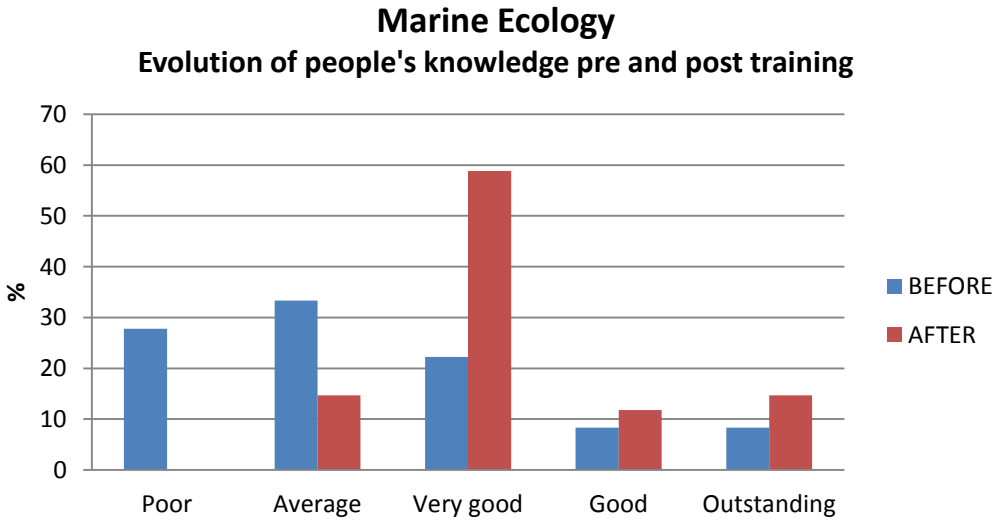


Figure 6 – Evolution of people's understanding of Marine Ecology

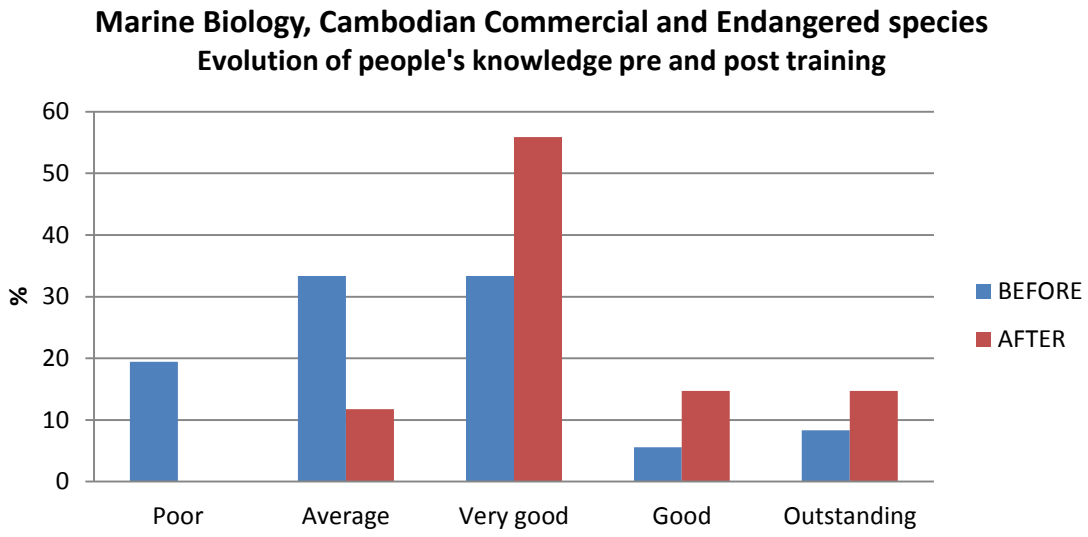


Figure 7 - Evolution of people's understanding of Marine Biology, Cambodian commercial and endangered fisheries resources

Though on their Pre-assessment forms many participants already showed a good overall understanding of why Ecology is important but lack Knowledge on Commercial and endangered species (**Figure 7**) for example:

- **On Ecology**

"Ecology is the interaction between biodiversity. The marine ecosystem research is very important for use to understand the important of each resource which could not be lost. If one is lost it will effect to another and also effect to the natural stability as the whole."

"Ecology is the interaction between biology and marine environment. Ecosystem research is important for us to understand the lifecycle of all marine species (flora and fauna) and its interaction with the marine environment."

"Ecology is the study of the environment, weather and the climate change. It is important for fisheries resources as a whole, like the impact of climate change on fisheries resources. If we can predict in advance we are possible to plan the solution or the means to mitigate on time."

"Ecology is the changing of environment based on the changing of nature. It is the interacting system. To have clear study it is important for us for sustainable resources maintaining, protecting, development."

"Ecology is the interaction between mangrove, seagrass, coral reef with other marine biotic animals. The study on ecosystem is very important for sustainable fisheries resources management planning."

"Marine ecology is the interaction between marine biotic animal and plant. Research is important for related factors, economics, protection and conservation." […]

- **On Biology, Commercial and Endangered Species**

"Commercial species are Grouper, shrimp, mud crab, and the endanger species are seahorse, dugong, coral reef, and mantis shrimp."

"Dolphin, snail, sea turtle, fish, dugong, and seahorse. Their lifecycles are baseed on coral reef, seagrass, and mangrove."

"Dolphin, dugong, seahorse, sea turtle, Holothuria sp. Some species live in the deep water like grouper, shark. And some species live in the coral reef and seagrass area."

"The endanger species are sea turtle, dolphin, dugong."

"Commercial species are sea turtle, coral reef, and grouper. Endanger species is sea turtle."

"The commercial species include shrimp, fish, squid, coral reef, mangrove, seagrass, crab. And the endanger species are dugong, dolphin, seagrass, and coral reef."

"Commercial species are crab, shrimp, squid, fish, mangrove, seagrass and coral reef. Endangered species are sea turtle, dolphin and shark."

"The Commercial species are Shrimp, crab and swimming crab. And the endangered species are sea turtle."

"Seagrass, mangrove, coral reef. Commercial species including fish, squid, crab and shrimp. Endangered species refers to some species of fish and biotic animals" […]

b. Feedback and Assessment Post Training

The Final feedback forms (**Appendix 18**) showed that participants felt that the after the training on Ecology and Marine Biology they had increased their understanding of the subjects and that the inclusion of information on conservation and fisheries management within the Ecology presentation had been very useful. Post-Assessment comments included some very similar answers to Pre-assessment but more specific references to subjects mentioned in the presentations. The increased knowledge on commercial and endangered species is shown in the comments, though their where still many participants that did not fully understand about endangered and commercial species. For example:

- **On Ecology**

"This study on marine ecology and biology has helped us to understand the species behaviour, endanger species and which species needs attention to protect or could be commercialized."

"It is the interaction between aquatic animal and aquatic plant to ensure the natural stability. It is important for fisheries resource, as if one of them lost, another will be followed."

"It is the interaction between marine aquatic animal and plant including coral reef, seagrass, mangrove, and other sea animal. It is important to understand the lifecycle of those species and the environmental issue."

"Marine Biology: This study is very important so we can understand each species and its behaviour."

"Marine Ecology and Biology is the interaction of fish and other marine aquatic animals and marine plants and the marine environment. Its study is important for sustainable fisheries management planning."

- **On Biology, Commercial and Endangered Species**

"The marine biology study's the biology of animals and plants that live in the sea. The Commercial species are crab, shrimp, squid, blood cockle, mantis shrimp. There are 29 endanger species according to sub-decree 123 dated 12 08 2009."

"Commercial species are Shrimp, squid, crab, grouper, mantis shrimp and the endanger species are dugong, sea turtle, dolphin, seahorse and giant clam."

"Marine biology differs depending on each species. There is a relationship between its behaviour, reproduction season, feeding and migration. For example, Shrimp – Penaeus Monodon during reproduction season swims to deep sea to spawn."

"The commercial species are grouper, shrimp, squid, crab, fish (mackerel), Endangered species are sea turtle, dolphin, dugong. Some endanger species need a long time to grow and are threatened by human activity. Some of them have few babies."

"Grouper is a commercial species. Endangered species include sea turtle, dugong, and dolphin. Coral reef feed by plankton and reproduced by spam and egg, mangrove help to purify climate, seagrass growth at the shallow water and impacted by fishing."

"Whale, dolphin, sea turtle and seahorse are endangered species. Their lifecycles have an interaction on each other to ensure the stability of nature."

c. Conclusion after Feedback and Assessment

The Feedback forms show a good overall improvement in the participant's feelings towards their own improved knowledge (**Figure 8 and 9**). Two main points are highlighted in the Assessment forms:

1) On the subject of commercial and endangered species participants need further improvement and training.

2) Most participants already had a reasonable understanding of the importance of inter-relationships and ecosystems.

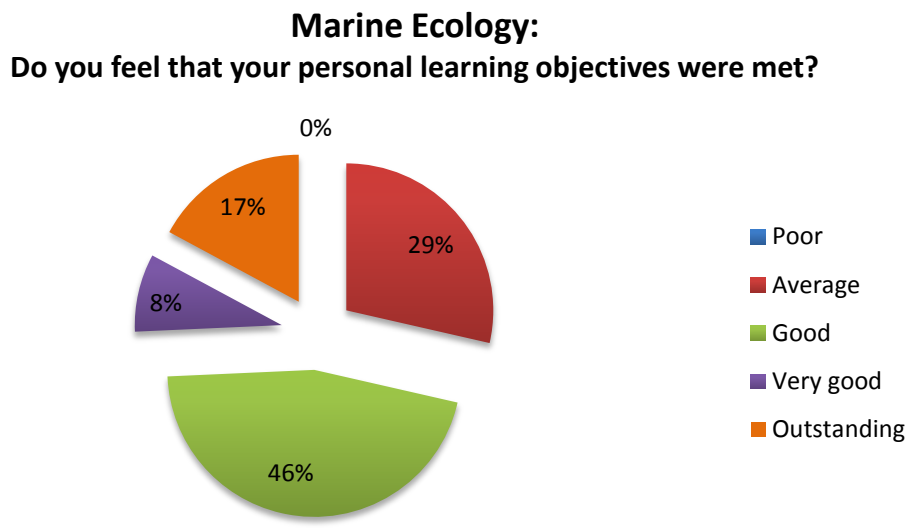


Figure 8 – Survey showing the degree of achievement in Participants' learning objective related to Marine Ecology

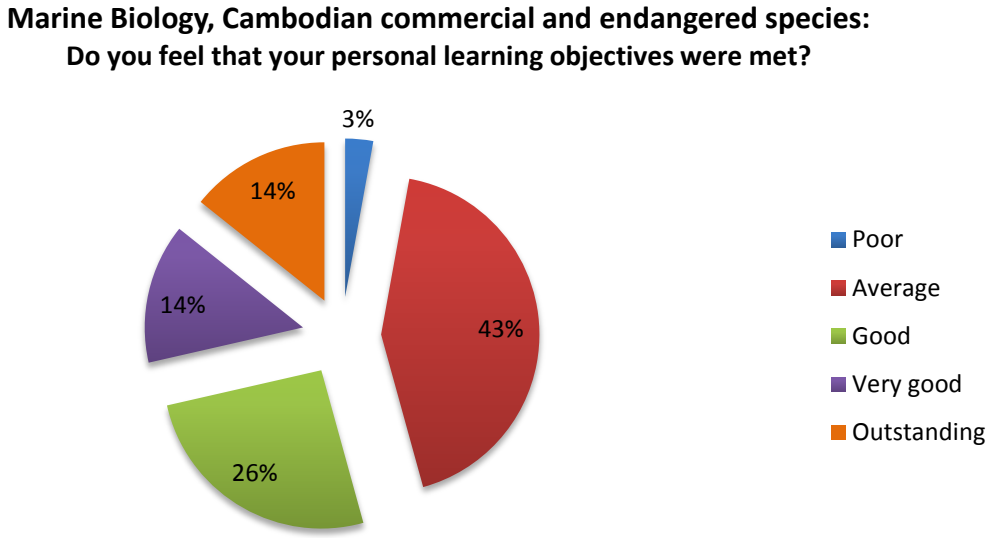


Figure 9 - Survey showing the degree of achievement in Participants' learning objective related to Marine Biology and Cambodian commercial and endangered species

During the Q & A (Questions & Answers) session for the Ecology presentation some important issues arose, one of those was the possible conflicts of MPA's/MFMA's (Marine Fisheries Management Areas) conflicting with CFi's. This is an area that needs to be looked at to assist in the implementation of MFMA's to make sure that Zoning is done in such a way as to protect the rights of the Communities and avoid possible conflicts between Fisheries Conservation and Community Fisheries. Quoted below:

Q.: "Can you give more idea on what is conservation, and protected area? Is it overlapping with CFi?"

A.: "Article 10-12 of fisheries law stated clearly on what is fisheries management area, and article 18 on protected and conservation area."

A.: "In a fisheries management area they classified into different zone including conservation, protection, and multiple use purpose. In conservation area is not allow to use. For protected areas is just allow to do family fishing and research."

A.: "For sure, in the area that already have CFi, we will put them together, and we will select the board or committee. And CFi is the subordinate. It is look like CFi Federation, but it is stronger than federation as it is signed by Minister of Agriculture in the picture of Prakas. We will keep the existing protection and conservation in the area. And it will also help to generate more income/funding to help our existing CFi too."

A.: "Conservation Department is just technical supporter while the Cantonment is the one who execute directly."

Q.: "CFi is established by sub-decree and endorsement from MAFF. I am afraid of MPA's overlapping with it again. And the conservation area should also take the committee from each CFi as it will work well."

Kimchhea, *A.: "It should not be a problem by creating a conservation/protected/managed area that covers the CFi area. "*

During the Marine Biology presentation there were also some important points raised during the Q & A. One important point to be addressed is the difference between the EEZ data from the FiA and the data on the FAO website this raised some sensitive questions. Quote:

Q.: "EEZ, in the slide is different 55,600km^2, is there any referent?"

A.:"It is from FAO website, including shared area by Vietnam may be the 1994 data one is excluded."

Also the need for local knowledge to be integrated into presentations and for people not to rely on outside data found on the internet. Quote:

"Before giving a presentation on Cambodia you should know the documents like the laws and regulations of Cambodia. Like the cases of blue swimming crab that you said have no conservation but indeed we have. It is well to say this with us, the Fisheries Staff, but it will be the problem if you are in the other bigger event, don't rely too much on websites and other foreign sources. When you talk about Cambodia you have to proof of the Cambodian facts."

This is a very important statement for the progression of programs and projects that are being implemented and leads on to the subject of coastal monitoring of marine resources and programs, many things are being done in Cambodia by many different groups and organizations both Cambodian and Foreign. There is a severe lack of knowledge sharing on coastal issues and a desperate need for an integrated approach, possibly a central database of collected and shared knowledge past and present, that can be accessed by all stakeholders and involved institutions for the benefit of Cambodia's coastal areas.

2. Safety at Sea Presentation

a. Feedback and Assessment Prior to Training

Prior to the beginning of the training presentation on Safety at Sea most participants noted on their initial feedback forms that their understanding of Safety at Sea was poor to average (**Figure 10**).

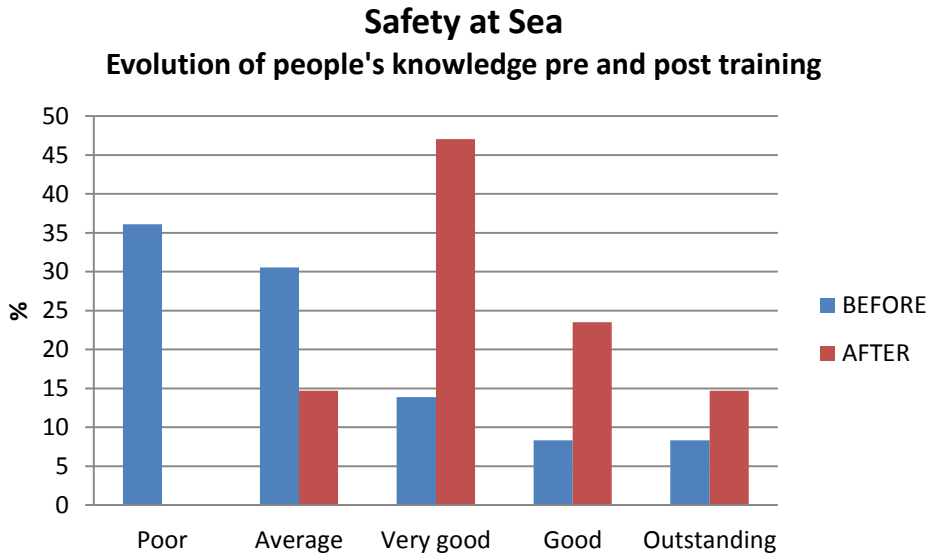


Figure 10 - Evolution of people's understanding of Safety at Sea

Though, on their Pre-assessment forms, many participants already showed a good overall understanding on the importance of Safety at Sea and many of the issues that need to be addressed. For example:

"Safety at sea currently is limited. Fishers must have life jackets and fire extinguishers, anchor, light signs, radio, compass/GPS, good engine system and boat body."

"It is important for good preparation for fisher to avoid any accident when fishing. Information database management, training, and dissemination to fishers is important."

"To have safety at sea we should have life jacket, floating device, safe gasoline container, and regularly check the engine and boat body before going fishing, also check the weather status and do not to overload the fishing vessel."

"Have to check on weather forecasting, equip with life jacket, fire extinguisher, check the engine, and have an accident alert system."

"Safety at Sea is fishing without accident at sea. To insure safety when fishing fishers need good quality fishing means, enough safety equipment, and to use information on weather forecasting."

"It means that fishing without any risks. To do that we have to listen to weather forecasting. Awareness of the fishing technique, equip enough tools like radio, GPS and life jacket."

b. Feedback and Assessment Post Training

The Final feedback forms showed that participants felt that the after the training presentation on safety at sea they had increased their understanding of the subject. Though the comments contained in the post assessment form showed only a few differing comments such as regular boat repairs and checks and some of the international standards. For example:

"Safety at sea means that all fishing boats should have regular repairs or check in every 6 months. Equipment should include rescue equipment, they should change the engine oil and check electricity devices regularly and have a compass. Drivers have to know about the weather status, be aware of navigation rules like using the right hand side when facing another boat and use lights and signs."

"Safety at sea is the appropriate control of fishing boat, regular 6 month checks on all the equipment, electric system and engine, compass and GPS. Fisher must be aware of navigation rule, and the use of light."

"Fisher can reduce maximum risk on their life, reduce fishing capital and increase income. By following the safety rules like the rules on boat use, first aid and rescue and call for help when there is accident."

c. Conclusion after Feedback and Assessment

The Feedback forms show a good overall improvement in the participant's feelings towards their own improved knowledge (**Figure 11**).

Figure 11 - Survey showing the degree of achievement in Participants' learning objective related to Safety at Sea

Though participants commented during the Q&A that the presentation should have been available in Khmer as requested, the presenter's explanation was "Apologies for not translating the presentation in Khmer as the terms will be easier to explain in English."

The overall conclusion on the participant's knowledge of Safety at Sea is that the knowledge of the subject is good but the ability to put into practice is difficult due to lack of resources and implementation programs.

3. Monitoring Presentation

a. Feedback and Assessment Prior to Training

Prior to the beginning of the training presentation on Monitoring most participants noted on their initial feedback forms that their understanding of Monitoring was poor to average (**Figure 12**).

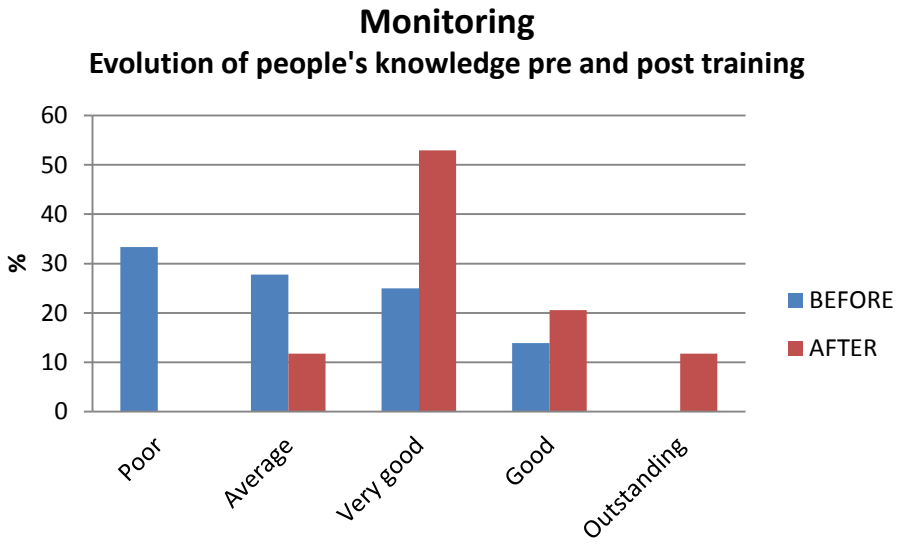


Figure 12 - Evolution of people's understanding of Monitoring

Their comments on the Pre-assessment forms showed severe lack of understanding on the reason for, the importance of, or the techniques involved in monitoring and 10 participants could not answer the question "what is your understanding of Marine Monitoring. Some of the Pre Assessment comments to the Question "What is your understanding of Marine Monitoring where:

"Monitoring is limited and all monitoring plans are not yet achieved."

"There were a lot of fish stock before and has been declining for now. It is because of increasing in number of fishing and illegal fishing."

"The fish yield is decreased due to the increasing of fishing boat and population."

"The monitoring is now limited."

"First, we need to conduct the research to collect the data. Then we conduct the monitoring and observe the changes to do comparison and find the solution."

"CFi establishment is the best way to monitor marine resources management."

"We have to collect the existing information and compare with the existing fisheries resource."

"Monitoring is to understand about fisheries health. It is the activity carried out for sustainable fisheries management."

"Engine fishing boat recording data, monitor the fishing catch and fishing inspection."

b. Feedback and Assessment Post Training

The Final feedback forms showed that participants felt that the after the training presentation on Monitoring at sea they had increased their understanding of the subject. The Post-Assessment forms showed a marked improvement of the understanding of the importance of marine monitoring and some of the techniques used to implement marine fisheries monitoring For example:

"Monitoring is to help us to better understand, be more efficient, and implement sustainable marine fisheries management both now and to the future."

"Fishers never fish according to quota and size limitation but do as they like to. Some resources have declined while other about to disappear."

"After training I think that fisheries monitoring is very important for our marine fisheries resources management."

"Monitoring is very important for the fisheries sector, this allows us to track the migration of marine fish, see the numbers and is then possible to use this information for law enforcement."

"Focus on species, stock, suitable size to harvest VS stock, we have to know which species is declining and decreasing."

"Our fisheries monitoring is currently limited. More attention on this matter should be paid."

"Marine monitoring is: number of fishing boat; fishing gears; number of fish caught; loss of resources".

c. Conclusion after Feedback and Assessment

The Feedback forms show a very good overall improvement in the participant's feelings towards their own improved knowledge on the importance of Marine Monitoring (**Figure 13**). The Post Assessment comments also show an improved understanding on the importance of Marine Monitoring and what sort of data is most needed.

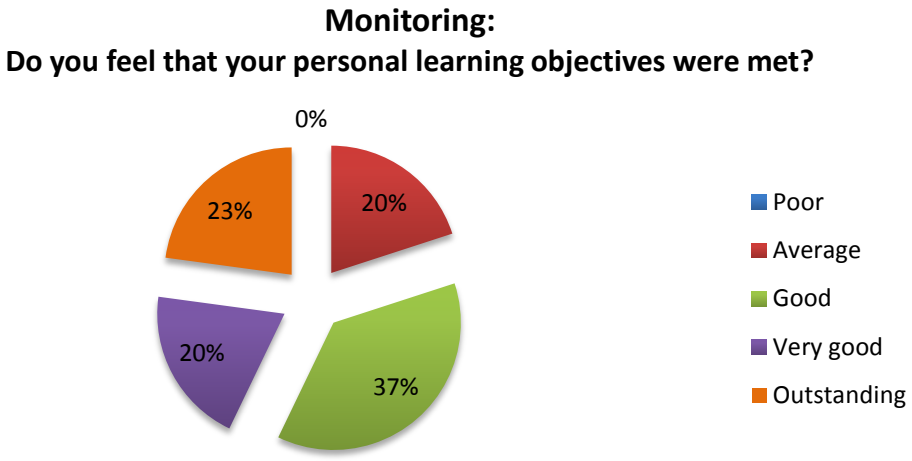


Figure 13 - Survey showing the degree of achievement in Participants' learning objective related to Monitoring

During the Q & A many very technical questions were raised showing a keen attitude to start implementing a good monitoring program, also raised where the issues of catches that are landed outside the county.

Kimchhea responded: *"In Cambodia it is hard to do this as most of our catch land in Vietnam or Thailand."*

Also that there is a lack of resources and financial support to implement monitoring programs: *"The monitoring and assessment is costly we need money. "*

The very urgent need for monitoring programs was highlighted and a good point was made: "*We should also discuss on the first step to do monitoring rather than just on the final result".*

The results of the discussions, assessments and feedbacks is that all participants agree that Marine Monitoring is a very important task that needs undertaking and that more training, resources and financial help are needed to begin implementing a successful Marine Monitoring program. The Monitoring Presentation was one of the most useful and productive presentations of the training.

4. Control and Surveillance Presentation.

a. Feedback and Assessment Prior to Training

Prior to the beginning of the training presentation on Control and Surveillance most participants noted on their initial feedback forms that their understanding of Control and Surveillance was poor to average (**Figure 14**).

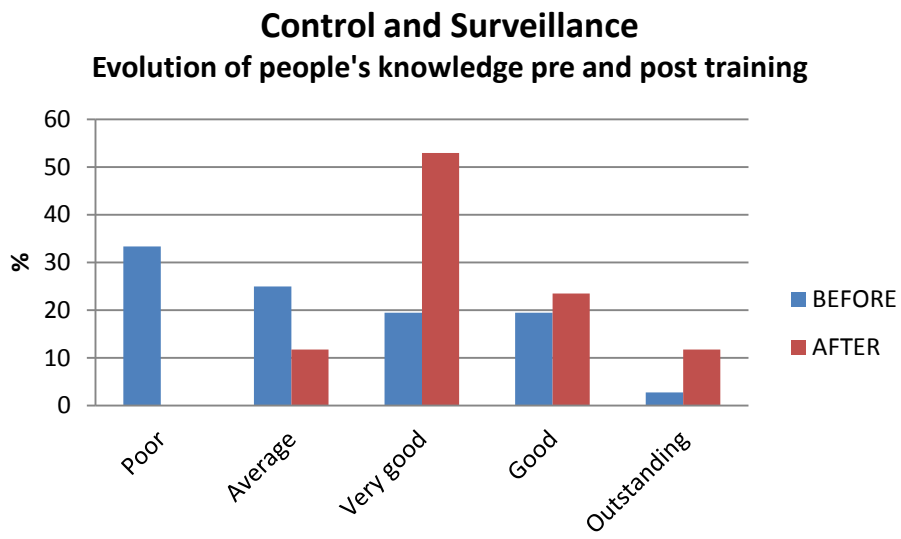


Figure 14 - Evolution of people's understanding of Control and Surveillance

Their comments on the Pre-assessment forms showed that the participants had a basic understanding of the need for Control and Surveillance. Some of the Pre-Assessment comments to the Question "What is your understanding of Control and Surveillance" where:

"It is important to combat inappropriate and illegal fishing and also to ensure sustainable fisheries resources."

"Controlling of illegal fishing by looking at the use of illegal fishing gear, the mesh size, depth of fishing ground, using the law as the basic tool to educate fishers on the impact of illegal fishing on fisheries resources."

"It is the fisheries law, and fishing related legal instruments for enforcement and control of the fishing domain, fishing gear, catch and close season control. It is important to ensure that the law is followed, the fishing boats are registered and it is then easier to control the safety of fishing boats, and increase the fishing domain tax."

"It must be a properly regulated management system; however it is still limited which is caused by many factors. It is important for sustainable marine natural resources management."

"It is important to disseminate the law, crack down on all illegal fishing activities to maintain sustainable fisheries."

b. Feedback and Assessment Post Training

The Final feedback forms showed that participants felt that the after the training presentation on Monitoring at sea they had increased their understanding of the subject. The Post-Assessment forms showed an improvement of the understanding of the importance of Control and Surveillance. For example:

"It is important for marine biodiversity, fisheries management and protection. It the work is well implemented, the fisheries resources will be increased and coastal livelihoods will be improved."

"Combating all destructive activities on biodiversity strongly contributes to sustainable use of resources, resources sharing and increased the national income."

"It is done to protect, conserve and manage fisheries resources sustainably. Reducing illegal fishing will contribute to RGC's poverty reduction program."

"MCS is:

- *Control illegal fishing activities*
- *Protect conservation area*

It is important to:

- *Increase fish stock*
- *Protect and conserve seagrass, coral reef, and mangrove.*
- *Law enforcement and other legal instruments*
- *Conflict resolution (procedure)*
- *It is very important for sustainable fisheries management in accordance to RGC's policy."*

c. Conclusion after Feedback and Assessment

The Feedback forms show a good overall improvement in the participant's feelings towards their own improved knowledge on the subject of Control and surveillance (**Figure 15**).

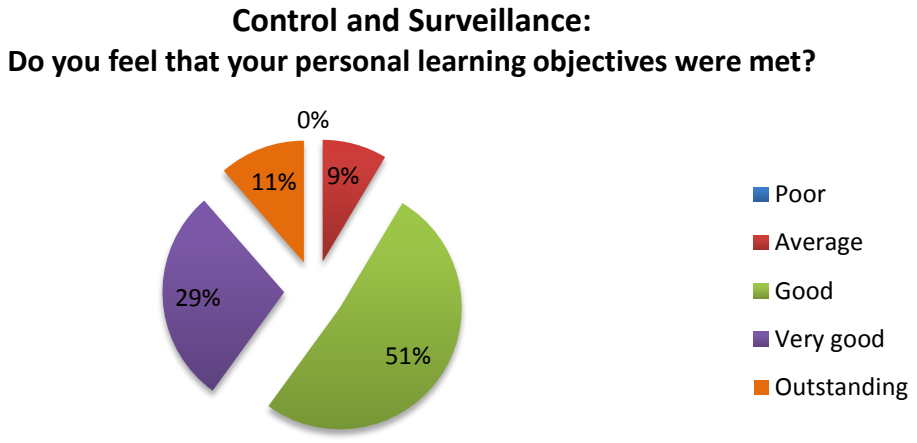


Figure 15 - Survey showing the degree of achievement in Participants' learning objective related to Control and Surveillance

The Post Assessment comments also show an improved understanding on the importance of Marine Monitoring and what sort of data is most needed. The Q & A session was very interesting with many points being raised:

Q.: "Please provide more idea on the inspectorate's job and structure?"

Oum Sokun, *A.: "The inspection work is one area, administration work with the cantonment to ensure smooth management is another area."*

Oum Sokun, *A.: "Inspection is about crack downs and recommendations to the cantonment, while control and monitoring is also each cantonment's work."*

Oum Sokun, *A.: "Law is strict, but sometime also has the loop holes, like being jailed from 1-3 years. Sometime they enforce the strict law, but the law might not be strict sometimes. Like when a person is supposed to be jailed for 3 years but if they know someone they will just get jail for 1 year. So law enforcement is flexible."*

Q: "What are the strengths and weaknesses of the monitoring work so far?"

Oum Sokun, *A.: "It is short question but very long to answer. Inspection is composed of crack downs and controls (strengthening law enforcement). We need to help the cantonments when they feel over their capacity. To act, we have to have enough information. But we never have 100% success as our resources are limited."*

Oum Sokun, *A.: "Strength: 50% is given to the inspectorate from the fines of* illegal fishing activities. *Weakness: limitation of resources (speed boat)."*

Q.: "Do you think the inspectorate can fully control both national and international fishing boat, both inshore and offshore?"

Oum Sokun, *A.: "In our water no foreign fishing boat."*

Oum Sokun, *A.: "There are a lot of mechanisms to crack down on trawlers but we can not stop them just by cracking down. So we created the artificial habitat to block the trawler we created crab banks, which increased crab 4 times. Then the trawlers changed to use crap traps as it cost less."*

Oum Sokun, *A.: "When the crab nets catch a lot crab, then crab supply is more than demand on the market this reduces the price. Then they changed their gear to offshore area to catch fish."*

Sin Sotharot, *A.: "SHV FiAC Mr. Roth: Most of the trawlers are illegally fishing. They have their network to share information, they know when we are about to come and they run away to the legal area."*

Sin Sotharot, *A.: "This is our weakness (limited resources). In SHV there is 145 km of coast, we only have 1 wooden boat to crack down on illegal fishing. That is why we need participation from local authoritys, community's and the armed forces. When we strongly combat them, they use the human rights issues to strike back at us in the form of a campaign.*

Hopefully you will understand the relationship between society and politics. The law enforcement sometimes will be soft and sometimes will be very hard."

Q.: "Can you please share you good experience in doing inspection?"

Oum Sokun, *A.: "It is hard to share. The weak country try's to follow the theory, while in the developed country the theory come after the practice. It is a social resolution which has many ways and we need to be patient. The law has come late to our country and it is hard to enforce the law."*

Oum Sokun, *A.: "Like what as Mr. Rot said, they go to strike us when we enforce the law and we are still not strong enough to deal with them."*

Oum Sokun, *A.: "But the best way is to educate them first and do it frequently. And if they don't follow the law then we will use hard means."*

Q.: "What is the role of inspectorate to ensure smooth work with the cantonment?"

Oum Sokun, *A.: Benefit sharing is the best means to ensure results, not only for inspectorate and cantonment, you should also think about the Sangkat. Mostly you don't share the benefit but if there is a mistake I am sure you will share.*

Oum Sokun, *A.: We have to do an audit on the structure of cantonments, sometimes we cannot rely on the Sangkat to work too much as they are limited in resources, so inspectorate and cantonment should also work together.*

Oum Sokun, *A.: Our main goal is to improve the relationship between inspectorate, cantonment and sangkat. Sometimes we need to work on our own, and sometimes we all have to work together and not to point fingers at each other.*

Oum Sokun, *A.: Our Inspectorate is also limited in Resources.*

Q.: What is rights and responsibility of each inspectorate and Sangkat?

Oum Sokun, *A.: "They all have to work together, none of them will be able to respond unless together, they have to work together. They are the guards of those resources and they know very well about their home areas and the actions needed."*

As you can see some of the most important parts are on the practicality of law enforcement and the lack of resources. This is an issue that is very sensitive and needs to be addressed.

VII. FEEDBACKS ON VENUE AND SERVICE

The overall feedbacks were very positive (**Figure 16**). Theory and practice proved to be a successful combination as the great majority of Participants recommended to further conduct such courses: *"I would recommend that if there is/are next training, the venue should be like this one". "The process is smooth and follows the schedule; all the messages are clear". The next training should follow this style. It should also add some topics like Project Management, SPSS (data analysis)".*

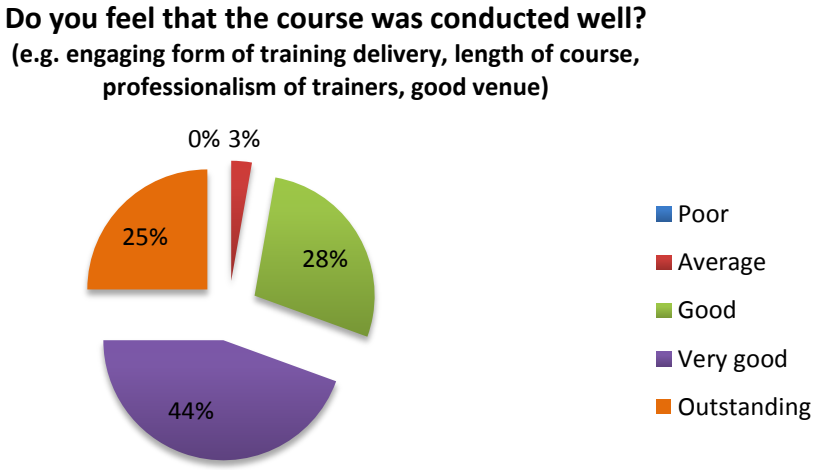


Figure 16 – Participants' feedback on the way the training course was conducted.

Giving the peculiarity of the location for this training, we thought important to include in this report the feedbacks related to the quality of service (**Figure 17 to 19**). The majority of feedbacks being positive, it shows that limited means and apparent logistic difficulties of choosing such a location are overcome by the quality of the on-site practical training and the motivation generated from the Participants themselves.

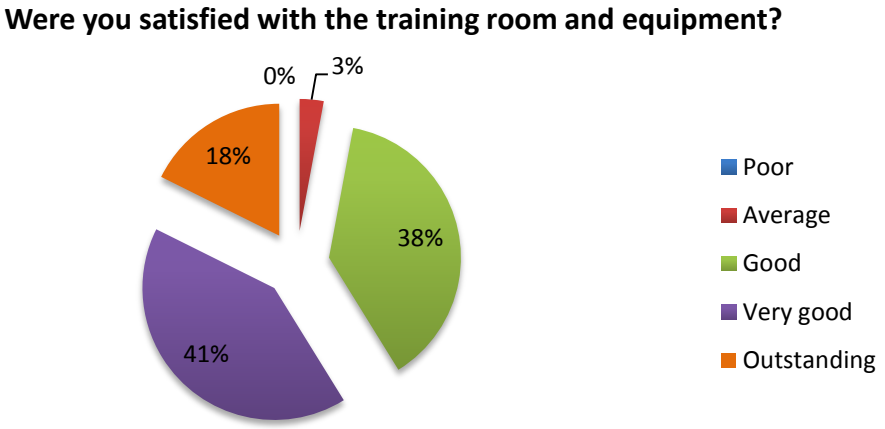


Figure 17 – Participants' feedbacks on the quality of the training room and equipment

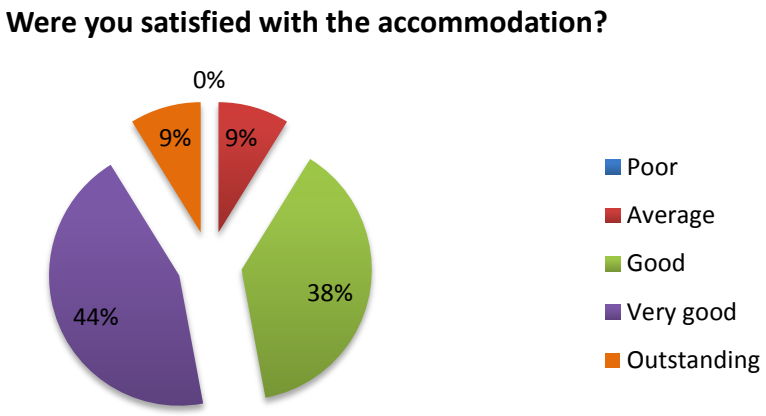


Figure 18 – Participants' feedbacks on the quality of accommodation.

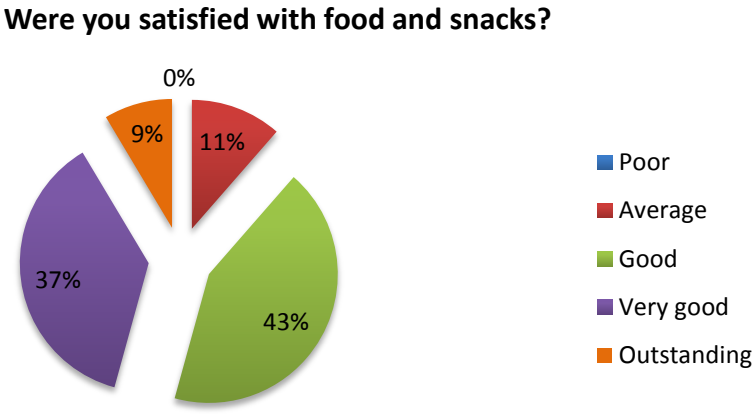


Figure 19 - Participants' feedbacks on the quality of food and snacks.

VIII. CONCLUSION AND RECOMMENDATIONS

It is clear from the information gathered during and after the training that focus on law enforcement is desperately needed to build capacity and resources as it is highlighted as an area severely lacking and is directly linked to the loss of livelihoods for CFi's and the fisheries sector as a whole.

It is also clear that many participants already have a good basic understanding of the subjects but lack the practical application, techniques and resources to undertake implementation of related activities.

Monitoring has been highlighted as an area clearly identified to have an important need for more training on techniques and training on implementation. And more involvement with the Marine Fisheries Research Institute.

Dissemination of information regarding Laws and regulations to CFi's is underway but that a lack of dissemination to outside fishers (who are the main cause of illegal and destructive fishing within CFi areas) has led to a decline in resources this needs to be addressed and dissemination to outside fishers included in future work plans.

Illegal trawling within the inshore areas has been highlighted as one of the most destructive and common activities affecting coastal livelihoods assistance to FiA in the area of practical law enforcement needs to be addressed

MFMA's/MPA's are underway and have been highlighted as a much needed measure to improve coastal resources. The FiA Community and conservation departments need assistance in management and marine monitoring to speed up this process and avoid potential future conflicts.

The need for co-management both between FiA and CFi's was highlighted and is an ongoing process, also noted is the need for good co-operation between Inspectorate and cantonment. There is also a strong need to include the military and build programs that are inclusive of the RCAF to address many sensitive issues on Law enforcement and the protection of the marine environment. Inclusion of RCAF and Marine Police is critical for the proper and smooth implementation of Marine Fisheries Law Enforcement

The Training succeeded in highlighting many areas to be addressed and this has been seen after the end of year speech by the Minister of Fisheries, Forestry and Agriculture, which included many topics addressed and discussed during the training course, including the need for better Marine fisheries law enforcement and a crackdown on illegal trawling. We are currently awaiting the translations of the notations taken during the end of year speech.

<u>Main Points</u>

1) Include practical implementation sessions into future training courses preferably on location.

2) Invite more participants from RCAF and Marine Police.

3) Desperate need to focus on and speed up Law enforcement implementation.

4) Demarcation of CFi and conservation areas.

5) Dissemination of information on CFi boundaries and Fisheries Laws not only to CFi's but more importantly to external fishers.

6) Set up of monitoring programs, both marine resources and fishers/gear/vessels.

7) Speeding up of the current management plans and zoning of CFi areas.

8) Look into the possibility of a knowledge database and/or information system for sharing knowledge and a communication system to make knowledge sharing and co-operation between stakeholders more efficient.

The feedbacks collected at the end of the training showed real enthusiasm, confidence and a desire from the Participants to start applying their newly acquired knowledge in their work activities (**Figure 20**).

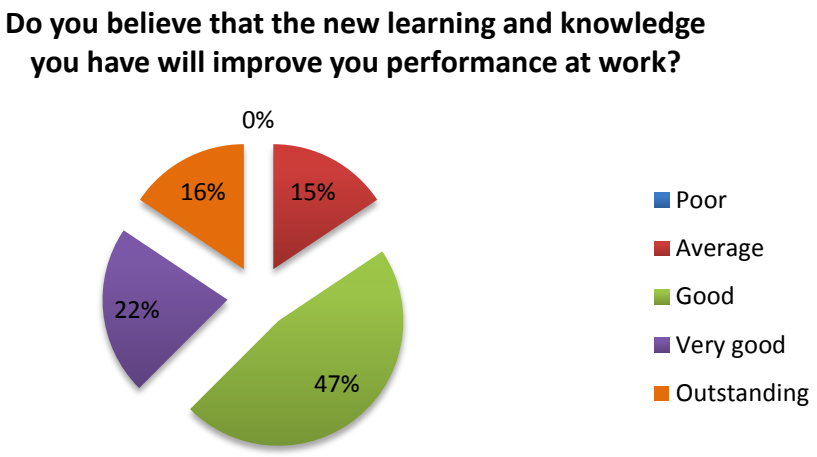


Figure 20 – Survey showing the Participants' confidence in applying the newly acquired knowledge at work.

During the Closing Ceremony (**Appendix 4**), Mr. Oum Sokun, Deputy Director of Marine FiA Inspectorate, told the Participants: *"The knowledge that participants gained from this training will be good for both, their current work and in the future, also for planning sustainable Fisheries Management."* Mr. Ly Vuthy, Deputy Director of Community Fisheries Development Department, added: *"I believe that everybody will think that the course was important and I would suggest all participants to continue searching and building up from what we have learnt."*

PICTURE CREDITS

12 – The training encouraged an attentive participation during presentation

APPENDIX 1. LIST OF PARTICIPANTS

List of Participants

Participated in the National Training Course on Marine Biology, Marine Ecology, Safety at Sea and Monitoring, Control and Surveillance (MCS) 18-23 December 2010

N°	Name	Sex	Position / Organization	Contact
1	Chhuon Kimchhea	M	Deputy Director of FAD / FiA	---
2	Ly Vuthy	M	Deputy Director of DCFD / FiA	---
3	Pom Sokhort	F	FiA staff / FiA	089 442 844
4	Kong Sovansay	M	DCFD staff / FiA	017 738 417
5	Keo Sovathepheap	F	DCFD staff / FiA	012 577 917
6	Em Thearith	M	IFReDI staff/ FiA	099 945 041
7	Heng Ponley	F	FAD staff / FiA	012 802 711
8	Pen Phoungmaly	F	FAD staff / FiA	011 891 606
9	Sung Sokunthea	F	IFReDI / FiA	012 668 310
10	Seang Leang	M	FCD staff / FiA	011 958 771
11	Hout Vuthy	M	FCD staff / fiA	017 870 205
12	Hout Vutha	M	P.P.R.U.A	012 866 498
13	Uch Camnap	M	Inspectorate / FiA Preah Sihanouk	---
14	Am Oeun	M	Inspectorate / FiA Preah Sihanouk	097 692 9686
15	Cheng Bunthan	M	Inspectorate / FiA Preah Sihanouk	097 677 0999
16	Sin Satharat	M	Vice Chief Cantonment / FiA Preah Sihanouk	012 712 082
17	Khin Saravuth	M	Cantonment staff / FiA Preah Sihanouk	012 974 457
18	Sun Vuthy	M	Cantonment staff / FiA Preah Sihanouk	012 892 256
19	Kong Kimyan	M	Cantonment staff / FiA Preah Sihanouk	012 600 266
20	Mam Sokdara	M	Cantonment staff / FiA Preah Sihanouk	016 789 848
21	Nen Chamroeun	M	Cantonment staff / FiA Preah Sihanouk	016 777 312
22	Hin La	M	Cantonment staff / FiA Koh Kong	015 896 967
23	Vann Thong	M	Cantonment staff / FiA Koh Kong	016 992 248

24	Kann Hong	M	Cantonment staff / FiA Koh Kong	097 707 5660
25	Chhor Bunchhong	M	Cantonment staff / FiA Koh Kong	016 771 768
26	Som Piseth	M	Vice Chief Cantonment / FiA Koh Kong	015 860 888
27	Soun Savorn	M	Cantonment staff / Kampot	012 589 205
N°	**Name**	**Sex**	**Position / Organization**	
28	Kem Sambo	M	Cantonment staff / Kampot	092 480 487
29	Chak Sineath	M	Cantonment staff / Kampot	012 828 926
30	Lim Ror	M	Vice Chief Cantonment / Kampot	012 955 001
31	Keat Khemra	M	Cantonment staff / Kampot	012 298 992
32	Phan Sopha	M	Cantonment staff / Kampot	050 442 777
33	Plong Noring	M	Chief Division / Kampot	012 810 985
34	Oun Vithou	M	Police / Preah Sihanouk	016 565 696
35	Heng Chamnap	M	Police / Preah Sihanouk	015 790 779
36	Sochin Da	M	Navy / Preah Sihanouk	097 976 8047
37	Neang Sambun	M	Sangkat-Koh Rong	015 511 028
38	Phor Nor	M	Sangkat-Koh Rong	012 744 874
39	Chhoun Lay In	M	Marine Inspectorate / Preah Sihanouk	099 618 598
40	Mean Sarun	M	Marine Inspectorate / Preah Sihanouk	088 870 0788
41	Hang Meng Heang	M	Marine Inspectorate / Preah Sihanouk	097 732 0036
42	Leang Sarath	M	Marine Inspectorate / Preah Sihanouk	012 792 636

APPENDIX 2. PROSPECTUS AND ITINERARY

Prospectus

Marine Biology, Marine Ecology, Safety at Sea and MCS

Koh Rong Samloem, Preah Sihanouk Province, **Cambodia**

18th -23rd December 2010

Background

Cambodia has rich marine resources and habitats such as coral reefs, sea grass beds, mangroves, wetlands, salt marshes, sensitive benthic habitats and sandy beaches. These marine resources and habitats have and are being seriously damaged by human activities including excessive fisheries exploitation, illegal fishing, habitat conversion, habitat loss, pollution and agricultural run-off. High population growth and increasing demand for marine fisheries products for both the local and international markets have caused a drastic decrease in fisheries resources. Cambodia has also recently been short listed as one of the countries to be most affected by climate change rating in at no. 12 on the UK Maplecroft list.

In order to manage fisheries resources more sustainably, the Fisheries Administration (FiA) has tried several approaches including centralized and decentralized approaches. Community-based natural resources management is one of the decentralized fisheries management approaches that has been promoted in the Cambodian fisheries sector for several years. The Royal Decree on the Establishment of Fisheries Communities was officially adopted and launched in June 2005 (FiA, 2005). The Decree encourages local small-scale fishers to form community organizations for the purpose of protecting and using fisheries resources in sustainable way within locally defined areas. Also the creation of a conservation department in 2009 has gone a long way to increasing the efforts to protect and conserve Cambodia's marine resources.

A knowledge of the below subjects is essential for FiA inspectorate and Cantonment officers to be able to efficiently implement national fisheries goals and action plans.

The FiA Inspectorate in the course of its duties to address the above mentioned issues needs to have a full understanding of the subjects mentioned below to fully carry out its duties and responsibilities following FiA national action plans. There are four main subjects to cover during the training course.

1. Marine Biology.
2. Marine Ecology.
3. Safety at Sea.

4. Monitoring control and surveillance.

The Training Course on above subjects has been identified and approved in the work plan for 2010 of RFLP/FAO Cambodia.

Objectives

This training program is designed for the purpose of providing awareness and knowledge on the concepts of these topics. The specific objectives of the training are as follows:

Marine Biology:

- Commercial marine species and marine endangered species, behavior, life cycles, breeding cycles and habitats.
- Basic understanding of the biology of coral reefs, sea-grass and mangrove habitats

Marine Ecology:

- Importance of coastal and marine Ecosystems, coral reef, sea-grass and mangroves but also including the link between the health of benthic habitats and the marine environment as a whole.
- MPA's (Marine Protected Areas, the need for creation, sustainable financing, implementation and benefits. Examples of success and programs in surrounding SE Asian countries

Safety at Sea:

- Including Emergency first response training, CPR, resuscitation and rescue techniques

MCS:

- Marine Surveys and demographic surveys including Data Collection and correlation. (reef check LIT).
- Fishing Techniques and Habitat Destruction including illegal and destructive techniques.
- Conflicts between coastal stakeholders including tourism, development, conservation, small scale fishers, middle scale fishers and commercial fishers.
- Information Networks for communication between Cantonments, national level FIA, stakeholders and community's.
- CFI's and community Law Enforcement assistance.
- FIA Inspectorate Officers and the importance of their role within Cambodia's fisheries sector.

Expected Output

By the end of the training course FiA inspectorate and Cantonment officers are expected to have grasped a better understanding of each subject and will be able to apply the knowledge and concepts in their daily work.

With key points being an understanding of:

- The importance of correctly enforcing fisheries laws.
- How illegal fishing directly affects fisheries resources and the links between destructive fishing and the decline in fisheries stocks in turn leading to increased poverty.
- The need for co-management with local communities and the benefits.
- Increased local knowledge of ecosystems, importance of species and habitats inter-relationships.
- Safety at Sea
- MCS knowledge allows for the correct decision making process, giving policy makers and supervisors the information they need to make decisions and legislation for the benefit of Cambodia's fisheries resources.
- The need for MPA's, their benefits and the need for MCS in order to create and then monitor the MPA's.
- A greater understanding of their roles as officers within the fisheries sector.
- A greater understanding of potential coastal conflicts and how to avoid them.
- How to apply this knowledge and the concepts learnt into their daily work activities.

Methodology and Material

Presentation Materials

- Projector
- Microphones
- Speakers
- Power point presentations and handouts in Khmer/English

Practical Activity Materials

- CPR Training doll and first aid kits
- Life Jackets and rescue aids
- Large Maps of Cantonments coastal and marine areas
- Role-play and activity materials
- Swimming aids
- SCUBA equipment

- Snorkelling equipment
- Reef check/LIT survey Equipment
-

The main activities and the methodology of the training are as follows:

- **Brainstorming:** Participants are asked to 'brainstorm' i.e. to generate ideas about a particular subject. Every suggestion is accepted without criticism or comment and written down on the flip chart. The group then discusses the ideas when all suggestions have been recorded.
- **Facilitator Presentation:** A presentation of a subject by the facilitator.
- **Games and exercises*:*** Games and exercises can help to sort out problems, to create a group identity, to help building trust within a group and to develop sensitivity to the problems of others. Different types and exercises are used: icebreakers, energisers, knowledge games which give information to the players.

  Large Maps of each Cantonments coastal area will be supplied, and over the course of the training will be used by participants to show their understanding of the locations of habitats, species and their relationships, also types of fishing gears and vessels within each cantonment area, and potential conflicts between stakeholders within each coastal cantonment will be able to be located and discussed using these maps.

- **Role Plays:** Participants take the role of fictive persons, including their attitudes, feelings, behaviour etc. Role plays can be used for different purposes, such as to rehearse new skills, to prepare for a new situation etc.
- **Plenary Discussion:** Plenary discussions i.e. where the whole group stays together are often used at the beginning and end of a session. They assist in getting the whole group moving, making sure that everybody has the information required and summing up the most important issues of a session.
- **Small Group Discussion:** Small groups carry out specific tasks or activities. These encourage people to share experience and knowledge, encourage participation and develop a co-operative approach to working.
- **Feedback:** The participants will discuss their experience in the field with for the benefit of shared experience learning
- **Practical Application**: This will include swimming lessons for those that cannot swim, snorkeling and SCUBA diving for those that are able. Fishing with the local community and integration into local activities including reef check training. In water rescue training.

Facilitator Presentations

Name	Organization	Topic to be taken and responsibility
Mr Ouk Vibol	FiA	Marine Ecology, Conservation and the need for MPA Creation
Mr Chan Sokha	RFLP/FAO	Safety at Sea
Dr Chea Phalla, Dr. Chea Darith	FiA	Monitoring
Oum Sokun	FiA	Control and Surveilance
Ly Vuthy	FiA	Closing ceremony – Final Talks
François Dufour	Songsaa Private Island	Marine Biology

MCC will be responsible for organizing and delivering all practical exercises:

1. Games and Exercises
2. Role Plays
3. Practical Application
4. Small Group Discussion

Training participants

The 30 training participants are from the 4 coastal province cantonments, Koh Kong, Preah Sihanouk, Kampot and Kep and FiA inspectorate.

5 Additional participants from Preah Sihanouk Province: Local Navy, Police and Sangkat will be invited to attend.

NB: Must have a mix of gender, minimum 20% female.

Opening Ceremony

The training session will be opened by:

1. Ouk Vibol : Head of FiA Conservation Department
2. Oum Sokun : Deputy Director of FiA Inspectorate
3. Yos Chanthana: Consultant for Fisheries Co-Management, RFLP/FAO

Itinerary

Day/Time	Modules	Facilitator
18th December, Saturday **Arrival**		
02:00 – 04:00 pm	Take boat from Sihanoukville to Koh Rong Samloem	Paul Ferber - MCC Marine Skopal - MCC
04:00 – 05:00 pm	Arrive and rooms allocated	
05:00 – 06:00 pm	Walking tour of Village 23 and surrounding area.	
06:00 – 07:00 pm	Introductory drinks (Getting to know everyone)	
07:00 pm	Dinner	

19th December, Sunday **Opening Ceremony** **Safety At Sea**		
07:00 – 08:30 am	Breakfast	
08:30 – 10:30 am	Opening ceremony.	Ouk Vibol, Head of FiA/FCD Oum Sokhun, Deputy Director of FiA Inspectorate Yos Chanthana, Consultant for Fisheries Co-Management, RFLP/FAO
10:30 – 10:45 am	Break	
10:45 – 12:00 am	Safety at Sea presentation	Chan Sokha – RFLP/FAO
12:00 – 01:30 pm	Lunch	
01:30 – 03:30 pm	Safety at Sea: EFR Training – (CPR and resuscitation all trainers are fully qualified). Activity: Swimming, Snorkelling and Diving	James Mosert – MCC Frank Letswaard – MCC Paul Ferber – MCC Carly Atkins – MCC Kylie Gavard - MCC
03:30 – 03:45 pm	Break	

03:45 – 05:45 pm	Safety at Sea: EFR Training – (CPR and resuscitation all trainers are fully qualified). Activity: Swimming, Snorkelling and Diving (continued)	James Mosert – MCC Frank Letswaard – MCC Paul Ferber – MCC Carly Atkins – MCC Kylie Gavard - MCC
07:00 pm	Dinner	

20th December, Monday Emergency First Response (EFR) Marine Ecology and Conservation		
07:00 – 08:00 am	Breakfast	

08:30 – 09:30 am	Marine Ecology
	• Endangered species
	• Conservation
	• MPA creation, Why do we need MPA's?
	• Cambodian ecosystems
	  • Coral
	  • Seagrass
	  • Benthic habitats
	  • Mangroves
	  • Benthic Habitats (Inshore area: coastline to 20m depth line)
		Mr Ouk Vibol – FiA/FCD

09:30 – 09:45 am	Break	
10:45 – 12:15 am	Activity on where are the habitats in your Cantonment area	Ouk Vibol – FiA/FCD Paul Ferber – MCC Marine Skopal – MCC Ueli Schmid - MCC
12:15 – 01:30 pm	Lunch	
01:30 – 03:30 pm	Practical activity: in water Rescue Techniques	James Mosert – MCC Frank Letswaard–MCC Paul Ferber – MCC Carly Atkins – MCC Kylie Gavard - MCC
03:30 – 03:45 pm	Break	
03:45 – 05:30 pm	Practical activity: in water Rescue Techniques (Continued)	James Mosert – MCC Frank Letswaard–MCC Paul Ferber – MCC Carly Atkins – MCC Kylie Gavard - MCC
07:00 pm	Dinner	

21st December, Tuesday **Marine Biology and Ecology**		
07:00 – 08:00 am	Breakfast	
08:30 – 10:00 am	Marine Biology, Cambodian Commercial Species and endangered species. • Behaviour, life cycles and breeding cycles. Basic understanding of the biology of coral reefs, seagrass and mangrove habitats. • Impacts and inter-relation of commercial species and Cambodian ecosystems. • Trash fish (by-catch): everything in the ocean plays its part and is important. • Food chains and relationships.	François Dufour – Songsaa Private Island
10:00 – 10:15 am	Break	
10:15 – 12:00 pm	Activity on Where these species are in your Cantonment	François Dufour – Songsaa Private Island Paul Ferber – MCC Marine Skopal – MCC Ueli Schmid - MCC
12:00 – 01:15 pm	Lunch	
01:15 – 03:15 pm	Monitoring 1. Importance of information ((why is this information important) • How big are fishing fleets? • How many fishers? • Types of Gear? • Types of fishing vessels? • Data from communities 2. Importance of information (why is this information important) • What are the Catch Quantities? • What are the Species being caught? • Where are these Species being caught? • When are these species being Caught?	Dr Chea Phalla, Mr. Chea Darith – Marine Fisheries Research Institute, FiA
03:15 – 03:30 pm	Break	

03:30 – 05:30 pm	Activity – Swimming, Snorkelling and Diving	James Mosert – MCC Frank Letswaard–MCC Paul Ferber – MCC Carly Atkins – MCC Kylie Gavard - MCC
07:00 pm	Dinner	

22nd December, Wednesday Marine Biology and Ecology MCS		
07:00 – 08:30 am	Breakfast	
09:00 – 11:00 am	Control and Surveillance Communications between communities and officials Roles and responsibilities of officers Enforcement Laws Identify conflicts – stakeholders • Fishers both foreign and local, small, middle and large scale • Tourism • Development	Oum Sokun – Deputy Director of FiA Inspectorate
11:00 – 11:15 am	Break	
11:15 – 01:00 pm	Activity – Illegal fishing and fisheries Law, activities in your area.	Oum Sokhun – FiA Paul Ferber – MCC Marine Skopal – MCC Ueli Schmid - MCC
01:00 – 02:15 pm	Lunch	
02:15 – 03:15 pm	Marine Monitoring (Reef Check and Marine Survey techniques)	Paul Ferber - MCC
03:15 – 03:30 pm	Break	
03:30 – 05:30 pm	Activity – Scuba-Diving (continued)	James Mosert – MCC Frank Letswaard–MCC Paul Ferber – MCC Carly Atkins – MCC Kylie Gavard - MCC
07:00 pm	Final Banquet dinner (sea food banquet)	

23rd December, Thursday Closing ceremony and awarding of certificates		
08:00 – 09:00 am	Breakfast	

09:00 – 11:00 am	Final talk – Overview of the week presentations and real push for the Inspectorates to be enthused about what they do and how they personally have a positive impact on Cambodia's Marine Life, Cambodia's Fishing Communities and Cambodia as a whole – economically, socially and environmentally (with big emphasize on Community co-management).	Oum Sokun – FiA Inspectorate Yos Chanthana – RFLP/FAO Ly Vuthy – FiA
11:00 – 11:30 am	Break	
11:30 am	Return by boat to Kampong Som	

Notes

All subjects will be linked and each presentation and interactive training session will show the links between the topics.

This is a Second Draft of the Itinerary and will be refined and arranged accordingly. Times on this Itinerary are just a rough guide and will be refined over the coming month.

Some Activities such as Diving are weather condition dependent, alternative activities will be prepared as a backup.

APPENDIX 3. OPENING CEREMONY: OPENING SPEECHES

Master of ceremony: Ms. Khim Wirya, Livelihoods Diversification National Consultant, RFLP-FAO.

The Opening Ceremony started with an apology for the absence by H.E Dr. Nao Thouk, RGC's Delegation in charge of Fisheries Administration Director General, Mr. Ing Try and Mrs. Khiang Khim, Deputy Director General of Fisheries Administration. The session was chaired by:

1. Mr. Oum Sokun, Deputy Director of Marine Fisheries Administration Inspectorate.
2. Mr. Ouk Vibol, Head of FiA Conservation Department.
3. Mr. Yos Chanthana, Consultant for Fisheries Co-Management, RFLP-FAO.

WELCOME REMARK

By ***Mr. Yos Chanthana***, Consultant in Fisheries Co-Management, RFLP/FAO

At the National Training on Marine Biology, Marine Ecology, Safety at Sea and MCS

Koh Rong Samloem, Preah Sihanouk, 18th – 23rd December 2010

On behalf of the Food and Agriculture Organization of the United Nations (FAO), I am pleased to be here today and thank you for your presence at this important training It is the first time that the RFLP-FAO hosts a training course on an island like Koh Rong Samleom, as normally you only attend training in the hotel with air conditioning. The intention is to link the knowledge you have learnt to the real practice in the field.

OPENING ADDRESS

By ***Mr. Oum Sokun***, Deputy Director of Marine Fisheries Administration Inspectorate

At the National Training on Marine Biology, Marine Ecology, Safety at Sea and MCS

Koh Rong Samloem, Preah Sihanouk, 18th – 23rd December 2010

I am pleased to have permission from the FiA Inspectorate Director to chair the training. Thanks to all participant's for the long trip taken and the commitment to be here in response to the RFLP's invitation. Thanks to the FAO with funding from the Spanish government for helping marine fisheries management. Thanks to Paul to enable this training.

Marine ecology had been researched since the French colony regime. Human activities and climate change are main cause of declining fish stocks and obstacles to fish migration. In the world thousands of species have already been disappeared.

For safety at sea, there is currently little attention from fishers to this particular topic. Moreover, most of fishing boats are not registered yet. Inspection (Monitoring, Control and Surveillance) is different from audition, but similar. We do not try to 100% enforce the law currently by catching all illegal people but we try to educate them on the law and safety. The Marine Inspectorate has to work in collaboration with FiA cantonment.

I hope that, after the training, all participants from the different Cantonments and other institutions will be the ones who can pass on what they have learnt to fishers.

OPENING ADDRESS

By ***Mr. Ouk Vibol***, Head of Fisheries Administration Conservation Department

At the National Training on Marine Biology, Marine Ecology, Safety at Sea and MCS

Koh Rong Samloem, Preah Sihanouk, 18th – 23rd December 2010

I wish all participants who have come to the training not just to act as students and teachers but also for all to have the chance to discuss, share and learn from each other. Marine Ecology including mangrove, seagrass and coral reef are important habitats in our ecosystem. However, up to date, 30% of marine ecology has been lost. There are ways to rehabilitate theses habitats through conservation, inspection and CFi mechanisms.

There is a coral reef conservation area around Koh Rong and Koh Rong Samloem which has been defined by the FiA in collaboration with Paul, MCC, and Mr. Chamroeun from Preah Sihanouk FiA cantonment who is in charge of community development. There is now a plan to establish the 2nd MPA in 2011 which will be 3 km from the beach around Koh Rong and Koh Rong Samloem which is under the process of negotiation. Hopefully, the RFLP-FAO will take it into consideration for funding support.

We could generate a lot of benefit from conservation: with tourism-based user fees, for instance. As I know, the average cost of a boat trip to visit the coral reef around Koh Rong Samloem is about 70 USD per person. It would be possible for us to add up another 2 USD fee to this service which can go to CFi to support protection and conservation.

Thank you to Paul for creating a business to benefit conservation, and thanks FAO for funding the training.

APPENDIX 4. CLOSING CEREMONY

CLOSING REMARK

By ***Mr. Yos Chanthana***, Consultant in Fisheries Co-Management, RFLP/FAO

At the National Training on Marine Biology, Marine Ecology, Safety at Sea and MCS

Koh Rong Samloem, Preah Sihanouk, 18th – 23rd December 2010

I expressed my deep thanks to MCC and its staff, especially Paul, for allowing such a good collaboration in implementing the LOA provided by the RFLP-FAO. He is also keen to have discussed on possibilities for the next step which is Capacity Building, and I will bring the suggestion to the RFLP team to see how the RFLP could provide more training to the FiA Cantonments.

By ***Mr. Oum Sokun***, Deputy Director of Marine Fisheries Administration Inspectorate

At the National Training on Marine Biology, Marine Ecology, Safety at Sea and MCS

Koh Rong Samloem, Preah Sihanouk, 18th – 23rd December 2010

I would like to thank Mr. Ly Vuthy, Deputy Director of Community Fisheries Development Department, Fisheries Administration who represents the Cambodia Delegate of the RGC in charge FiA Director and Mrs. Kaing Khim, Deputy Director General, FiA.

The knowledge that participants gained from this training will be good for both, to their current work in the future, and also planning for sustainable Fisheries Management. I believed that, in the future the participants will be skilled on marine survey like what Paul shared in the presentation. Furthermore, with regards to safety at sea, it is very important, as many people have died on this matter. Before, when we saw a people in the water which is about to sank with cannot help them. If at that time we know how to rescue in the water, they would not have died. In the future you will now be able to see whether fishing boats have enough safety at sea equipment aboard. Even this course is general but we can still use all of the knowledge we acquired for now and future.

Finally, I would like to thank the FAO-RFLP for both its help and support to the Inspectorate and its cantonments.

By ***Mr. Ly Vuthy,*** , Deputy Director of Community Fisheries Development Department, FiA

At the National Training on Marine Biology, Marine Ecology, Safety at Sea and MCS

Koh Rong Samloem, Preah Sihanouk, 18th – 23rd December 2010

Last but not least, we proceed to the close session and for sure we will open it again in the near future. I am very pleased even though I have not been able to attend the full length of the training yet at least a full day session. I also want to apology on behalf of the FiA head

representatives who do planned to come but were unfortunately too busy this week which made it impossible for them to come. As for Kaing Khim, she is sick and could not make it.

On behalf of the FiA I want to thank the RFLP-FAO, Paul Ferber-MCC for undertaking this LOA and for the good preparation and organization of this training event. Thanks for active participation and sharing. Even though the Cambodia coastal area is short, its fisheries resources are rich. Our knowledge of fisheries is limited which means that our management capacity cannot reach a maximum level. The FiA thinks that we still have limited capacity which is the reason why that we gave the fishing area to local community so they can manage it using a clear boundary. As a result, there are currently 40 CFi's that have been established along the coastal area. We are proud that the RFLP-FAO provides funding to support Cambodia instead of Thailand or other countries because Cambodia has the need to use this funding.

This was four-day training was intense and tiring but it is important for individuals as well as for the whole Fisheries sector: all of you will use the knowledge to manage our fisheries resources. I also appreciated that the organizer chose the right place to conduct the training. Here is the best place to link knowledge to practice such as safety at sea, biology and ecology.

I believe that everybody will think that the course was important and I would suggest all participants to continue searching and building up from what we have learnt. We can also use global sharing tool such as the Internet. For example, if you still have questions concerning Reef Check, you can go and look for information on the Internet.

I am really interested by what Chanthana, Tharotha and Oum Sokun rose about the follow-up of this training. So we now need to think about several things: should we continue the training? What is the benefit? We have to do a diagnostic before giving a treatment so we have to think about: do we train the right people? What about their background? Are they willing to join? So you first have to think about these questions, then make a proposal and give it to supporting organizations and even to the rest of our staff.

For reef check, it should be applied in collaboration and with the involvement of local fishers as they are the one who know well how to dive and have existing local knowledge on where the resources are.

Finally, I would recommend the FiA Cantonments to actively get involved with the RFLP-FAO who is keen to train us. I think that the RFLP is very useful for us, so try to extract all the benefits from this program and apply it to your projects. What we need is to define our needs and benefits from this project.

I declared the training closed and wish all participants a safe trip back home.

Appendix 5 – Safety at Sea

The Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP)-CMB

TRAINING ON SAFETY AT SEA

FOR SMALL SCALE FISHING BOAT

Mr. CHAN SOKHA
Safety at Sea Consultant

Koh Rong Saleum Island
19 November, 2010

Contents

- Introduction
- Objectives
- The current safety situation in CMB
- Regulating safety at sea
- Safety in small scale fisheries
- Small scale fishing operations
- Rules governing steering, navigation
- Vessel navigating light
- Buoyage

Contents (cont's)

- Tides
- Meteorology
- Boat stability
- Search and rescue
- Emergency situation
- Essential safety equipment
- Survival at sea
- General deck safety
- Checklist
- Five minutes checking

1. Introduction

- Fishing is the most dangerous occupation, estimated 24000 deaths/ year in the world
- Safety of fishing boats and fishermen involves in regulation, navigation, construction, equipment of the vessels and human error
- RFLP-CMB has funded by the Spanish through FAO produced the output 2
- The consultation workshop on the develmnt of CFiAMP in SV, Kpt, Kept, KK, safety at sea activities have been found and documented

2. Objectives

- The trained participants will get knowledge on Safety at Sea
- To improve safety at sea and vulnerability reduction
- To reduce accident at sea and their causes
- To improve the logistic of equipments, fire prevention, fishing operation
- Safety of navigation light and rules of navigation

3. The current safety situation in CMB

- No training modules dealing specifically with safety at sea for small-scale fishermen
- Data collection on accident at sea is limited, no structures designed and available data are not recorded
- Monitoring boat safety

  -the fishing boats used in CMB are traditional ones, built up with wooden planks

  -design

  -boat building

  -launching and sailing

- Availability of safety equipment
  - -safety equipment is not available on board
  - -no specialized shops or distribution program
- Engine safety
  - -no training modules designed for engine
  - -fisherman maintains his own outboard motor
- Crew safety
  - -lack of training centers
  - -fishermen's knowledge passed from father
  - -hindered by religious beliefs and the risk-taking culture

- Search and Rescue
  - -there is no SAR system
  - -fishermen run a voluntary service

4. Regulating Safety at Sea

- International rules and regulations
  - -Guidelines for the design, construction, equipmt
  - -Guidance on training and certification of boat
  - -International convention on SOLAS
  - -International convention on STCW 95 for boat
  - -International convention for the Safety of fishing vessels, 1977

-UN Convention on the Law of the Sea

-IMO Code for investigations into accidents and incidents at sea

-International Convention on Maritime SAR

-ILO Recommendations concerning work in the fisheries sector

- National rules and regulations

-Sub-Decree # 14 (RGC) on the Organization and Functioning of the MPTW, (March 3, 1998)

-Circular # 006 (MPWT) on Management of Sea Navigation (October 1, 1999)

-Circular # 003 (MPWT) on Means of Waterway Transport Management (June 27,2000)

-Law on Fisheries (March 30,2006)

-Proclamation (MAFF) on technical inspection of fishing boat management

5. Safety in Small Scale Fisheries

- Boat safety

-design, construction, equipment & operation

-boats built of wood, maintenance every six month

-equipment as rope, anchor, paddle, tool box such as hammer, nail…

•Safety equipment

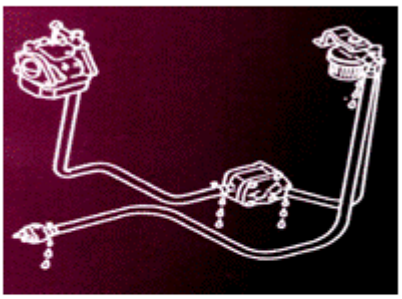
• Engine safety

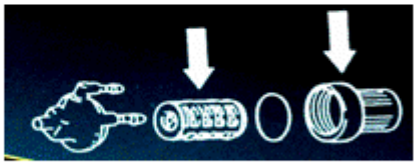
-fuel/oil mixture

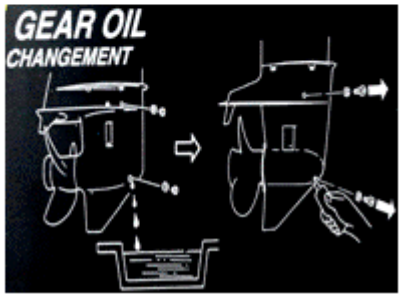
-checking the fuel system

-draining and replacing gear oil

-cleaning the filter







•Fire prevention

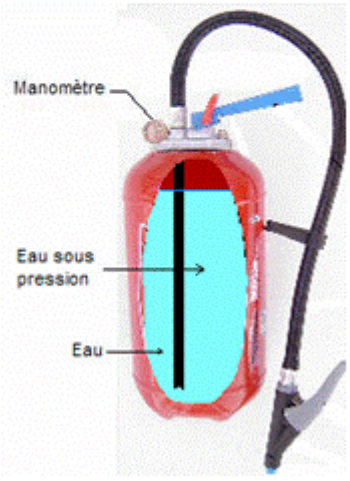
-the fire triangle

-different types of fire

Class	Name	Description
A	Fires of solids or dry fires	These are fires of slow- or fast-burning dry materials such as charcoal, wood, cotton waste, cloth and paper.
B	Fires of liquids or oily fires	These are fires of liquids or liquifiable solids (petrol, oil, fuel oil, greases etc).
C	Gas fires	This type of fire involves gases or vapours, such as hydrogen (pure or a mixture, as in mains gas), propane or butane, etc.
D	Metal fires	These are fires of combustible metals (such as aluminium, magnesium, potassium) for which special methods of extinguishing are required.

-different types of fire extinguishers

water extinguisher



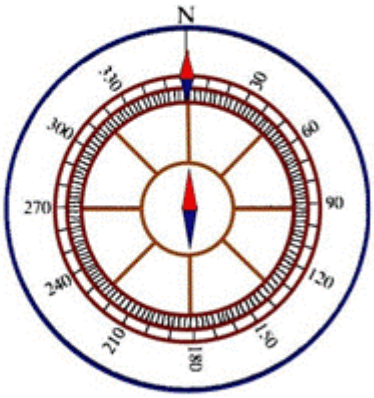
power extinguisher

-How to use it

6. Small scale fishing operation

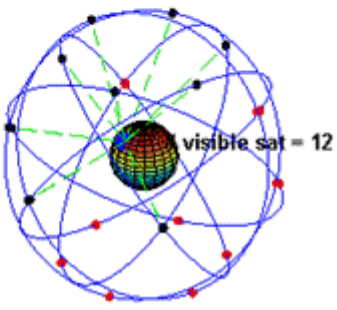
- Using charts

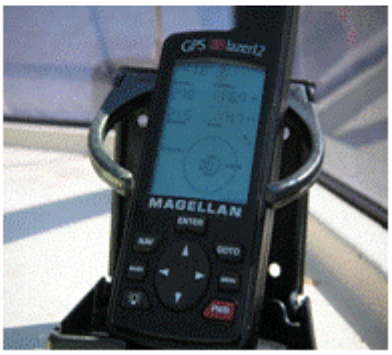
- The magnetic compass



- GPS

-position	-direction
-speed	-course
-time of arrival	-time remaining,
-distance	-search and rescue
-record route/data	-times of sunrise/sunset





7.Rules steering and navigating

- General-Definition of Ship

-the word ship refers to any type of craft or vessel, used to be used as a means of transport on water

-this means that small-scale fishing vessels are considered to be ships (R. 3)

-danger may come from anywhere. This is why seafarers must be on watch (R. 5)

-there is any doubt about the risk of collision, it must be considered that the risk exists. (R. 7)

- Restricted visibility

if you cannot see other vessels because of fog or bad weather:

-reduce your speed

-give sound signal,

-navigate with care

-be prepared to stop (R.19)

- Narrow channels and fairways

-vessels of less than 20 meters in length shall not impede the passage of other vessel

-vessels engaged in fishing shall not impede the passage of other vessels

- Order of priority

-vessel not in command

-vessel whose ability to maneuver is restricted

-vessel handicapped by its draught

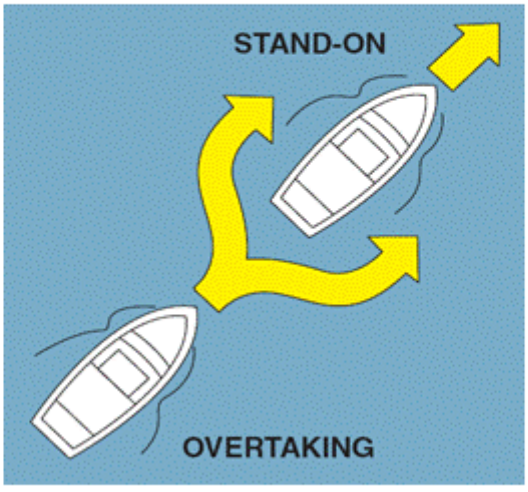
-vessel engaged in fishing

-sailing vessel

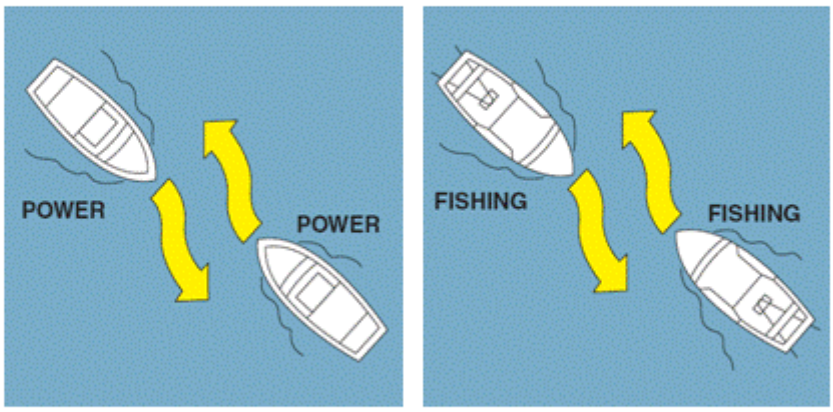
-power-driven vessel underway.

- Most common scenarios

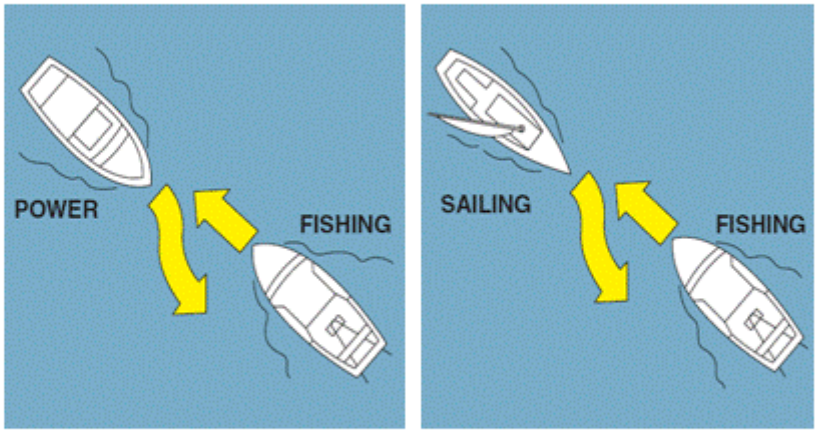
-Overtaking another vessel (R-13)



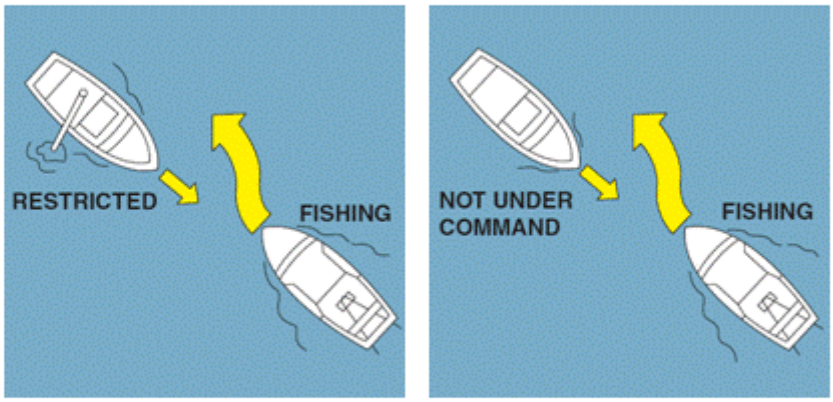
-Head-on situations (R-14)



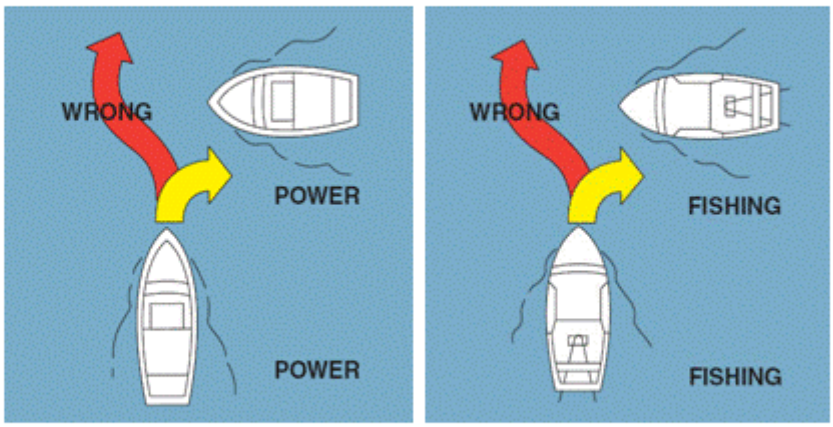
- Head-on situations (R-18)



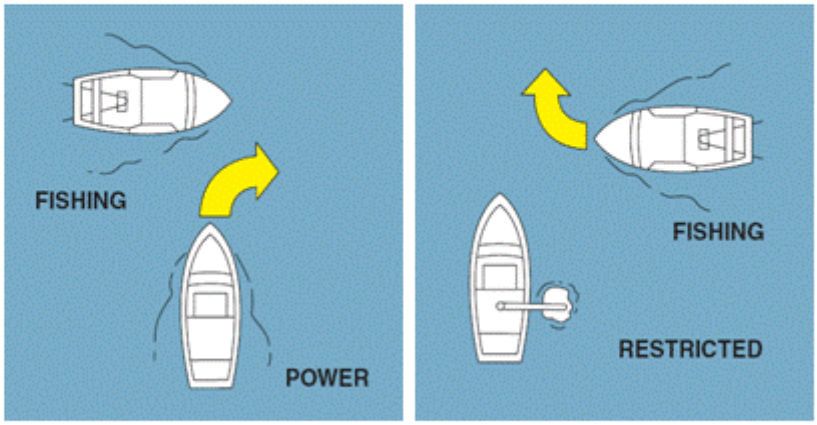
-Continuous (R-18)



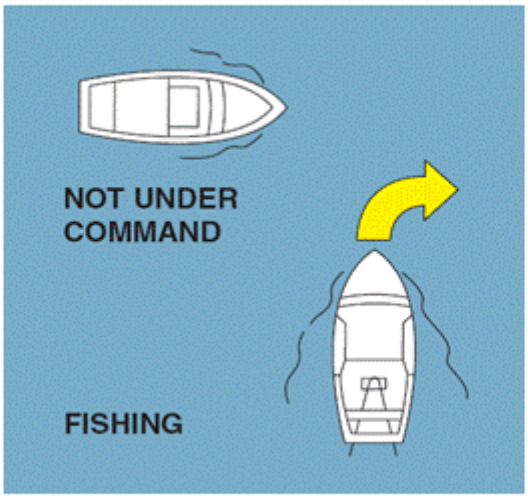
-Crossing the path of another vessel (R-15)



-Crossing the path of another vessel (R-18)



-Continuous (R-18)

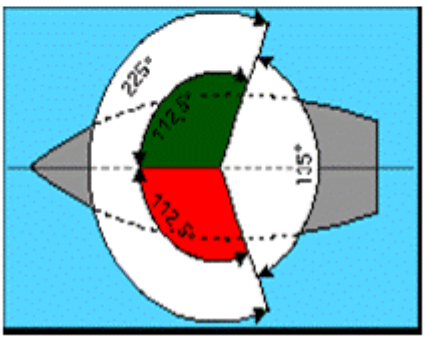


8. Vessel navigation lights

- General

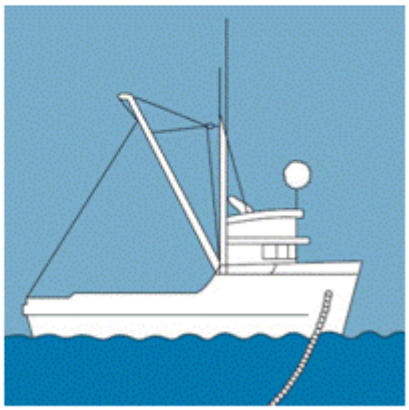
-navigation lights and signals not only tell other vessels where you are, but what you are doing. Using these lights and signals is an important part of safe navigation

-the different lights on a vessel that is "underway"

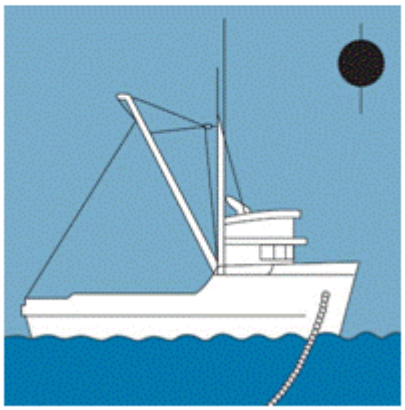


- Instead of the lights shown above, fishing vessels of less than 12 meters in length

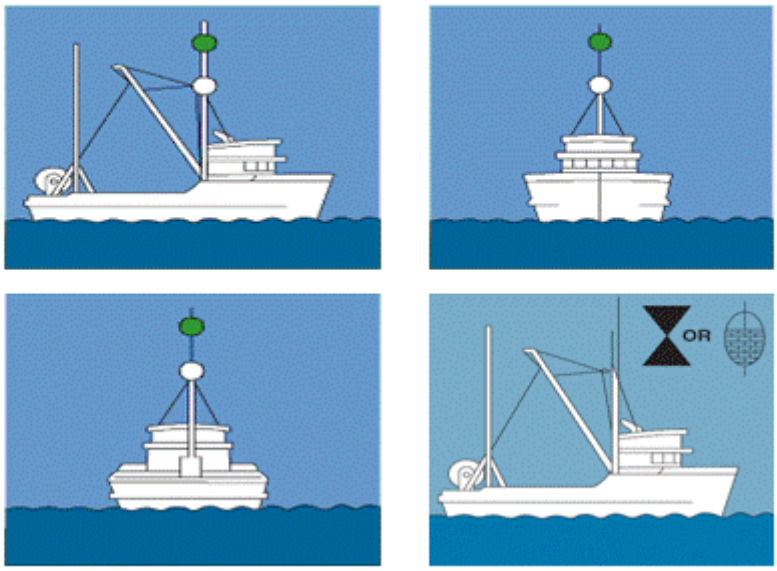
-vessel at anchor at night



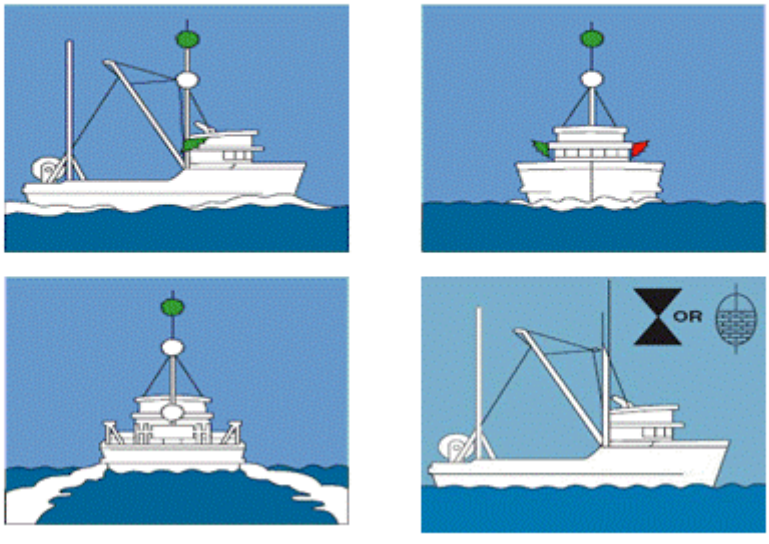
-day signal



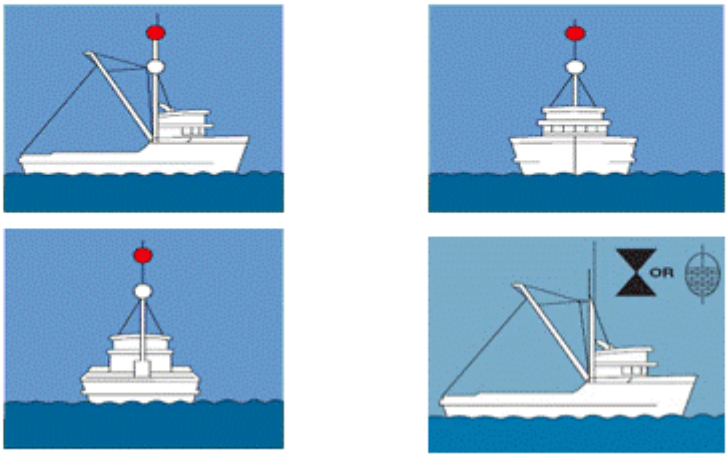
- Vessel engaged in trawling, underway, but not making way through water.



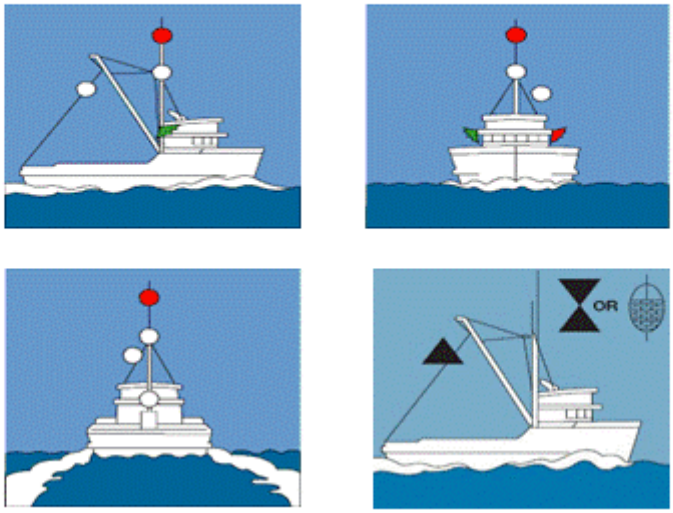
- Vessel engaged in trawling, underway and making way through water



- Vessel engaged in fishing other than trawling, underway, but not making way through water, with gear extending no more than 150 metre horizontally.



- Fishing gear extending more than 150 metres horizontally



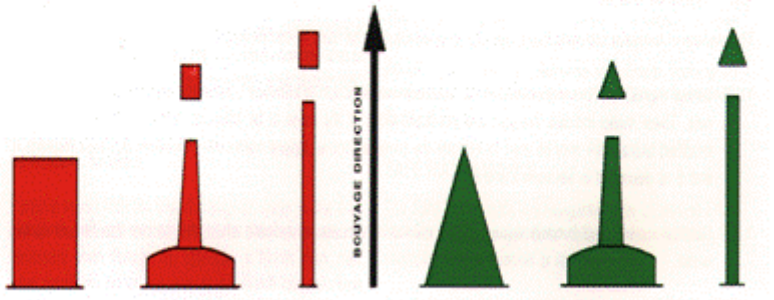
9. Buoyage

- Buoyage is to draw the navigator's attention to the edges of the channel and to the dangers
- IALA divides the world into two regions, A and B

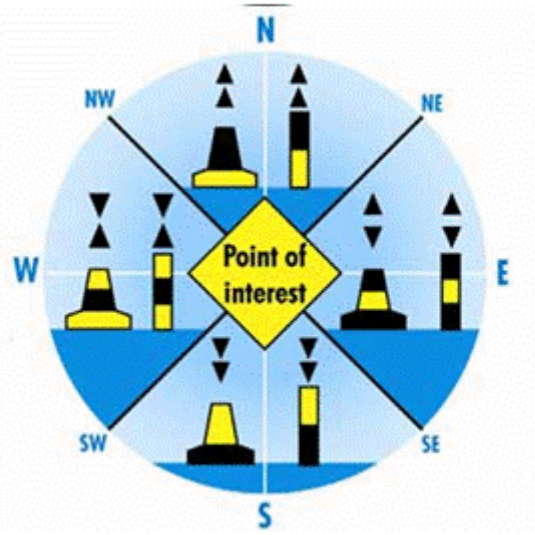
- Types of marks for regional A
  - -the lateral marks
  - -cardinal marks

- The lateral marks

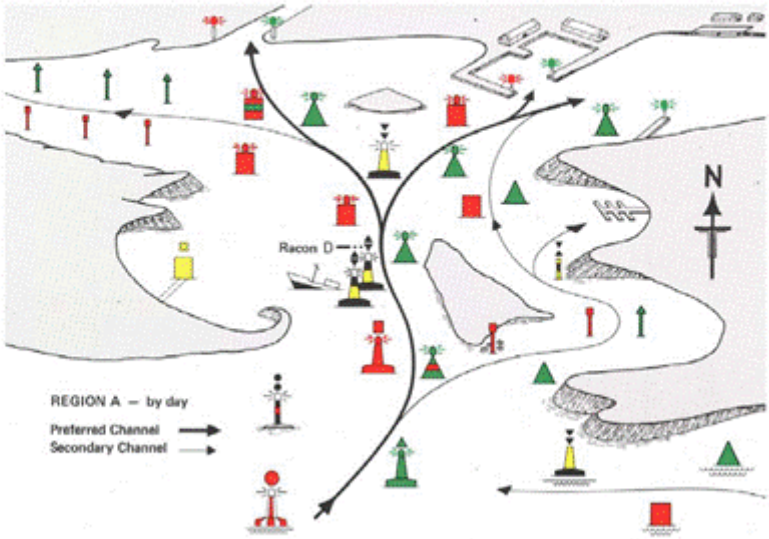
-port side marks -starboard side marks



- Cardinal marks

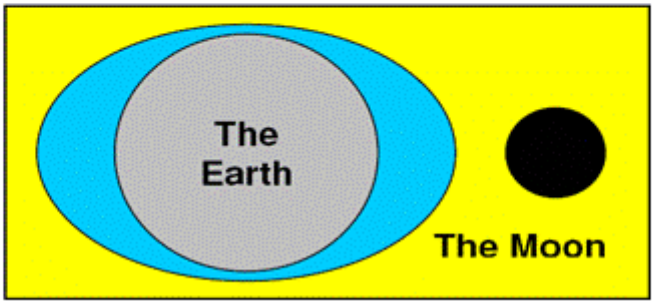


- Example of buoyage (Region A)



10. Tides

- The moon turns around the earth and it generates movement of the water and is mainly responsible for the tides



11. Meteorology

- Weather forecasts

  -consulting the official meteorological services;

  -consulting the media ;

  -listening to coastal radio stations;

  -consulting the port's weather warning system.

- Warning condition

  -small craft (winds 20-33 knts, wave heights 2-3 m)

  -gale warnings (winds 34-47 knts, wave heights 6-9 m)

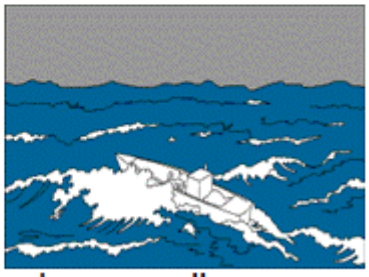
  -storm warnings (winds 48-63 knts, wave heights 9-16m)

  -hurricane warnings (winds over 64 knots, wave heights over 16 m).

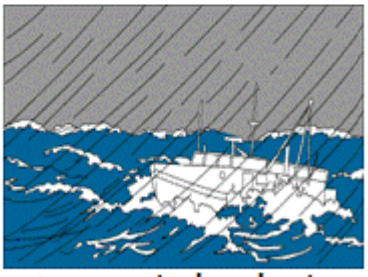
12. Boat stability

- Accidents, sinking, capsizing caused by stability to result in the loss of human lives at sea
- Reduce the risk of accidents, keep the rules in mind

-be aware of wind, waves and water depth, check weather forecasts before departure

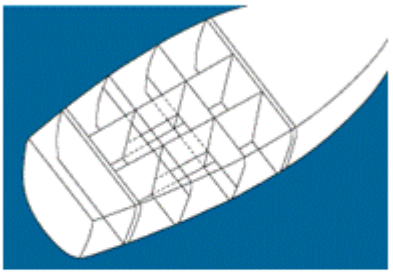


heavy swell



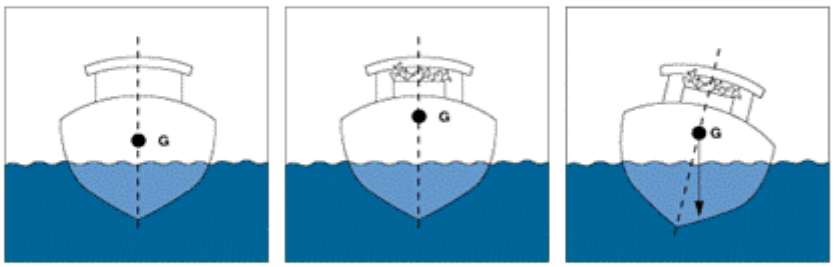
strong wind and rain

-don't overload your boat -compartmentalization of hold



-when there is a risk of stability loss, reduce the vessel's movements and avoid high-speed turns

- Position of the centre of gravity depending on load



13. Search and Rescue

-assistance to persons in danger is a legal requirement

-mayday, mayday, mayday on channel 16

-use equipment on boat

14. Emergency Situation

- Out of fuel

EMERGENCY SITUATION

OUT OF FUEL

• Take adequate fuel to sea • Take more than required for intended distance to travel	Prevention
• Radio for assistance • Use alternate propulsion source (e.g. sails, oars)	Actions

- Lost sight of land

EMERGENCY SITUATION

LOST SIGHT OF LAND

• Have navigation skills	Prevention
• Head towards direction last saw land	Actions

- Vessel swamped

EMERGENCY SITUATION

VESSEL SWAMPED

Prevention

- Don't overload
- Beware of bad weather

Actions

- Discard extra cargo or fish
- Bail or pump water out

- Vessel instability

EMERGENCY SITUATION

VESSEL INSTABILITY

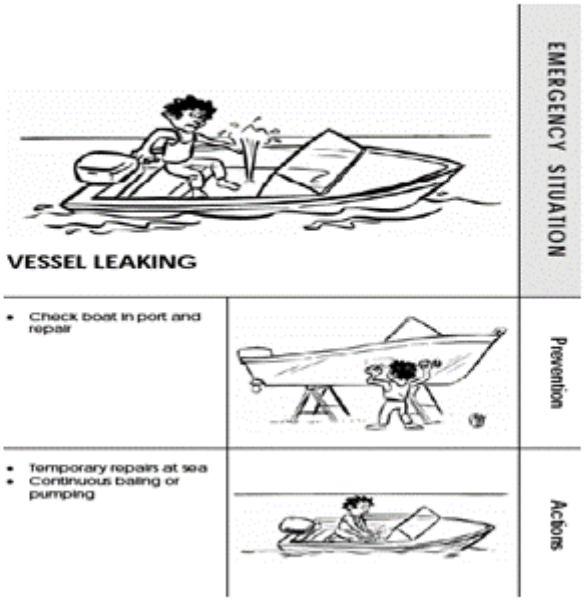
Prevention

- Load boat correctly
- Keep weight low in the boat

Actions

- Re arrange weight
- Clear scuppers

- Vessel leaking



- Vessel overloaded

- Vessel failure

EMERGENCY SITUATION	
 ENGINE FAILURE	
Prevention	• Service engine regularly • Have spares and tools 
Actions	• Attempt to repair • Radio for assistance • Use alternate propulsion 

- Sudden change of weather

EMERGENCY SITUATION	
 SUDDEN CHANGE OF WEATHER	
Prevention	• Check weather forecast before going to sea 
Actions	• Head for port • Heave to 

- Grounding on a reef

GROUNDING ON A REEF

EMERGENCY SITUATION

• Keep a good lookout • Know the area		Prevention
• Attempt to get off • Radio for assistance		Actions

- Collision with another vessel

COLLISION WITH ANOTHER VESSEL

EMERGENCY SITUATION

• Keep a good lookout		Prevention
• Repair damage • Assist each other		Actions

- Loss of steering at sea

EMERGENCY SITUATION

LOSS OF STEERING AT SEA

• Check steering gear regularly		Prevention
• Rig a jury rudder system		Actions

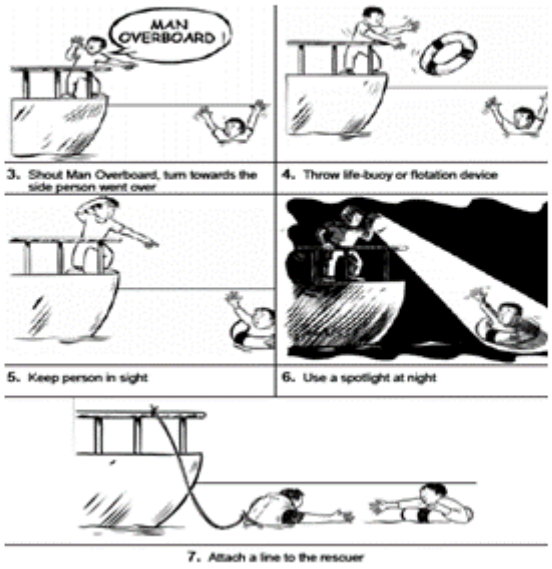
- Loss of propeller at sea

EMERGENCY SITUATION

LOSS OF PROPELLER AT SEA

• Check propeller regularly		Prevention
• Radio for assistance • Use alternate propulsion		Actions

- Man overboard



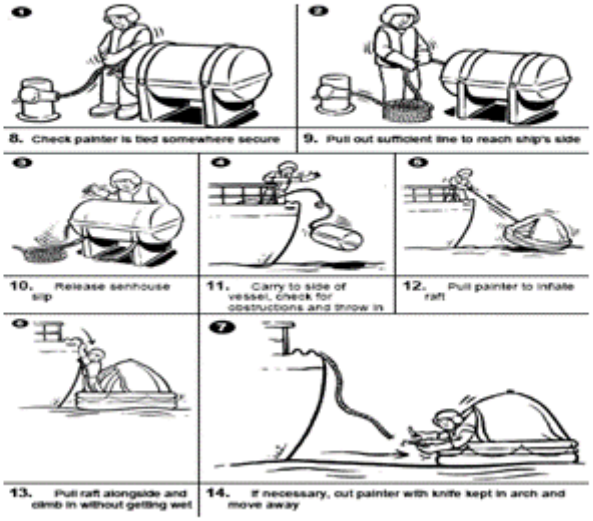
15. Essential Safety Equipment

- Life saving aids

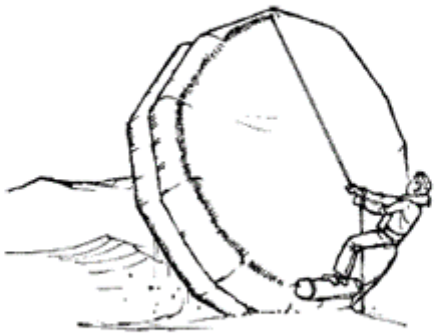
Life jackets

16. Survival at Sea

- Life raft equipment



- Righting a life raft

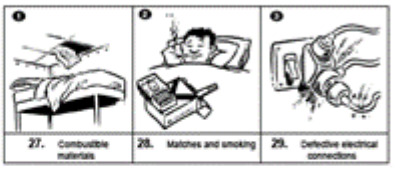


- After launching

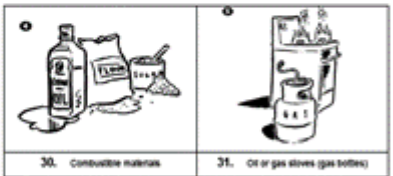
17. Fire prevention and control

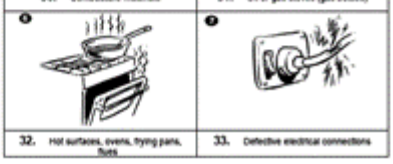
- Causes of fires

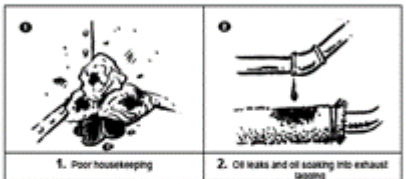
Fire in the engine room

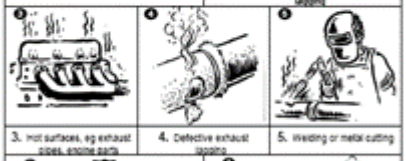


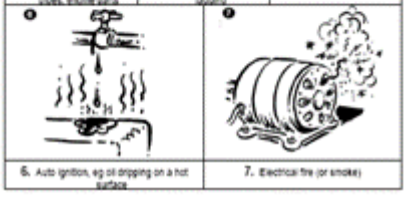
2. Fire hazards in the galley





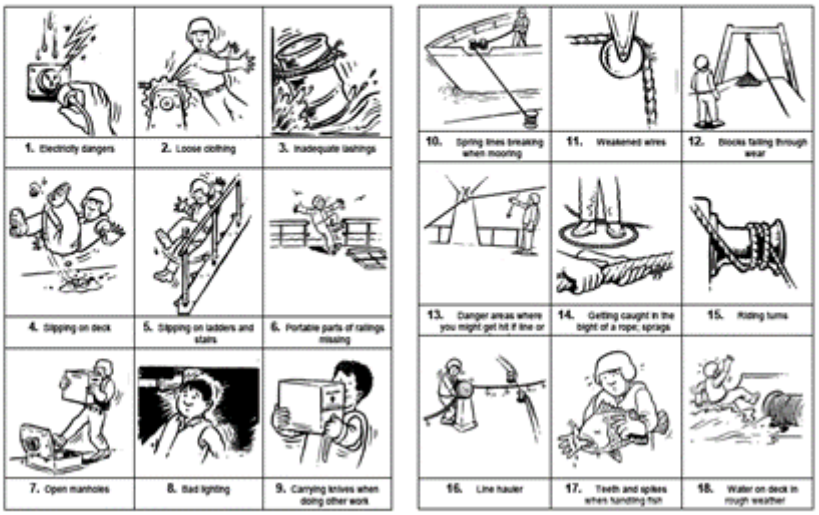




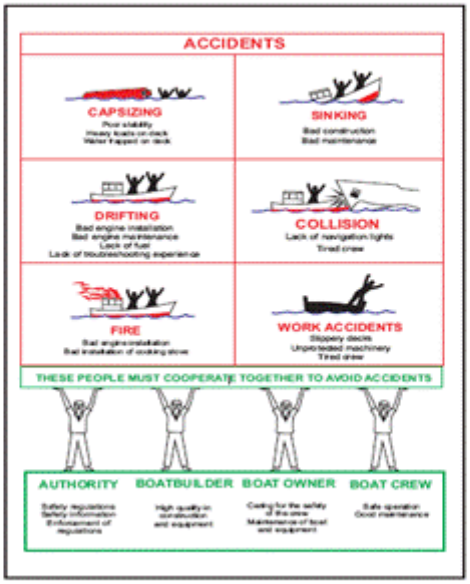


18. General deck safety

- Dangers



- Accidents

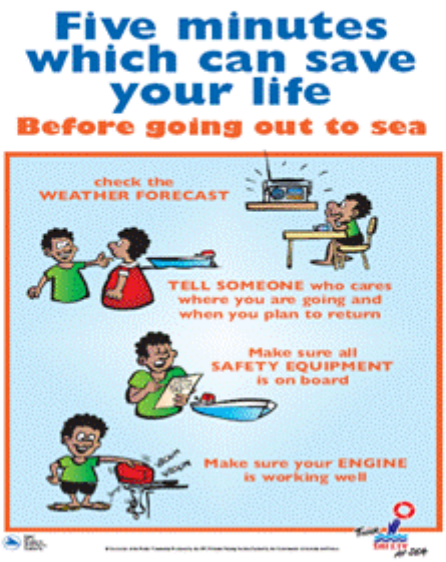


19. Safety checklist

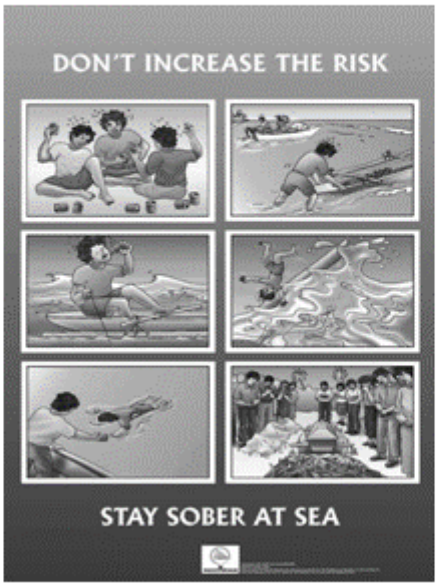
- For small boat

20. Five minutes checking

- Before going out to sea



Do not increase the risk !!!



THANK YOU FOR YOUR ATTENTION!

Appendix 6 – Marine Ecology

Training Course on
Marine Biology, Marine Ecology, Safety at Sea and MCS

Presentation

on

Conservation of Marine Ecosystem

By Mr. Ouk Vibol
Acting Director of Department of Fisheries Conservation

Contents

Introduction

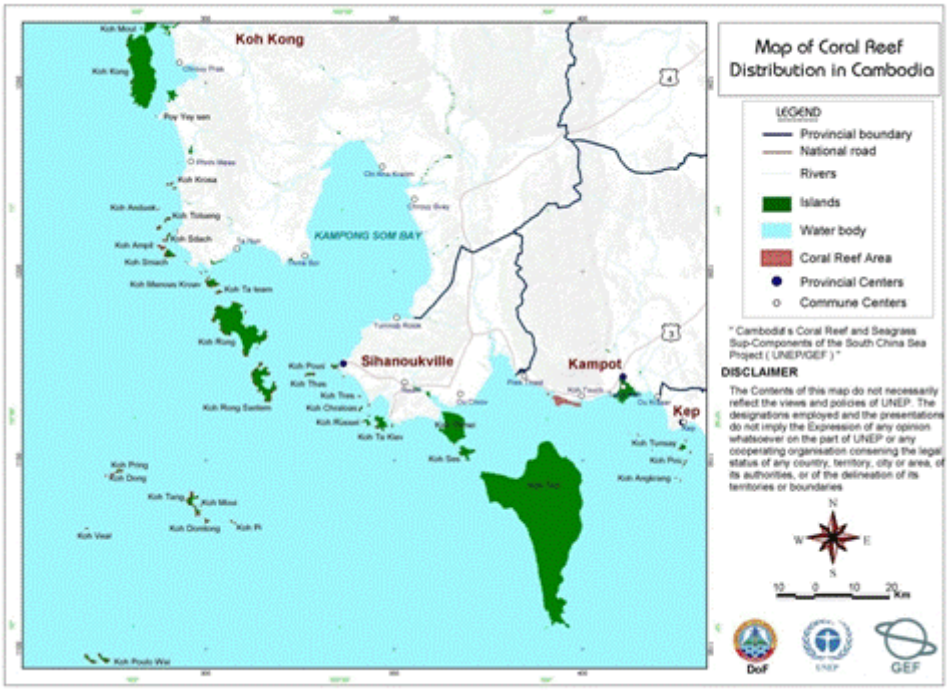
- Coastal Merine Ecosystem

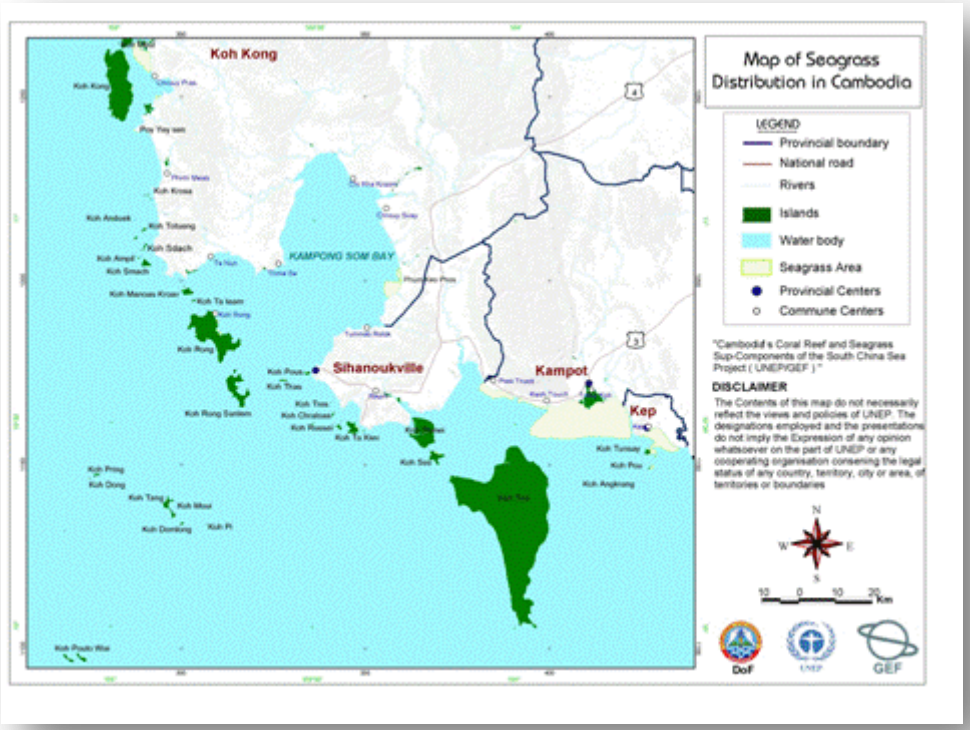
Province	Coral Reef	Seagrass	Mangrove
Koh Kong	602	3993	
Preahsihanouk	1,198	164	13,500
Kampot	953	25,000	
Kep	52	2,790	1005
Total	2800	30,000	72,350

- Ecological Value

Habita	Value (USD/ha/year)
Coral reef	1,542
Seagrass	1,181
Mangrove	2,872
Wetland	294

- Based on Economic Analysis, seagras in Kampot provides fish catch in value of 1,000 USD/ha/year, excluded collection of seaweed and invertebrate
- There are many high econimic and endangered species living in the seagrass area
- Based on report of Seargrass in the South China Sea showed that seagrass meadow in China provided 16,640-18,385usd/ha/year
- Seagrass in Vietnam provided 23,000 USD/6months
- Prof. Nguyen Van Tien reprted that Ameria spent 630,000 USD to replant 1 ha of seagrass




Map of Seagrass Distribution in Cambodia
LEGEND
Provincial boundary
National road
Rivers
Islands
Water body
Seagrass Area
Provincial Centers
Commune Centers
"Cambodia's Coral Reef and Seagrass Sup-Components of the South China Sea Project (UNEP/GEF)"
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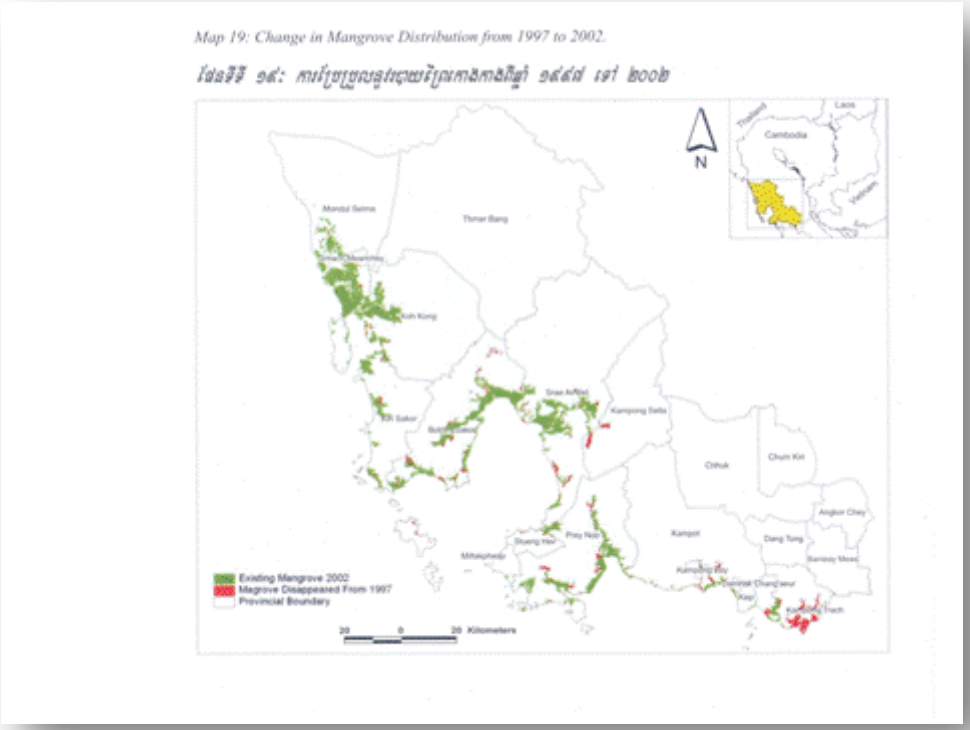
Koh Kong
KAMPONG SOM BAY
Sihanoukville
Kampot
Kep
Koh Rong
Koh Rong Samlem
Koh Tang
Koh Poulo Wai
N
W
E
S
10 0 10 20 Km
DoF
UNEP
GEF

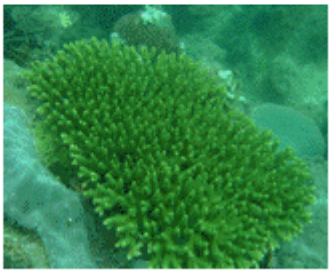

Map 19: Change in Mangrove Distribution from 1997 to 2002.
Existing Mangrove 2002
Magrove Disappeared From 1997
Provincial Boundary
20 0 20 Kilometers
N
Cambodia
Koh Kong
Kampong Seila
Chhuk
Kampot
Angkor Chey
Dang Tong
Banteay Meas
Chum Kiri
Prey Nob
Mittakpheap

Coastal Ecosystem

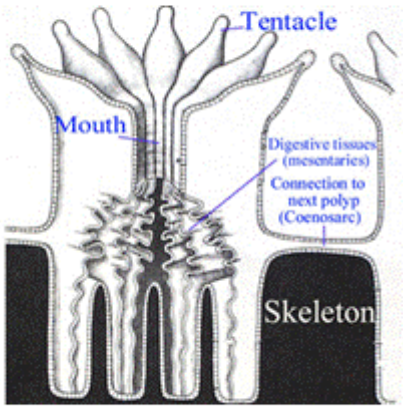
Biology of Coral Reef

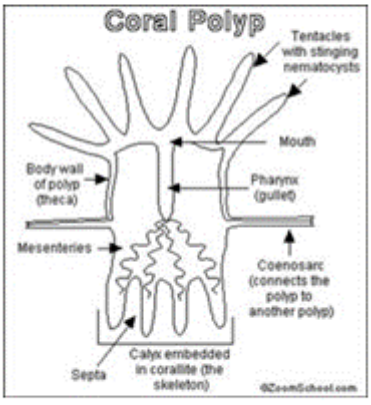
- Corals are a remarkable group of animals that inhabit tropical marine waters around the world
- They form vast colonies known as coral reefs
- Coral reefs are in fact made up of many tiny animals known as coral polyps
- Each coral polyp is an individual animal and the individual polyps coexist as part of a larger colony of polyps.

- There are two types of coral, hard coral and soft coral
- Hard corals (like brain coral and elkhorn coral) have hard, limestone skeletons which form the basis of coral reefs
- Soft corals (like sea fingers and sea whips) do not build reefs.
- Reefs grow best in warm, shallow, clear, sunny and agitated waters.
- Grows about 1-1cm per year.
- Generally, sift coral grow faster than hard coral



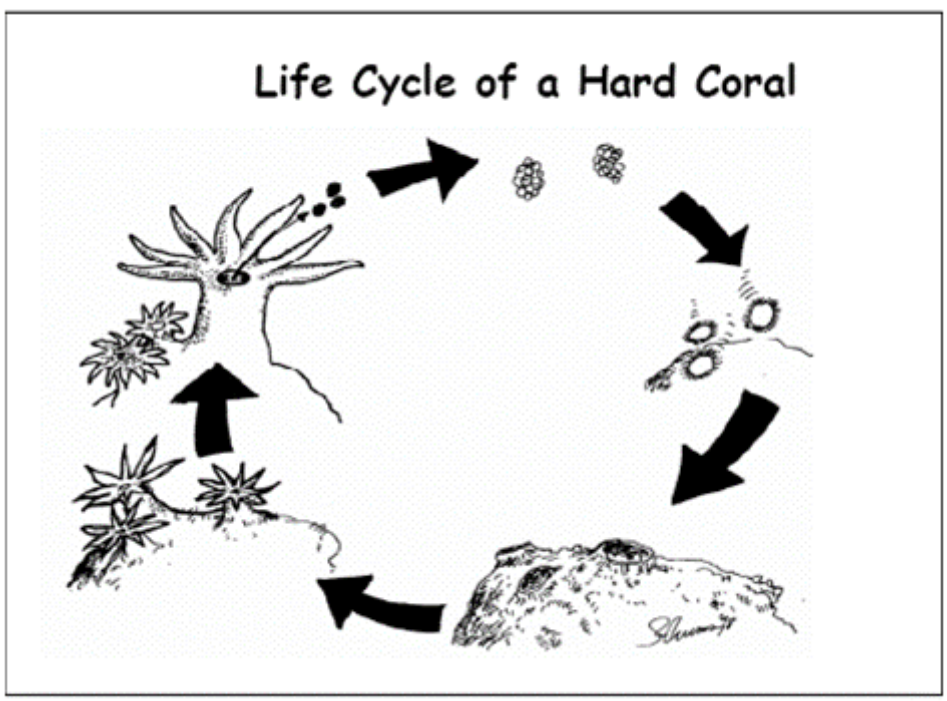
Transect of Hard Coral Reef





Environmental Condition

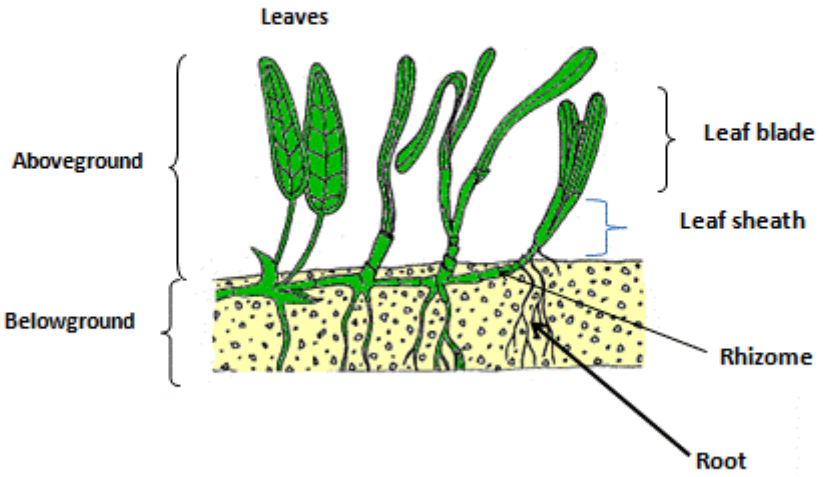
- Water temperature 25-31C°
- Salinity: 34-37₀%
- Area with absence of mud
- Clean water with light
- Absence of toxicity



What is seagrass and where they grows?

- Seagrass is like grass, but grows in the water, with flower, root, rhizome
- Grows in rich nutrient area, low level of acid and submerges in the water
- Seagrass adopted in shallow water depth of tropical and sub-tropical region.

How can we identify seagrass



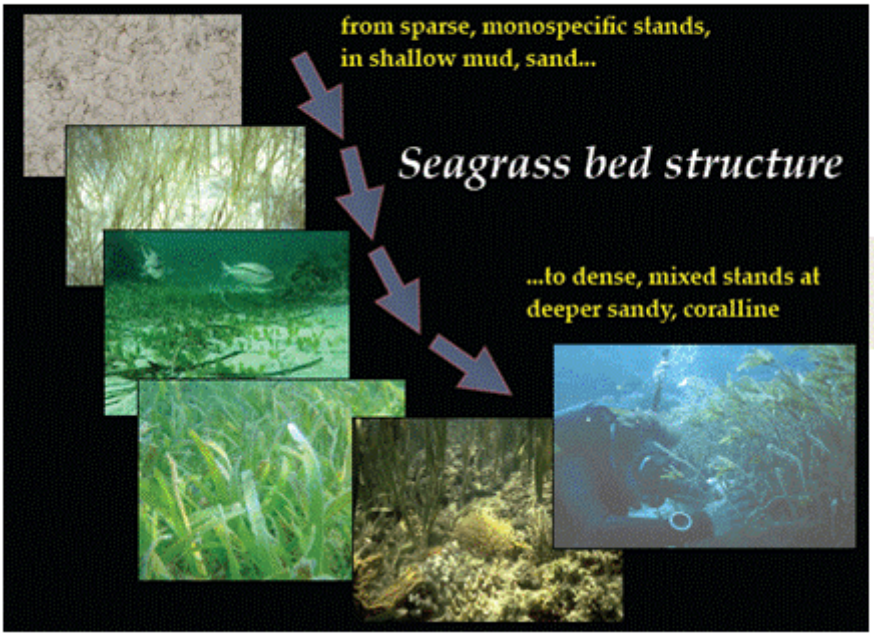
What type of environmental condition required by seagrass to grow

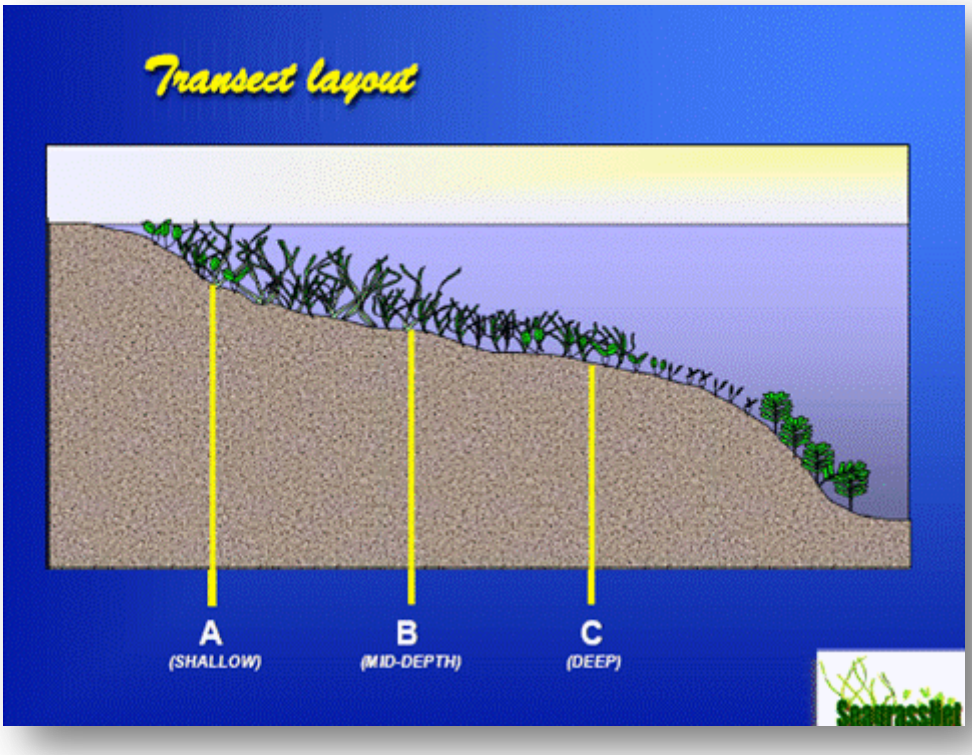
- Salinity: 10-45 ₀%
- Bottom substrate: sandy silt
- Water depth: 0.5-10 Meter
- Strong light penetration (11% of light penetration)

Water quality in the seagrass meadow in Kampot

Water quality	Maximum level	Minimum level
Oxygen (mg/L)	9.6	6.3
pH	8.3	7.7
Temperature (degrees Celsius)	33.8	30.1
Salinity (ppt)	27.5	21.3
Depth (m)	6.5	0.35
Transpanecy (m)	3.2	0.35
Light penetration	4.857143	0.53125
NH_4^+ (mg/l)	0.4	0
$NH3^+$ (mg/l)	0	0
NO_2 (mg/l)	<0.05	<0.05

Structure of Seagrass





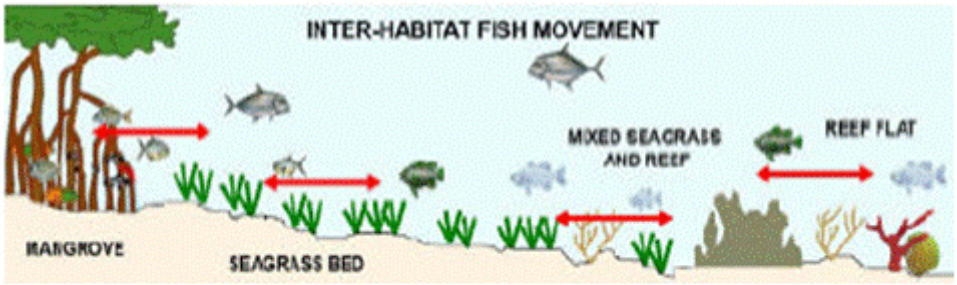
Seagrass Species by water depth in Kampot Province

Water depth	0.1-0.5	0.5-1	1-1.5	1.5-2	2-2.5	2.5-3	3-3.5	3.5-4	4-4.5	5-5.5	5-6	6-7	>7
1. *Halodule Uninervis*	x	x	x	x	x	x	x	x	x	x	x	x	
2. *Cymodocea Rotundata*		x	x	x	x	x	x	x	x	x			
3. *Halophila decipiens*			x	x	x	x	x		x	x	x	x	
4. *Syringodium isoetifolium*		x	x	x	x	x	x	x	x	x	x	x	
5. *Enhalus Acoroides*	x	x	x	x	x	x	x						
6. *Thalassia hemprichii*					x	x							
7. *Halophila ovalis*	x		x		x	x	x	x					
8. *Cymodocea Serrulata*				x	x	x							
9. *Halodule Pinifolia*				x									
10 *Halophila minor*					x	x							
	3	4	6	7	9	9	7	5	4	4	3	3	0

Mangrove

- Mangrove forest is a type of tree that grow along coastal and stream or canals connected to the sea
- This tree can adapt to salt water and tidal condition
- Generally, there are many species of mangrove in coastal area of Cambodia

Habitat Interaction



Establishment and Management of Marine Management Area

1. **Type of Marine Management Area**
   - Mangrove Forest Area, Inshore Fishing Area, Offshore Area, Seagrass Area, Coral Reef Area,
   - Marine Management Areas comprising inter alia, islands, seagrass areas, coral reef area, and mangrove forests which are important for fisheries resources sustainability shall be classified as Fisheries Resources Protected and Conservation Areas
   - The creation or nullification of a fishery management area shall be defined by the proclamation of the Minister of Agriculture, Forestry and Fisheries.

2. Criteria for Establishment of Marine Management Area

- Criteria:
  - Importance of biodiversity and fisheries resources and role of ecosystem
  - Economy, socio-economy and culture
  - Type and Size
  - Level of threats

3. Step of Marine Management Area Establishment

Steps to be followed:

1. Primarily identification of potential area for management, conservation and development of resources
2. Research study and analysis of scientific data on fisheries resources, habitats, ecosystem, economics, socio-economics, culture and threats
3. Produce map with location, boundaries, size and GPS points
4. Conduct consultation meeting with relevant institution, local authorities, fisheries community and other stakeholders.

4. Management of marine management area

- Management planning prepared through Casual Chain Analysis:
  - Cause
  - Root cause
  - Effect
  - Ecological problem
  - Impacts
  - Intervention

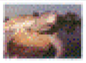
  (With attachment of exmaple)

5. Monitoring and Evaluation

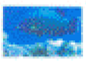
Management Indicators	Ecological/Environmental Indicators	Socio-Economic Indicators
MANAGEMENT CAPACITY • Formal Management framework • Trained Man-power (No./levels) • Facilities and equipment • Sustainable Financing	• Condition and healthy of ecology • Abundance of Marine bivalves • Abundance of animal that habitat dependent	FISHERIES • Catch per unit effort • Total landing • Income
		TOURISM • Number of visitors • Number of tourism operators • Income
MANAGEMENT APPROACH • Sectoral • Integrated • Community-based • Multiple-use		FORESTRY • Volume of timber • Weight of charcoal product • Income
MANAGEMENT TOOLS • Licensing and permits • Seasonal closure • Zoning		ACTIVITIES OTHER THAN FISHERIES, TOURISM AND FORESTRY • Numbers of people involved • *Per capita* income
		OVERALL LIVING STANDARD • Level of education • Health of the community

Protection of Endangered Fisheries Resources

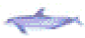
- Species Identification
  - Endangered species: 58 species (Sub-Decree No. 123 dated 12 August 2009
  - 29 marine and 29 inland water species
  - 3 group divided
    - Critical endangered species
    - Endangered species
    - Vulnerable species

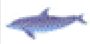
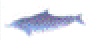
[illegible]		[illegible]	*Heosemys grandis*	Asian giant terrapin	II	- [illegible]
[illegible]		[illegible]	*Amyda cartilaginea*	Asiatic soft - shell turtle	II	- [illegible]
[illegible]		[illegible]	*Pelochelys cantorii*	Asian giant soft-shell turtle	II	- [illegible]
[illegible]						
[illegible]		[illegible]	*Crocodylus porosus*	Estuarine crocodile	I	- [illegible]

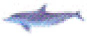
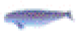
-[illegible]-

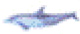
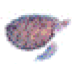
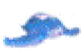
						[illegible]
[illegible]		[illegible]	*Dugong dugon*	Dugong	I	- [illegible]
[illegible]						
[illegible]		[illegible]	*Cheilinus undulates*	Humphead Wrasse	II	- [illegible]

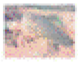
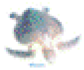
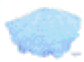
-[illegible]-

[illegible]		[illegible]	*Pseudorca crassidens*	False killer whale	II	[illegible]
[illegible]		[illegible]	*Globicephala macrorhynchus*	Short-finned pilot whale	II	[illegible]
[illegible]		[illegible]	*Tursiops aduncus*	Indo-Pacific bottlenose dolphin	[illegible]	[illegible]

[illegible]		[illegible]	*Orcaella brevirostris*	Irrawaddy dolphin	I	[illegible]
[illegible]		[illegible]	*Tursiops truncatus*	Common bottlenose dolphin	II	[illegible]
[illegible]		[illegible]	*Sousa chinensis*	Indo-Pacific hump-backed dolphin	[illegible]	[illegible]

៥៩		[illegible]	*Stenella longirostris roseiventris*	Dwarf spinner dolphin	II	[illegible]
៦០		[illegible]	*Stenella attenuata*	Pantropical spotted dolphin	II	[illegible]
៦១		[illegible]	*Neophocaena phocaenoides*	Finless porpoise	I	[illegible]

៦២		[illegible]	*Delphinus capensis tropicalis*	Long-beaked common dolphin	I	[illegible]
៦៣		[illegible]	*Chelonia mydas*	Green turtle	I	[illegible]
៦៤		[illegible]	*Eretmochelys imbricata*	Hawksbill turtle	I	[illegible]
៦៥		[illegible]	*Dermochelys coriacea*	Leatherback turtle	I	[illegible]

[illegible]		[illegible]	*Caretta caretta*	Loggerhead turtle	I	[illegible]
[illegible]		[illegible]	*Lepidochelys olivacea*	Olive ridley turtle	I	[illegible]
[illegible]		[illegible]	*Tridacna squamosa*	Fluted giant clam	[illegible]	[illegible]

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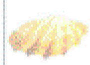
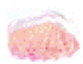
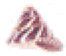
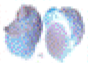
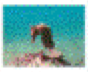
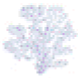
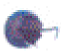
[illegible]		[illegible]	*Tridacna maxima*	Elongate giant clam	II	[illegible]
[illegible]		[illegible]	*Tridacna crocea*	Crocus giant clam	II	[illegible]
[illegible]		[illegible]	*Tridacna gigas*	Giant clam	[illegible]	[illegible]

-[illegible]-

[illegible]		[illegible]	*Trochus niloticus*	Commercial top		[illegible]
[illegible]		[illegible]	*Turbo marmoratus*	Green turbo or green snail		[illegible]
[illegible]		[illegible]	*Hippocampus spp.*	Sea horse	ន	[illegible]
[illegible]		[illegible]	*Anthozoa spp.*	Corals and sea anemones		[illegible]

[illegible]

[illegible]		[illegible]	*Tachypleus gigas*	Triangular-tail horseshoe crab		[illegible]
[illegible]		[illegible]	*Carcinoscorpius rotundicauda*	Mangrove horseshoe crab		[illegible]
[illegible]		[illegible]	*Rhincodon typus*	Whale shark	[illegible]	[illegible]

[illegible]

[illegible]

- Planning -
What should be done for ecosystem conservation in the future

Protection Measure for Endangered Fishery Resources

(Proclamation No. 571 dated 06 September 2010)

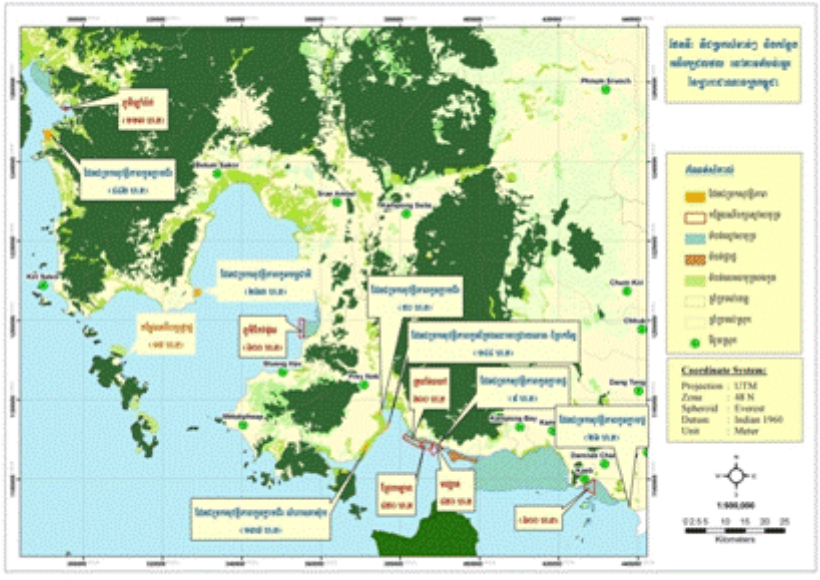
- Research study on species, distribution and situation of endangered fishery species and its habitat for effective protection, conservation and rehabilitation
- Identify, manage, protect and conserve the natural habitats and rehabilitate these species available in the wild
- Create refuge centers for the purpose of rescuer, care and scientific study research the endangered fishery species
- Widely disseminate and with all medias on endangered fishery species to encourage participation of local people in protection and conservation of these species

- Transporting, processing, buying, selling, and stocking endangered fishery resources form natural water body are prohibited, unless with official permission from FiA for research purpose only
- All farms for grow-out or breeding of endangered fishery resources for trade must follow condition as below:
  - Farm construction shall be permitted by central of Fisheries Administration, based on scientific data
  - Farm and endangered fisheries species must be registered at the Fisheries Administration
  - Farm operation must be under strictly controlled by the Fisheries Administration
  - Transporting, processing and stocking of endangered fishery species from registered farm for local trade shall be permitted by the Director of Fisheries Administration and for international trade shall be permitted by the Minister of Agriculture, Forestry and Fisheries with the request of the Director of Fisheries Administration.

- In case of catching the endangered fishery resources accidentally the fishermen must release them urgently back into the natural water body with no conditions and shall not make harm or kill those species and report to fishery official or follow the recommendation provided by the fishery official. In case of seeing corpse or fossil, shall inform or provide to the fishery official.

- Person who commits harm to endangered fishery resources, shall be penalized under the Article 98 of Low on Fisheries

Goal 3: The fisheries domain and associated resources are in a healthy and resilient condition and sustainably managed			
Indicators	**Baseline**	**By the end of 2015 (6 years)**	**By the end of 2019 (10 years)**
The number of endangered aquatic species in Cambodia	2009: 58 species listed as endangered in sub-decree	The number of endangered aquatic species reduced to 52	The number of endangered aquatic species reduced to 46
The mapping, demarcation and protection of flooded forest	2009: 2,157Ha inland and 307Ha coastal demarcated	At least 10% of the area of inland flooded forest and at least 25% of the area of coastal flooded forest protected through physical demarcation	At least 35% of the area of inland flooded forest and at least 75% of the area of coastal flooded forest protected through physical demarcation
The area of critical fisheries habitats under sustainable management	2009: Seagrass: 2,500Ha, coral: nil mangrove: 200Ha,	At least 5,000ha of seagrass and 500ha of coral reef are under an appropriate form of sustainable management and 700ha of flooded forest and mangrove are replanted	At least 7,000ha of seagrass and 840ha of coral reef are under an appropriate form of sustainable management and 1000ha of flooded forest and mangrove are replanted

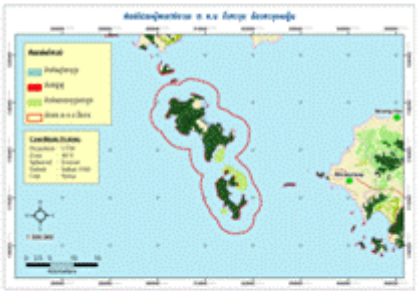


Planning for Kampot and Kep Province

- Strengthen management of seagrass conservation in Chan Haon, Trapiang Ropov and Prek Tnaot
- Establishment of new seagrass conservation in Koh Tonsay, Kep province
- Protection of Dugon, Dolphin, sea turtle and seahorse
- Rehabilitation of mangrove forest area

Planning for Preahsihanouk Province

- Continue establishing and managing Mangrove Management Area
- Establishment and management of Marine Management Area in Koh Rong Group of Island
- Research and conserve sea turtle, seahorse, Dolphin
- Public awareness



Planning for Koh Kong Province

- Continue strengthening management of seagrass conservation in Chroy Pras
- Establishment and management of Marine Fisheries Management Area in Koh Sdach Group if Island
- Research and protect Sea turtle, Seahorse and dolphin
- Conduct public awareness meeting

Thank you

Appendix 7 – MCC History and Activities

ការអភិរក្សសមុទ្រនៅកម្ពុជា
marine conservation
CAMBODIA

- Marine Conservation Cambodia was founded in early 2008 to protect and conserve the marine environments around the Islands of Koh Rong Samloem and Koh Rong and the livelihoods of the island communities that rely on these resources.
- We assist the community of Koh Rong Samloem with the management and the sustainable use of their marine resources, alternative livelihoods and community pride.
- We provide opportunities for alternative forms of income through true eco-tourism allowing time for the community to become involved in conservation.

Marine Resource Management on Koh Rong Samloem

Initial Problems

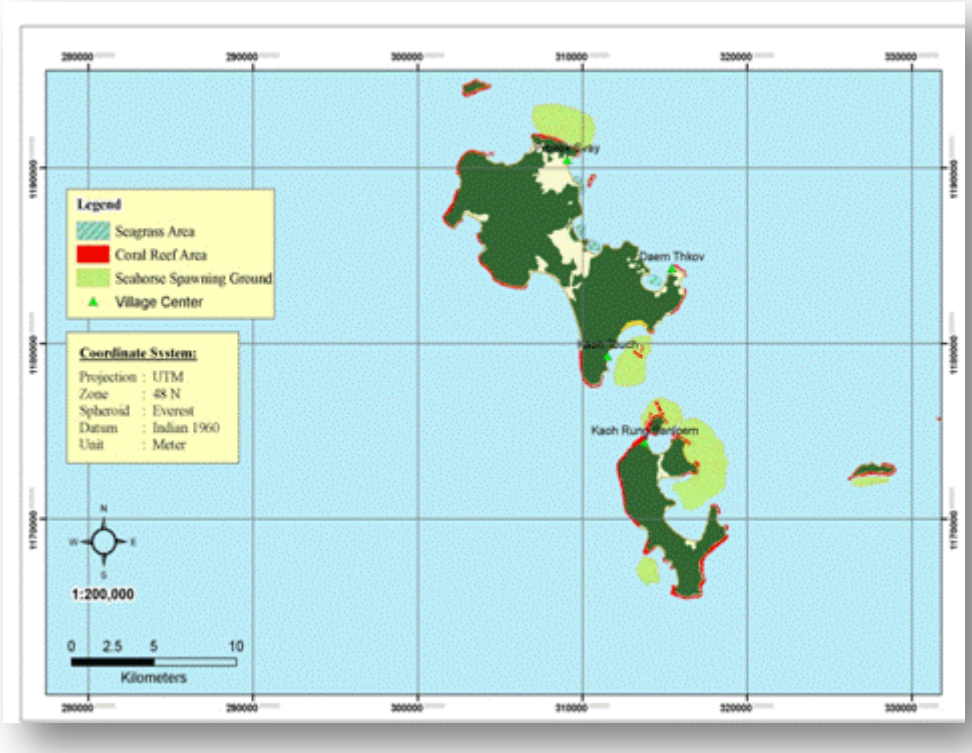
- If you are struggling to support your family and feed your children then conservation is not a high priority.
- If there are few resources and many that need them, management of those resources can be complicated and take time.
- Conservation could not work without full support and assistance from the community.
- Lack of resources and financial support.

What needed to be done first and still continues

- Developing relationships with other organizations that can assist.
- Providing alternative ways of generating income.
- Reduce poverty
- Creating education programs.
- Marine Research

What needed to be done next and still continues

- Involvement of National and Provincial level government and relevant authorities.
- Creation of community fisheries area
- Establish Conservation areas within the community area
- Development of community fisheries management
- Management of true eco-tourism
- Mapping of marine resources


Legend
Seagrass Area
Coral Reef Area
Seahorse Spawning Ground
Village Center
Coordinate System:
Projection : UTM
Zone : 48 N
Spheroid : Everest
Datum : Indian 1960
Unit : Meter
1:200,000
0 2.5 5 10
Kilometers
Daem Thkov

Community Marine Resource Management

- Protection from the main threats to the islands marine resources by means of community patrols and education.
- Guidelines for the sustainable use of the community fishing area.

Main Threats

- Illegal & Destructive fishing
- Over fishing
- Coastal development
- Sedimentation
- Waste dumping

Current projects

- Continued Marine resources research
- Continued Marine resource mapping
- Continued community education
- Continued sustainable resource management
- Continued training of community patrols
- Continued integration of eco-tourism
- Creation of new conservation areas
- Assisting the FIA in the creation of Governmental MPA's

Koh Rong Samloem community has proved that once empowered, supported and trained in the implementation of conservation and management of Marine Resources.
A community can increase their own standard of living whilst protecting the environment.

Given time to develop proper management plans on sustainable use, and utilisation of the marine resources Koh Rong Samloem will soon become a working model, that can be used to help other coastal communities

With the Support of the FIA and an ability to generate income from eco-tourism the community on Koh Rong Samloem has been able to see the benefits of conservation and true eco-tourism.

Other Achievements along the way

• Cataloging of over 100 marine species previously unregistered in Cambodia to be added to the Cambodian marine species database of worldfish/fishbase.

• Assisted the FIA in creation of a 4km buffer zone to protect against sand mining around the islands of Koh Rong and Koh Rong Samloem.

• 1 new species of marine invertebrate identified in Cambodia

• 1 new species of seahorse registered with project seahorse for Cambodia

• Slowed the decline of the seahorse populations around Koh Rong Samloem

Problems Faced and Problems that Continue

• Lack of communication between relevant agencies and partners

• Lack of infrastructure and resources to tackle current threats

• Lack of participation from foreign businesses that use the marine resources

• Increased green washing

• Lack of funding

• Poverty

Appendix 8 – Marine biology, Cambodian Commercial Species and endangered species

Cambodian marine resources

Value of Cambodian marine domain - an overview

- Marine coastline: 435km
- Exclusive Economic Zone: 55,600km²
- Average depth: 50m

- 525 species of marine finfish
- 20 species of marine crabs
- 42 species of marine gastropods
- 24 species of marine bivalves
- 11 species of marine mammals

- Cambodian fisheries developed in freshwater first, and now is developing in marine systems

- In 2006: Inland fisheries yield: 400,000 tones of fish
  Marine fisheries yield: 60,000 tones of fish

- Conservation value

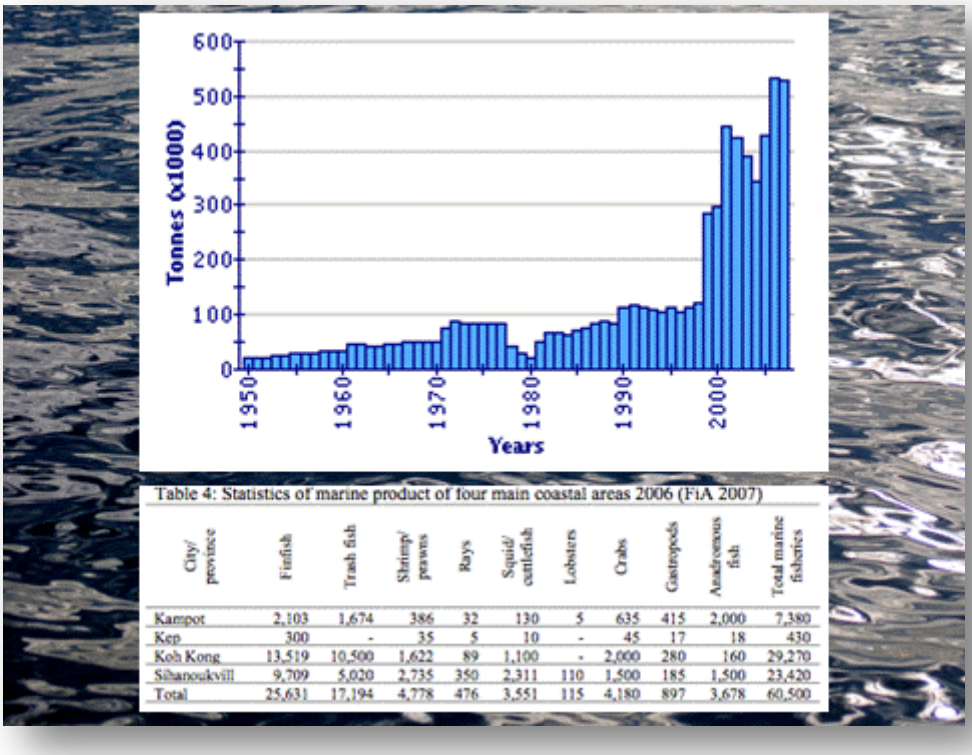


Table 4: Statistics of marine product of four main coastal areas 2006 (FiA 2007)

City/ province	Finfish	Trash fish	Shrimp/ prawns	Rays	Squid/ cuttlefish	Lobsters	Crabs	Gastropods	Anadromous fish	Total marine fisheries
Kampot	2,103	1,674	386	32	130	5	635	415	2,000	7,380
Kep	300	-	35	5	10	-	45	17	18	430
Koh Kong	13,519	10,500	1,622	89	1,100	-	2,000	280	160	29,270
Sihanoukvill	9,709	5,020	2,735	350	2,311	110	1,500	185	1,500	23,420
Total	25,631	17,194	4,778	476	3,551	115	4,180	897	3,678	60,500

Value of Cambodian marine domain - an overview

Problems	Solutions
• Poor management of marine fisheries	• Improve laws and management (quotas, size limit, etc.) of fisheries
• Habitat destruction and pollution	• Controlled coastal and island development
• By-catch (trash fish processed in Sihanoukville for fish feed since 1993)	• Use sustainable fishing techniques

Blood Cockle

General Information

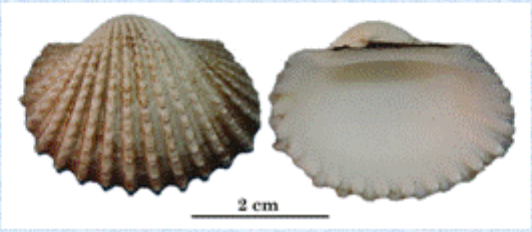
- Bivalve mollusk
- Adult size: 5cm
- Red liquid inside that gave it its English name.

Behavior

- Live buried into sand or mud
- Filter feeder, feeding mainly on organic detritus
- Reproduces from August to February

Habitat

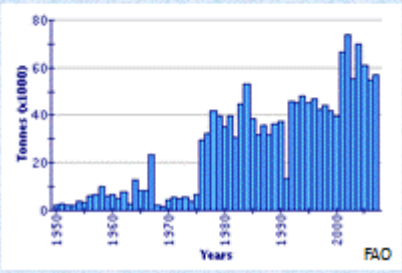
- Intertidal zones



Blood Cockle

Commercial Use

- Fished and consumed in eastern Asian countries (eg. China, Korean Rep., Thailand, Cambodia)
- Coastal fisheries
- Aquaculture



Conservation

- Stock is still healthy
- Size limit
- Care must be taken when culturing blood cockles: is the area selected for aquaculture an habitat for other organisms?

Giant Clam

General Information

- Largest bivalve mollusk on Earth
- Can weigh up more than 200kg for 1.2m
- Long-lived (100 years or more)

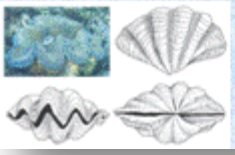
Behavior

- Settle in cavities on rocks or corals
- Filter feeders
- Grow rapidly thanks to symbiotic micro-algae inside their tissue.
- Hermaphrodites (produce eggs and sperm)
- Broadcast spawning

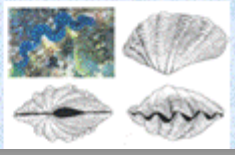
Habitat

- Coral reefs

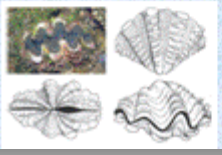
Common



Crocus



Elongate



Flutate

Giant Clams

Commercial Use

- Considered as a delicacy in many countries (eg. Japan, France)
- Shells sold as decorative accouterments (or used as ashtrays!)
- Sold for the aquarium industry
- Adductor muscle sold at high prices in China (aphrodisiac powers…)

Conservation

- Classified as vulnerable by IUCN (International Union for Conservation of Nature)
- Got extinct in many places due to overfishing.
- Numbers decreased worldwide
- Protected by Cambodian Law on Fisheries

Squid

General Information

- Cephalopod mollusk
- around 300 species identified
- 3 hearts, 8 arms (holding), 2 tentacles (capturing)
- fastest invertebrates
- short lifespan, 1-3 years
- usually around 30cm

Behavior

- live in deep waters during day
- migrate to surface at night to hunt fishes, crustaceans and other squids
- Form big schools during mating.
- Use colors to communicate

Habitat

- oceans worldwide
- Live in open ocean and deep sea
- Come in the reef areas at night.
- Juveniles often stay in the shallows and feed on plankton

Squid

Commercial Use

- Widely fished worldwide, including in Cambodia
- Fished mostly using squid jigs (coastal fisheries), but also with nets (industrial fisheries)

Conservation

- Squids are not endangered (yet…)
- Protect their habitat
- Avoid releasing organic trash in the ocean as squids may feed on it and get sick
- Implement quotas

Shrimp

General Informations

- decapods crustaceans
- 2 pairs of claws
- relatively short-lived (1-6 years)
- 1-30cm

Behavior

- Filter feeding
- Swim backwards

Habitat

- Oceans and freshwater streams
- sea floor
- Juveniles often stay in estuaries.

Shrimp

Commercial Use

- Very important commercial species worldwide (3.000.000 tons/year of shrimp consumed by humans)
- Coastal fisheries and industrial fisheries
- Fished using otter trawlers, cast nets, seines, shrimp baiting and dip netting
- Extensive aquaculture as shrimps are fast growing and resistant to pollution.
- 75% of aquaculture production in Asia (mainly China, Thailand and Philippines)

Conservation

- Important source of food for many marine organisms, from fish to whale
- Highest rate of by-catch from shrimp fisheries: in 1997, FAO recorded a world-average of 5.7 pounds of by-catch for 1 pound of shrimp
- Shrimp trawlers are emptying the oceans!

Mantis Shrimp

General Biology

- crustaceans
- maximum size: 30cm
- partial carapace (rear part of the head and 3 first segments
- very powerful claws
- long-lived

Behavior

- Live in burrows in the sediments or rock cavities
- Leave their burrow to hunt, relocate or mate
- Complex behavior, very good eye sight

Habitat

- Mostly found in tropical and sub-tropical shallow waters
- Rocky shallows, intertidal areas and sea beds



Mantis Shrimp

Commercial Use

- Appreciated in many Asian countries like Cambodia.
- Coastal fisheries
- Fished using shrimp gillnets or more traditional techniques like in Japan with painting brushes
- Kept and sold alive.

Conservation

- No data available on catch and population numbers
- Research



Blue Swimmer Crab

General Information

- crustaceans
- males: blue/purple
- females: brown/grey
- Size: 10-20cm
- active swimmers
- omnivorous: feed on bivalves, fishes and macro-algae

Behavior

- Buried in sediments most of the times
- Come out to feed during high tides
- mating:
  - January to March
  - Female attached underneath the male

Habitat

- Larvae and juveniles grow in estuaries.
- Adults live in sandy, muddy, algal or seagrass areas
- Go to deeper areas as they grow older

male

female

Blue Swimmer Crab

Commercial Use

- Important commercial species throughout the Indo-Pacific.
- Coastal fisheries
- Caught in crab pots or trawlers
- Good aquaculture species:
  - fast growth
  - resistant larvae
  - high tolerance to nitrate (NO_3^-) and ammonia (NH_3)
- Cultured in Australia, Japan, and other Asian countries

Conservation

- No current conservation effort in Cambodia
- Conservation efforts are needed:
- No harvesting of pregnant females and juveniles (protected by law in Australia)
- Minimum size

Seahorse

General Information

- fish
- Nearly 50 species described
- Poor swimmers

Behavior

- Stay stationary most of the time, holding on something with their tail
- Eat small shrimps, fish larvae, crustaceans and plankton
- Female deposits eggs in the male brood pouch

Habitat

- Sea grass beds
- mangroves
- coral reefs

Seahorse

Commercial Use

- Captured for medicine (China), aquaria and souvenirs
- captive breeding

Conservation

- Endangered
- Protected by Cambodian Law on Fisheries
- Protect their habitat

Grouper

General Information

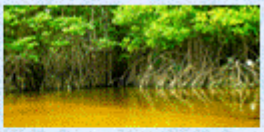
- Carnivorous fish
- Diverse group
- Some species can grow up to 2m and weigh more than 100Kg

Behavior

- ambush predators
- feed on fish, octopus, crab and lobsters
- usually spawn between may and august
- territorial
- hermaphrodites: change from female to male as they grow bigger

Habitat

- Mangroves, seagrass beds (juveniles)
- Coral reefs, rocky shallows (adult)



Blacktip gp. bluelined gp. coral trout baramundi cod honeycomb gp.

Grouper

Commercial Use

- Tasty and appreciated worldwide
- Fished intensively and sold, usually alive
- Coastal fisheries
- Main fishing technique: line fishing

Conservation

- Cambodian species are not endangered and therefore not protected
- But if fishing keeps on going without management, they may soon be.
- Protect their habitat

Mackerel

General Information	Behavior	Habitat
• Coastal pelagic fishes • Fast swimmers	• Form large schools • Hunt for small fishes • Are preys for many marine species (eg. Tuna) • Reproduce between march and July • migrate between their feeding ground and spawning ground.	• Open sea

Indian mackerel

short mackerel

Mackerel

Commercial Use	Conservation
• Major fishing effort in the Gulf of Thailand and in Cambodia towards these species • Drift nets, purse seines (industrial fisheries) and gill nets (coastal fisheries) • Mackerels are sold in local markets and exported to Thailand	• Season is closed from 15 January to 31 March for all Mackerel species

Figure 4: Volume of mackerel caught in the Gulf of Thailand from 1950-2004 (Sea Around Us 2005).

Tuna

General Biology

- Pelagic fishes
- fast swimmers (70km/h)
- Pink/red flesh

Behavior

- Migratory species
- Large schools
- Single breeding ground for many species
- Juvenile schools stay in the shallows
- Adult schools travel deeper
- Often associated with dolphins and sharks

Habitat

- Open ocean

Tuna

Commercial fishing

- Industrial fisheries

Current conservation efforts

- Implement quotas based on Maximum Sustainable Yield
- Use techniques that reduce by-catch (dolphins)

Sea Turtle

General Biology

- Marine reptiles
- Long lived (up to 80 years)
- Come to the surface to breathe

Behavior

- Juveniles grow and live in the open ocean
- Adults come back to coastal areas to reproduce
- Females land on the beach at night to nest

Habitat

- Open ocean
- Sea grass beds
- Coral reefs
- mangrove

Hawksbill turtle

loggerhead turtle

green turtle

Sea Turtle

Commercial use

- Hunted for its flesh and carapace

Conservation

- Protected by Cambodian law on Fisheries

Critically endangered

threatened

endangered

Dugong

General Information	Behavior	Habitat
• Large marine mammal • 2.7 m long on average • Can weigh up to 300 kg • Long lived (70 years)	• Bottom feeders, graze on seagrass (sea cows) • Sexual maturity: 8-18 years • 13 months gestation	• Sea grass areas • Sheltered areas like mangrove channels or bays

dugong

Dugong

Commercial fishing	Conservation
• Dugongs were hunted for thousands of years, resulting in a great reduction of their numbers worldwide. • Now forbidden	• Protected by Cambodian law on Fisheries • Protect sea grass beds • No nets in Dugong areas

Dolphin

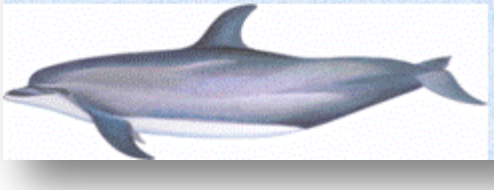
General Information	Behavior	Habitat
• Descendant from terrestrial	• Hunt for fish and squid • Complex behaviour • One of the most intelligent creatures on Earth	• Open sea and coatal waters

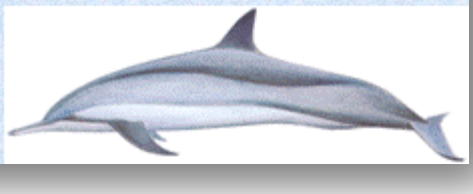
common bottlenose dolphin

dwarf spinner dolphin

Dolphin

Commercial fishing	Conservation
• By-catch	• Protected by Cambodian law on Fisheries





Species	Value	Status	Commercial use	habitat
Blood cockles	commercial	healthy	fishing/aquaculture	intertidal
Giant clams	conservation	endangered	NO	Coral reef
Shrimp	commercial	healthy	fishing/aquaculture	estuaries coastal waters
Mantis shrimp	commercial	??	fishing	Rocky shallows coral reef
Squid	commercial	healthy	fishing	Deep sea coral reef
Sea horse	conservation	endangered	NO	Mangrove/sea grass/coral reef
Grouper	commercial	healthy	fishing/aquaculture	Mangrove/coral reef/rocky shallows
Mackerel	commercial	healthy	fishing	Open sea
Tuna	commercial	healthy	fishing	Open sea
Sea turtle	conservation	endangered	NO	Open sea/mangrove/coral reef/sea grass
Dugong	conservation	endangered	NO	Sheltered coastal areas
Dolphin	conservation	endangered	NO	Open sea/coastal

Sources

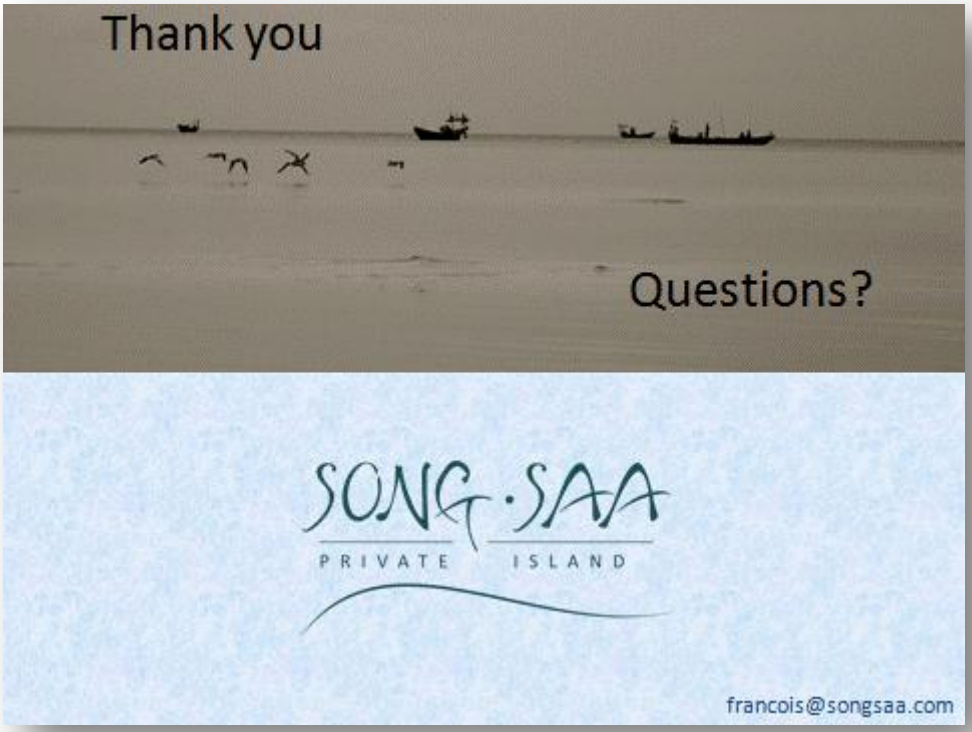
Food and Agriculture Organization

Marine Conservation Cambodia

MARINE FISHERIES RESOURCE MANAGEMENT
POTENTIAL FOR MACKEREL FISHERIES OF CAMBODIA

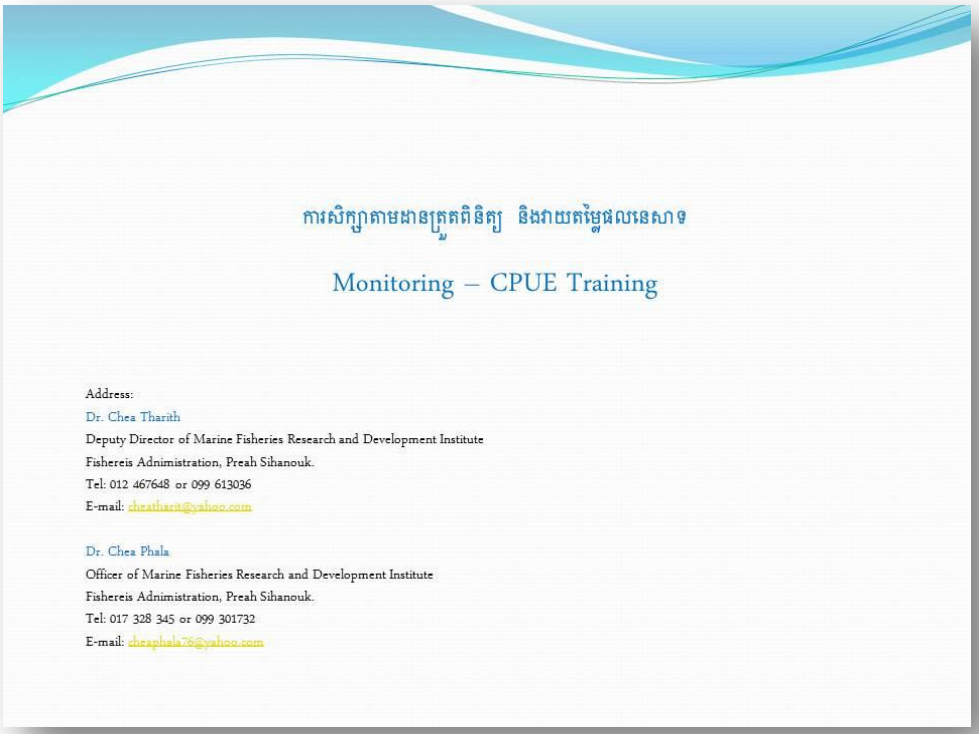
EM Puthy
Senior Officer
Fisheries Administration
Ministry of Agriculture Forestry and Fisheries
Kingdom of Cambodia
E-mail: emputhy@yahoo.com drputhy@gmail.com

Supervisor
Dr. Dadi Mar Kristofersson dmk@hi.is
Department of Economics, University of Iceland


Thank you
Questions?
SONG·SAA
PRIVATE ISLAND
francois@songsaa.com

Appendix 9 – Monitoring


MINISTERIO DE ASUNTOS EXTERIORES Y DE COOPERACIÓN
aecid
FAO
រដ្ឋបាលជលផល
វិទ្យាស្ថានស្រាវជ្រាវ និងអភិវឌ្ឍន៍ជលផលសមុទ្រ
Marine Fisheries Research and Development Institute
វគ្គបណ្តុះបណ្តាលស្តីពី
Monitoring – CPUE Training
ជីវសាស្ត្រសមុទ្រ ប្រព័ន្ធអេកូឡូស៊ីសមុទ្រ សុវត្ថិភាពនៃការធ្វើនេសាទនៅសមុទ្រ និងការងារអធិការកិច្ច
រៀបចំដោយៈ បណ្ឌិត ជា ថារិទ្ធ និង បណ្ឌិត ជា ផល្លា PREPARED BY DR. CHEA THARITH AND DR. CHEA PHALLA
កោះរុងសង្គីម (ខេត្តព្រះសីហនុ) KOH RONG SAMLOEM
ថ្ងៃទី ១៩-២២ ខែ ធ្នូ ឆ្នាំ ២០១០


ការសិក្សាតាមដានត្រួតពិនិត្យ និងវាយតម្លៃជលនេសាទ
Monitoring – CPUE Training
Address:
Dr. Chea Tharith
Deputy Director of Marine Fisheries Research and Development Institute
Fishereis Adnimistration, Preah Sihanouk.
Tel: 012 467648 or 099 613036
E-mail: cheatharit@yahoo.com
Dr. Chea Phala
Officer of Marine Fisheries Research and Development Institute
Fishereis Adnimistration, Preah Sihanouk.
Tel: 017 328 345 or 099 301732
E-mail: cheaphala76@yahoo.com

តើធនធានជលផលសមុទ្រមានសារៈសំខាន់អ្វីខ្លះ? What is the importance of Marine Fisheries Resources

ធនធានជលផលសមុទ្រក្នុងប្រទេសកម្ពុជាបានដើរតួនាទីយ៉ាងសំខាន់: Marine fisheries in Cambodia play an important role:

- វិស័យជលផលសមុទ្រដើរតួយ៉ាងសំខាន់ចំពោះចំណូលជាតិ និង ផ្តត់ផ្តង់ជីវភាពរស់នៅរបស់ប្រជាពលរដ្ឋនៅតំបន់ឆ្នេរនៃប្រទេសកម្ពុជា Contribute to national income and support community fisheries livelihoods.
- ផ្តល់នូវប្រភពប្រូតេអ៊ីន៨១.៥%នៃត្រីទឹកសាប និងត្រីទឹកប្រៃក្នុងរបបអាហារប្រចាំថ្ងៃ Provides protein 18,5 % in total daily necessary protein.
- ផ្តល់ការងារធ្វើដល់ប្រជាជនរស់នៅក្នុងតំបន់ និងជុំវិញតំបន់នេសាទ Provide emloyment for people living in fishing areas and around fishing areas.

សេចក្តីផ្តើម Introduction

- ត្រីនៅសមុទ្រកម្ពុជាមានប្រមាណជាង៤៣៥ ប្រភេទ ស្ថិតក្នុង ២០២ពូជ និង ៩៧អំបូរ Marine Fisheries in Cambodia includes around 435 species, 202 genus, 97 families
- ដង់ស៊ីតេប្រែប្រួលពី ២០តោនទៅ៣៣តោន/គម^{2} Densities vary from 20 to 33 tons per square kilometers
- ផលចាប់សរុបពី១៣៧០០-៦០០០០តោន/ឆ្នាំ មធ្យម៥០០០០តោន/ឆ្នាំ Total catch is around 13 700 to 60 000 tons per year. The average is 50 000 tons per year.

ហេតុអ្វីបានជាចាំបាច់ត្រូវធ្វើការវាយតម្លៃធនធានទាំងនោះ? Why do we need to monitor the Fisheries Resources?

- To assess the current status of fisheries resources and fisheries grounds.
- To assess the level of exploitation in the fishing areas/grounds.
- Provides recommendations based on research results related to fisheries:
  - ត្រី (Fishes)
  - ក្តាម បង្គា (Crustaceans)
  - មឹក គ្រំ ព្រៃគង ងាវ លៀស (Molluscs)
  - ឈើងសមុទ្រ ផ្កាយសមុទ្រ (Echinoderm)
  - ធនធានផ្សេងៗ (ផ្កាថ្ម ស្មៅសមុទ្រ សត្វសមុទ្រ ព្រៃលិចទឹក) Other resources such as seagrass, coral reef, marine species and mangrove

តើការប្រមូលទិន្នន័យ ផលនេសាទមានសារៈសំខាន់អ្វីខ្លះ? Why is catch monitoring important?

ការប្រមូលទិន្នន័យផលិតផលជលផលដែលមានតម្លៃសេដ្ឋកិច្ច គឺជាគោលបំណងដ៏សំខាន់ក្នុងការប៉ាន់ប្រមាណផលចាប់

សរុបរួមមាន៖ Data necessary to design a catch monitoring program:

- ប្រភេទឧបករណ៍នេសាទ Fishing gears
- ប្រភេទទូកនេសាទ Type of fishing boats
- ប្រភេទផលនេសាទដែលចាប់បាន Type of species
- ទិន្នផលនេសាទ CPUE

ប្រភេទឧបករណ៍នេសាទនៅប្រទេសកម្ពុជា Fishing gears used in Cambodia

- អួន (អួនអូស អួនទឹត អួនខ្វែ...) Trawling, encircling purseine, beach purseine...
- មង (ត្រីបេកា ត្រីកាម៉ុង ត្រីឆ្លាម ត្រីក្បាក់ ក្តាម បង្គា...) Gillnets (Spanish mackerels gillnets, shark gillnet, crab gillnet, shrimp gillnet, etc.)
- លប (លបត្រី លបមឹក លបក្តាម...) Squid traps
- សន្ទូចរនង Longline
- Push nets (hand push nets, motorized push net)
- រាវដាំវ By-hand collection
- Other fishing gears (spear fishing, shell collecting...)

តើការប្រមូលទិន្នន័យផលនេសាទមានសារៈសំខាន់អ្វីខ្លះ? Why is data collection important ?

- ការប្រមូលទិន្នន័យនេះគឺត្រូវអនុវត្តជាប្រចាំដែលវាមានសារៈសំខាន់សម្រាប់ឃ្លាសាស្ត្រក្នុងការគ្រប់គ្រងធនធានជលផល Data has to be collected frequently and regularly in order to optimize fisheries management

- ក្នុងស្ថានភាពដែលមានការកើនឡើងនូវចំនួនទូកនេសាទ ឧបករណ៍នេសាទទំនើប និងការប្រែប្រួលប្រសិទ្ធភាពការចាប់មួយឯកតា (CPUE) គឺជាសូចនាករមួយសំខាន់ ក្នុងការគ្រប់គ្រងធនធានជលផល។ Data collection related to fishing gears, equipment and catch is imporant in order to calculate CPUE and optimize fisheries management.

ភាពចន្លោះនៃការសិក្សាស្រាវជ្រាវធនធានជលផលសមុទ្រកម្ពុជា The gaps in marine fisheries research in Cambodia

- ការសិក្សាស្រាវជ្រាវស្តីពីផលនេសាទនៅមានកម្រិត Study on fish catch landing is limited
- ស្ថិតិផលនេសាទនៅកម្ពុជាពុំទាន់មានភាពច្បាស់លាស់ Fisheries statistics is not clear yet
- ស្ថានភាពនៃការគ្រប់គ្រងធនធានធម្មជាតិមិនទាន់មានភាពប្រសើរ Lack of fisheries resources management
- កើនឡើងនូវការធ្វើនេសាទហួសកម្រិតក្នុងតំបន់ Overexploitation of fisheries resources

គោលបំណង OBJECTIVES

- ដើម្បីគ្រប់គ្រងការប្រើប្រាស់ធនធានប្រកបដោយចីរភាព In order to o manage fisheries resources in a sustainable way, community members have to know their own resources
- វគ្គបណ្តុះបណ្តាលនេះត្រូវបានរៀបចំឡើងដើម្បីប្រមូលព័ត៌មាន និង វាយតម្លៃផលិតផលនេសាទ This training course is designed to data collection and assessment of fisheries production in community fisheries to selected community fisheries.

ការរំពឹងទុក EXPECTED OUTPUT

បញ្ចប់វគ្គសិក្ខាកាមនឹងទទួលបានចំណេះដឹងដូចខាងក្រោម៖ At the end of the training course the participants are expected to:

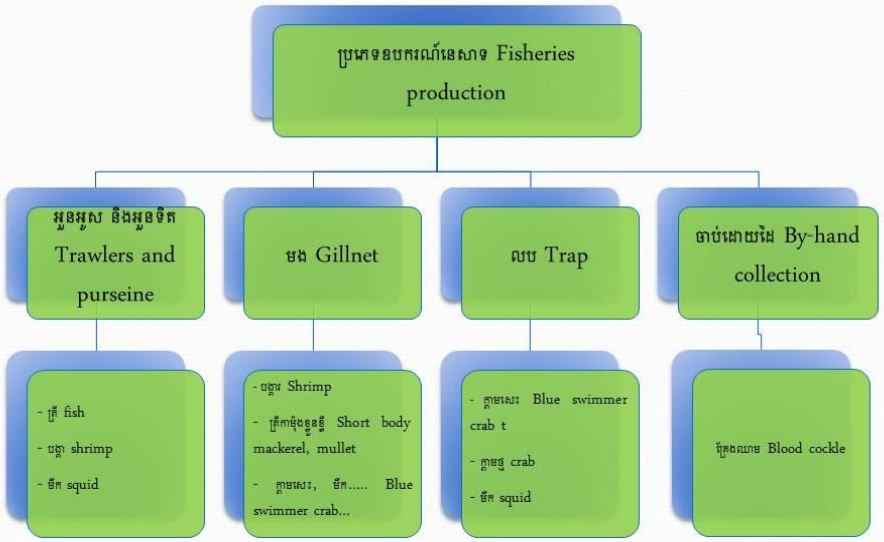
- យល់អំពីគោលបំណងនៃការសិក្សាតាមដានស្ថានភាពធនធានជលផល Having knowledge of recording and assessment of fish production of their own community fisheries.
- ចំណេះដឹងលើការកត់ត្រាទិន្នន័យ និងវាយតម្លៃការធ្វើនេសាទ Understand the importance of data/information for better management in their own community; and
- យល់ពីសារៈសំខាន់ព័ត៌មាន/ទិន្នន័យសម្រាប់គ្រប់គ្រង Understand the definition or meaning of data/information

វិធីសាស្ត្រសិក្សាស្រាវជ្រាវ និងសម្ភារ METHOD AND MATERIAL

ប្រសិទ្ធភាពការចាប់មួយឯកតា Catch per Unit Effort (CPUE)

ឧបករណ៍នេសាទ Fishing gear		ឯកតា Unit
ទូកអួស Trawler	→	គ.ក្រ / ដងនេសាទ kg /trip
មង Gillnets	→	គ.ក្រ / ១០០ម/ ថ្ងៃ kg /100m/day
លប Traps	→	គ.ក្រ / ១០០លប/ ថ្ងៃ kg /100 traps/day
ការដាវ Shellfish collection by hand	→	គ.ក្រ / ថ្ងៃ kg / day
រុញឈិប Hand Push Net	→	គ.ក្រ / ថ្ងៃ kg / day

ប្រភេទឧបករណ៍នេសាទសំខាន់ៗ Main fishing gears

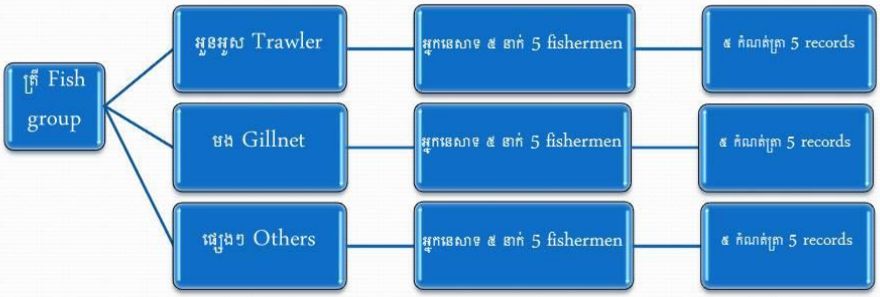


អ្នកណាជាអ្នកប្រមូលពត៌មាន? Who should collect the data?

អ្នកប្រមូលព័ត៌មានត្រូវបានជ្រើសរើសចេញពីអ្នកនេសាទផ្ទាល់ ឬ អ្នកដែលមានជំនាញ និងបទពិសោធន៍ក្នុងសហគមន៍ The person collecting the data should be chosen among the fishers or those who have skills and experience in Community Fisheries.

វិធីសាស្ត្រយកសំណាក Sampling methods

Example of data collection for one species group in one community



តួនាទីរបស់អ្នកកត់ត្រាទិន្នន័យ? What is the role of the person collecting data ?

អ្នកប្រមូលទិន្នន័យនឹងត្រូវធ្វើការងារមួយចំនួនដូចជា: He/She will work as follow:

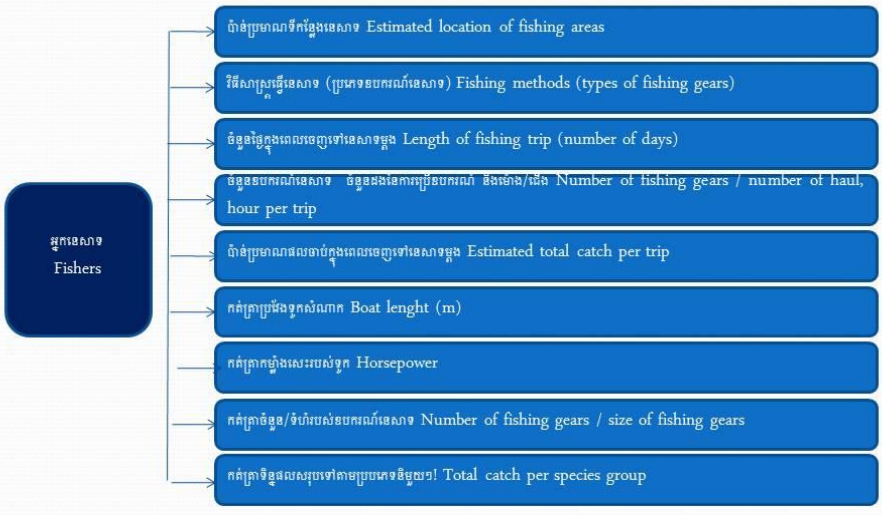
- វាយតម្លៃលើទីកន្លែងនេសាទ Locate fishing grounds
- វិធីសាស្ត្រផ្ទៀនេសាទ

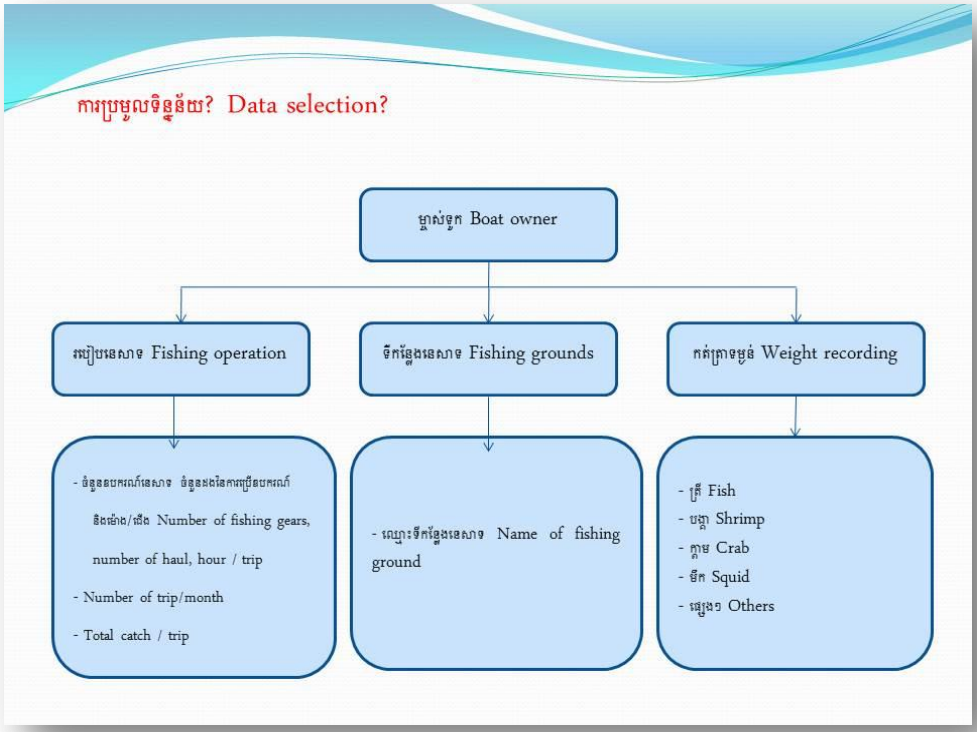
  (ឧបករណ៍នេសាទ) Make an inventory of the fishing methods

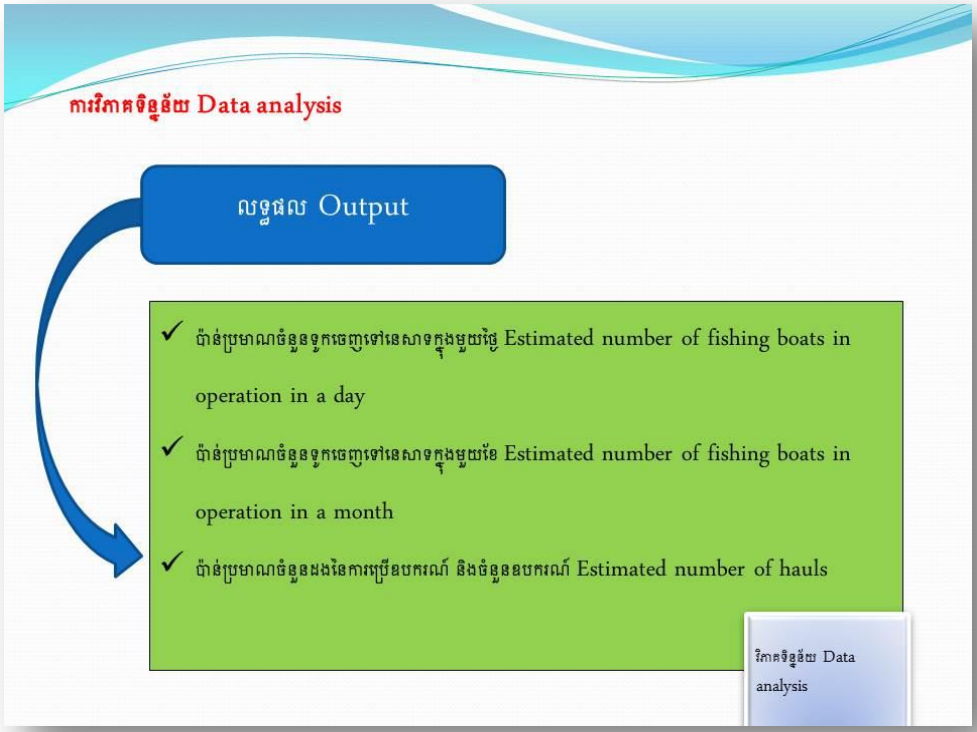
តួនាទីរបស់អ្នកកត់ត្រាទិន្នន័យ? What is the role of the person collecting data?

- ប៉ាន់ប្រមាណផលនេសាទសរុបក្នុងពេលចេញទៅនេសាទម្តង To estimate the total catch per trip
- កត់ត្រាប្រវែងទូក និងកម្លាំងម៉ាស៊ីនទូក To record boat lenght, engine power
- កត់ត្រាពីប្រភេទឧបករណ៍ និងចំនួនឧបករណ៍នេសាទ To record the types and number of fishing gears
- កត់ត្រាផលចាប់សរុបទៅតាមប្រភេទនីមួយៗ To estimate the total catch per species per trip

ពត៌មានអ្វែលត្រូវយកពីទូកនេសាទ? What kinf of information should be collected from the fishing boat?




ការប្រមូលទិន្នន័យ? Data selection?
ម្ចាស់ទូក Boat owner
ការប្រមូលនេសាទ Fishing operation
ទីកន្លែងនេសាទ Fishing grounds
កត់ត្រាទម្ងន់ Weight recording
- ចំនួនឧបករណ៍នេសាទ ចំនួនដងនៃការប្រើឧបករណ៍ និងម៉ោង/ដង Number of fishing gears, number of haul, hour / trip
- Number of trip/month
- Total catch / trip
- ឈ្មោះទីកន្លែងនេសាទ Name of fishing ground
- ត្រី Fish
- បង្គា Shrimp
- ក្តាម Crab
- មឹក Squid
- ផ្សេងៗ Others


ការវិភាគទិន្នន័យ Data analysis
លទ្ធផល Output
✓ ប៉ាន់ប្រមាណចំនួនទូកចេញទៅនេសាទក្នុងមួយថ្ងៃ Estimated number of fishing boats in operation in a day
✓ ប៉ាន់ប្រមាណចំនួនទូកចេញទៅនេសាទក្នុងមួយខែ Estimated number of fishing boats in operation in a month
✓ ប៉ាន់ប្រមាណចំនួនដងនៃការប្រើឧបករណ៍ និងចំនួនឧបករណ៍ Estimated number of hauls
វិភាគទិន្នន័យ Data analysis

លទ្ធផល (ត) Outputs (continued)

- ✓ ប៉ាន់ប្រមាណចំនួនថ្ងៃក្នុងពេលចេញទៅនេសាទម្តង Estimated number of day per trip
- ✓ ប៉ាន់ប្រមាណផលនេសាទជាមធ្យម (គ.ក្រ)/អួនអូស/មង/លប/ថ្ងៃឬ ខែ ឬ ឆ្នាំ Estimated average catch landing
- ✓ ប៉ាន់ប្រមាណផលនេសាទ តាមប្រភេទនីមួយៗ (គ.ក្រ)/អួនអូស/មង/លប/ថ្ងៃឬ ខែ ឬ ឆ្នាំ Estimated catch per species (kg per trawl, gillnet, traps, per day/month/year)

វិភាគចំនួនន័យ

Appendix 10 – Monitoring, Control and Surveillance

Control and Surveillance

PRESENTED BY

MR. OUM SOKUN

DEPUTY DIRECTOR OF MARINE FISHERIES ADMINISTRATION INSPECTORAT

Definitions

Control: Specification of the terms and conditions under which resources can be harvested.

- National Fisheries Legislation : Law on Fisheries 2007 (MAFF).
- National, sub-regional or regional agreements.

➡ Provides the basis for which fisheries management arrangements, via MCS, are implemented.

Surveillance: the regulation and supervision of fishing activity to ensure that national legislation and terms, conditions of access, and management measures are observed. This activity is critical to ensure that:

- resources are not over exploited.
- Poaching is minimized.
- Management arrangements are implemented (FID/FAO 2010).

I. The Fisheries Domains

Article 11.

[…] The Marine fishery domain is divided into:

- ***Inshore fishing area***, which extends from the coastline at higher high tide to the **20 meter deep line.**
- ***Offshore fishing area***, which extends from the 20 meter deep line to the outer limits of the Exclusive Economic Zone of the Kingdom of Cambodia.
- ***Fishery conservation area, sea grass area, and coral reef area*** which are habitats for marine aquatic animals and plants.
- ***Mangrove forest area*** including mangrove and forests zone, which are important feeding and breeding habitats for aquatic animals, and ***protected inundated areas***.

II. The Continuity of Fisheries Management

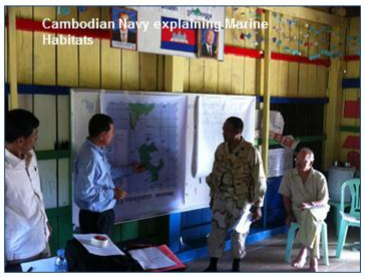
Article 15.

- The FiA shall develop National Fishery Management Plan according to the National Fishery Policy **with a broad participation from local communities and relevant authorities. […]**

Communication between communities and relevant authorities: a necessary condition for an effective Fisheries Management

All relevant authorities should work together to conserve Cambodian Marine Resources and ensure a sustainable development of communities' livelihoods.

Lack of communication and cooperation will only result in ineffective management of the Fisheries Resource which in turn will affect the livelihoods of coastal communities.



The National Fishery Management Plan shall reflect the following important principles:
(in art. 15)

Integration of local communities to sustainable fisheries management.

Communication and collaboration between relevant authorities and local communities.

Resolving conflicts over the utilization of fishing areas.

Elimination of overfishing.

Protection of the biodiversity of inland and marine environment

Improvement of the fishermen's benefits.

Research, Control, Surveillance and Monitoring at all levels of FiA

III. Protection and Conservation of Fisheries

Article 18.

Fishery Management Areas comprising inter alia, rapids and deep pools located in rivers, Tonle Sap Great Lake, lakes, inundated forests, **group of islands, sea grass areas, coral reef area, and mangrove forests** which are of importance for the sustainability of fishery resources shall be classified as **Protected and Conservation Areas of Fishery Resources**.

Protected and Conservation Areas of Fishery Resources are the most important areas to be controlled and surveilled. Communities' livelihoods as well as tourism development shall greatly depend on the sustainable management of these areas.

Article 19.

The following shall be **prohibited:**

1. **Any fishing activities in the fishery conservation areas** except for special permission from the MAFF to the FiA to conduct the fishery scientific, technical research and experiment.

2. **By pass navigations or any activities** in the fisheries conservation areas except competent officers **in the case of law enforcement**.

Article 22.

- **Disposing, discharging, dumping or littering toxic substances (solid or liquid) in fishery domains,** which were determined by law and other juridicial legislations of the Kingdom of Cambodia, and Conventions or International Treaties on Environmental Poisoning, **and any agreements or any activities that cause toxic or harm to aquatic animals shall be prohibited.**

Toxic substances greatly affect marine life, which in turn affects the livelihoods of the communities that depend on these resources.

Lingering cyanide in the water kills the coral and the algae on which the fish feed: every fish caught this way destroys approximately a square meter of reef.
(Fred Pearce, CDNN).

IV. The Management of Inundated Forests and Mangroves

Article 26.

- **Setting fires in the inundated forest and mangrove areas is prohibited.** Setting fires or using fires by the Fishery Administration is permitted to benefit silviculture or inundated forest and mangrove hygiene. […]
- **All citizens, community fisheries, armed forces, and authorities** of all levels shall have **the obligations to participate in the maintenance and protection of fish sanctuaries, forests, fire prevention and fighting** against any inundated forests and mangroves fire.

Article 27.

- **Protected inundated areas** shall be the inundated lands in the fishing lots, and the inundated forest and mangroves areas, which **shall be protected for planting or conserving for reforesting to balance the fishery eco-system.**

Article 28.

Shall be **prohibited:**

1. **Expanding agriculture lands or using lands** which are protected by the provision of this law for other purposes other than development of fisheries in the inundated areas.
2. **Issuance of land title** in the protected inundated areas.
3. **Cutting, reclaiming, digging out, clearing, burning or occupying** flooded forests and mangroves.
4. **Destroying, cutting down** of inundated forest and mangrove forest or **rooting up to collect trunks** of inundated and mangrove forests.
5. **Commercial collection, transportation, and stocking of woods, firewood or charcoals** of inundated and mangrove forest species.
6. **Construction of kilns, handicraft places, processing places and all type of plants** using raw materials of woods of inundated and mangrove forest species.

V. The Management of Fisheries Exploitation

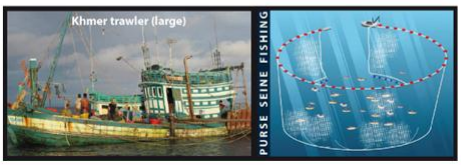
Article 30.

Fishing practice is classified into three types of fishing gears:

1. **Small-scale fishing gears.**

2. **Middle-scale fishing gears.**

3. **Large-scale (Industrial) fishing gears.**



Article 32.

- All types of fishing exploitation in the inland and marine fishery domains, except subsistence fishing, shall have:
- 1. To get **fishing license**.
- 2. To **pay tax and fishing fees** to the state.
- 3. To follow the regulations stipulated in the fishing license. [...]

Licensing for monitoring

Licensing is a very easy way for FiA Central to gather data concerning fishing fleets (sizes, types and numbers).

VI. Marine Fishery Exploitation

Article 45.

- **All types of fishery exploitations** in the marine fishery domain, *except subsistence fishing*, shall be allowed **only in the possession of license** and these exploitations shall follow the conditions and obligation in **fishing logbook**. [...]

Data compiled in a fishing logbook usually include:

- Vessel name / side number / license number.
- Catches by species (kg) / by-catch.
- Types of gears used.
- Location of fishing ground / depth.
- Fishing period, etc.

Why is this important? It shall allow FiA Central to:

- Monitor the catches / evaluate the quantities caught.
- Evaluate fishing gears efficiency / impact on fisheries stocks.
- Anticipate stock depletion by optimizing its management.

Article 36.

- The **license** for the establishment of **middle-scale location for buying, selling, stocking or processing fish or fishery products** shall be issued by the competent Fisheries Administration. [...]

Article 37.

- The **license** for establishing **fish landing as a location for collecting, distributing, trading fishery products** shall be issued by the competent Fisheries Administration. [...]

Licensing for monitoring

Licensing allows FiA Central to follow the catches and the trading of fisheries resources.

Article 47.

- Fishermen shall transship fishery products at a **fishing port** determined by the Fisheries Administration.
- **Foreign fishing vessels** that are permitted to fish in the marine fishery domain **shall inform the Fisheries Administration prior to port calls** in marine fishery domains of the Kingdom of Cambodia.
- Other terms and conditions on transshipments of fishery products and **anchoring of the foreign fishing vessels** shall be determined by the Fisheries Administration.

Article 48.

- Based on **precise scientific information** that the fishing practices have been or are being the cause of **serious damage to fish stock**, the FiA has the rights to immediately and temporarily **suspend fishing activities and propose for a re-examination of the fishing agreement** [...].

Scientific monitoring is a necessity in order to:

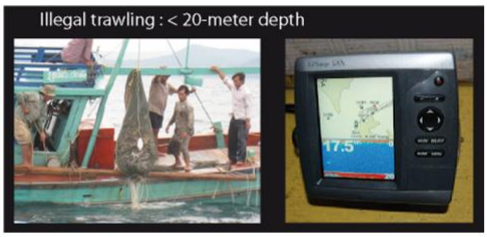
- Optimize fisheries management
- Avoid depletion of fisheries stocks
- Measure the impact of fishing gears on species

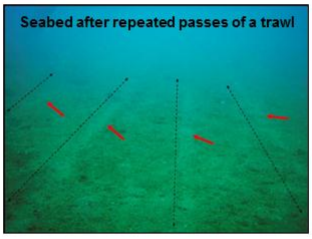
e.g. : Scientific research shows that:

- **Trawling** over a previously untrawled area can remove about **1 tonne of attached seabed animals and plants per square kilometer trawled** (about 10 % of the biomass attached to the seabed).
- Repeated passes of a trawl over the same area quickly **remove the entire seabed life.** 13 passes of a trawl can remove 70 to 90% of the biomass of the seabed *(The current status of the GBR, 2006)*.

Article 49.

- **Trawling in the inshore fishing areas shall be forbidden**, except for the permission from the MAFF at the request of the FiA to conduct scientific and technical researches.





Trawling is the most destructive type of fishing:

- Very unselective / no ability to selectively catch target species
- Bring up a significant by-catch (8 to 10 more weight than of target species)
- Has direct and indirect, immediate and long-term negative impacts on the benthos that will in turn greatly affect the livelihood of small and middle-scale fishers.

In this case, what is the procedure ?
Who the witness should call to ?

Article 50.

- All fishing vessels which are **not licensed** to fish in the Marine Fishery Domain **shall not keep their trawl fishing gears stowed in a manner that they are readily for fishing**. **No fishing vessel with trawl fishing gear and motorized Short-necked clam scraper shall be allowed in the inshore fishery area unless the gear is stored in a manner that it is not readily available for fishing** or is allowed as stated in the article 49 of this law.

Article 52.

Shall be prohibited:

- 1. Fishing or any form of exploitation which damages or disturbs the growth of sea grass or coral reef.
- 2. Collecting, buying, selling, transporting and stocking of corals.
- 3. Making port calls and anchoring in a coral reef area.
- 4. Destroying sea grass or coral by other activities.
- All the above activities mentioned in points 1, 2 and 3, may be undertaken only when permission is given from the MAFF.

VII. Licensing

Article 70.

- All licenses used in the fishery sector, and the division of the authority to be responsible for issuing license shall be determined by the proclamation of the MAFF.

Licensing allows FiA Central to monitor fishing activities. It is an essential procedure in Fisheries Management.

VIII. Legal Procedures for Fishery Offence Solving

Article 72.

- A fishery offence is a peculiar criminal offence as stipulated in this law.
- The officers of the Fisheries Administration have the competence as a **judiciary police officer** in **investigating the fishery offence and file a complaint to the competent tribunal.**
- **Investigating, controlling, preventing and protecting against fishery offence** are the competence of the Fisheries Administration.
- The operation of the FiA Officials habilitated as judicial police officers **have to abide by the law on penal procedures**.

Article 73.

- […] The FiA Officers who have been habilitated as judiciary police officers must **prepare and sign the minutes of fishery offences in his/her competency.** […]

Article 74.

- **Local authorities, armed forces, custom, airport, port authorities, and other concerned authorities** shall facilitate and provide forces to investigate, prevent and crack down on fisheries offences or temporarily **keep all evidences of offence** in case there is a proposition from the Fisheries Administration officer.

In case of the competent authorities mentioned in the above paragraph have found the actual fishery offences as below, the authorities:

1. Shall **immediately report** to the nearest competent FiA officer.
2. Shall **temporarily detain the suspect and evidences** then send immediately to FiA who is habilitated as judiciary police officers to execute the law.
3. Could **neither directly fine nor seize evidence** of the fishery offences.

Importance of communication and collaboration between competent local authorities and FiA officers for an effective Law Enforcement.

Article 76.

In case of obvious fishery offences, the competent officers of the FiA have the rights to temporarily seize:

1. Fishery products which were illegally fished, farmed, processed, stocked, sold, bought or transported against this law.
2. Inundated and mangrove forest products and by-products from illegal cutting, reclaiming and clearing.




3. Fishing gears and other associated means which have illegally been used for fishing purpose.
4. Endangered fishery resources.

5. Materials, equipment or means of transportation which have illegally been used or taken out any device which are used to operate vessel or vehicle
6. Other documents related to fishery offences.

Informal licenses should be kept as evidence so the correct procedure could be explained to the person who issued the document.



7. All kinds of licenses, in case of the license holder have contravened this law.
8. The FiA officials habilitated as judicial police officers shall have the rights to detain the suspect within only 48 hours in order to file complaint to the court of law.

Conclusion

- ***Control*** relies on *The National Law on Fisheries* which provides the basis for implementation of fisheries management .
- ***Surveillance*** is a critical activity: effective measures of **Law Enforcement** needs to be undertaken and facilitated by engaging collaboration between FiA, relevant authorities and local communities.
- The most important today is **to put an end to illegal and destructive fishing techniques**, such as trawling in inshore areas and poaching from foreign vessels: the marine ecosystem will soon pass a point of no-return when it will be impossible to recover from the damages. What, then, will happened to the coastal communities who depend on fisheries resources ?
- In some areas, ongoing **collaboration between FiA officers, local authorities and communities** have shown results and prove that efforts made towards Law Enforcement can benefit to all Cambodians.

Thank you

Appendix 11 – Marine monitoring (Reef Check and Marine Survey Techniques)

For the Marine Monitoring topic, Mr. Ferber used a standard Reef Check presentation. Due to copyrights, we feel we are not able to distribute this document.

Appendix 12 – Practical Activity: Habitat, Species and Activities Location Exercise

Training Course on

Marine Biology, Marine Ecology, Safety at Sea and MCS

18-23 December 2010 - Koh Rong Samloem, Preah Sihanouk Province

HABITATS, SPECIES AND ACTIVITIES LOCATION EXERCICE

Objective:

The Habitat, Species and Activities Location exercise workshop aims to guide the participants in identifying and assessing the marine ecosystem in their area. This will help evaluate the participants' knowledge and possible gaps in the understanding of the marine environment and related activities and allow further improvements in the management of coastal areas and marine resources.

Mechanics:

1. Divide the group into Provinces' representatives:

   Group 1: Preah Sihanouk
   Group 2: Kampot & Kep
   Group 3: Koh Kong

2. Each group will be given:

   - A map of their Province
   - Placing markers relating to species, fishing vessels, gears & habitats

3. Give each group between 30 minutes and an hour to answer the workshop guides.

4. Have each group pick up a reporter to present their output. Each presenter will be given 15 to 30 minutes to present, answer questions and for additional comments.

Workshop Guide Question – 20th December, Monday

Activity on where are the habitats in your Cantonment area

For each different group:

1. Identify the different habitats present in your area and place them on the map.
2. Assess the role and the importance of these habitats at an environmental, social and economic level.
3. Assess the current health of these habitats and the main threats (natural, anthropogenic).
4. Mention the measures already in place and suggest measures to improve the management of these habitats.

Habitat	Role and Importance		Current health	Main threats	Measures already in place	Measures to improve its management
	Environmental	Socio-economic				

Workshop Guide Question – 21st December, Tuesday

Activity on where are commercial and endangered species in your Cantonment area

---

For each different group:

1. Identify the commercial and endangered species in your area and place them on the map.
2. For each commercial species, do we know the following data and why these data are important:
   - The condition of the stock (e.g.: abundant, declining, overfished…)?
   - The quantities caught?
   - The commercial value?

3. For each protected/endangered species, do we know:
    - Why are these species protected (e.g.: importance, role in ecosystem)?
    - Why and by who are they targeted?
4. Mention the measures already in place and suggest measures to improve the management of commercial species and the protection of endangered species (Catch monitoring program? Law enforcement? Establishment of Protected Areas? Educational campaigns? etc.).
5.

Commercial Species	**Do we know the data? Why are these data important?**			**Measures already in place**	**Measures to improve stock management**
	Stock	**Quantities caught**	**Commercial values**		

Protected / Endangered species	**Why are they protected?**	**Why and by who are they targeted?**	**Measures already in place**	**Measures to improve their protection**

Workshop Guide Question – 22nd December, Wednesday

Activity on fishing (legal/illegal), Fisheries Law and activities in your Cantonment area.

For each different group:

1. Fishing-related activities:
   a. Identify Community Fisheries (registered/non-registered) and place them on the map.
   b. Identify the different types of fishing present in your area (separate legal and illegal activities) and place them on the map.
   c. Specify:
      - Their targets species
      - Their impact on the marine ecosystem (e.g.: low impact – selective fishing-; high destructive impact –by-catch-, etc.).
      - Possible conflicts
   d. Mention the measures already and in place and suggest measures to:
      - Reduce negative impacts of fishing techniques and illegal fishing activities
      - Solve potential conflicts
      - Improve the monitoring of fishing activities

2. Other activities:
   a. Identify the other marine-related activities present in your area and place them on the map.
   b. Assess their impact on marine ecosystem and resources.
   c. Identify potential conflicts.

d. Suggest measures to improve their management.

Type of fishing	Target species	Impact on ecostytem	Conflicts	Measures already in place	Measures to improve management

Other activities	Impact on marine ecosystem and resources	Potential conflicts	Measures already in place	Measures to improve management

Appendix 13 – Maps and map markers

Maps and map markers used during the practical activity "Habitats, Species and Activities Location exercise"

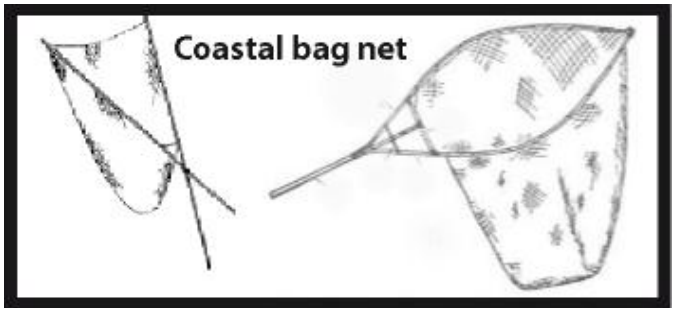
I. COMMUNITIES

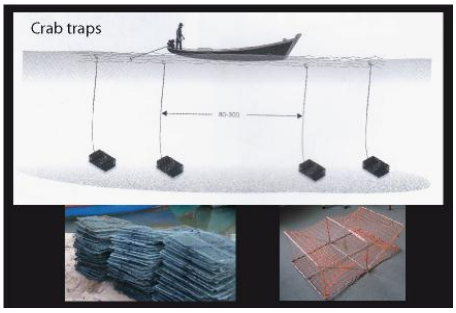
II. AQUACULTURE

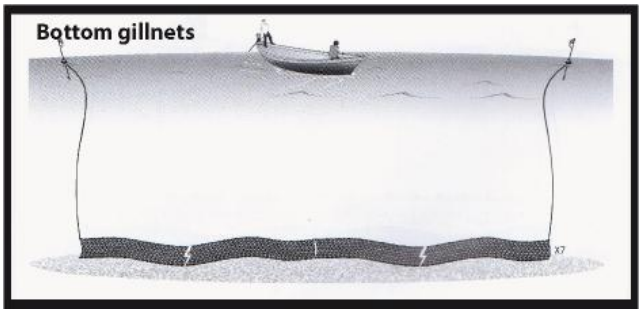
III. FISHING – LEGAL & ILLEGAL (DESTRUCTIVE) ACTIVITIES


Khmer trawler (large)


Bottom gillnets : crab nets

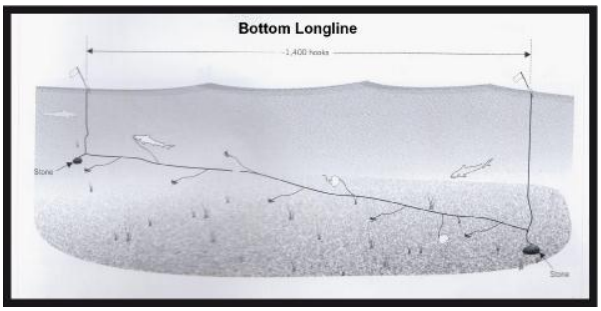

Coastal bag net

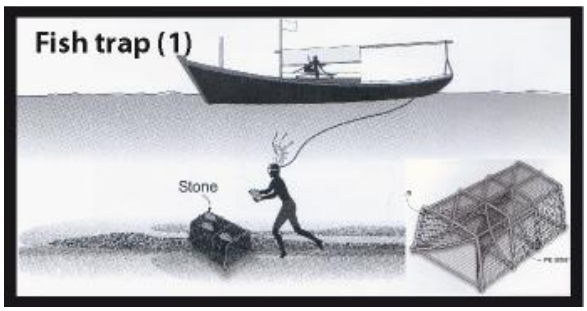

Crab traps

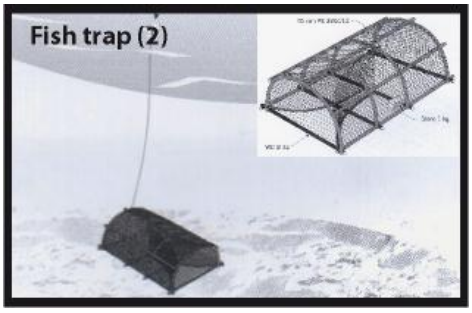

Bottom gillnets


Falling gears (1)

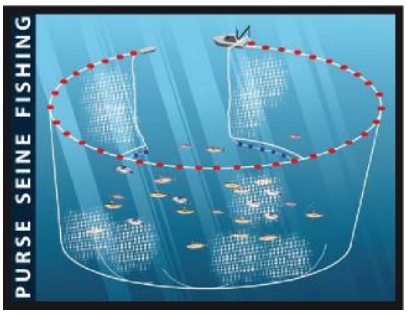

Falling gears (2)

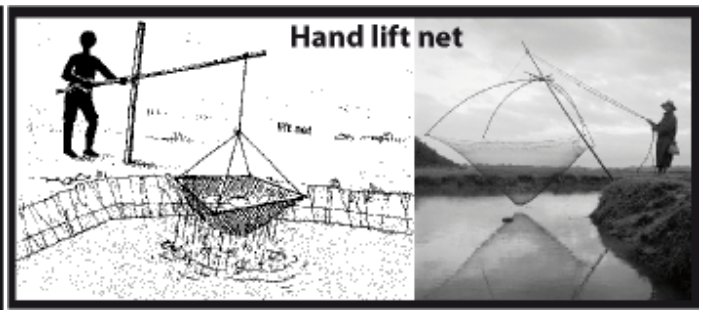

Bottom Longline


Fish trap (1)
Stone


Fish trap (2)


Cylindrical drum fish trap


PURSE SEINE FISHING


Hand lift net

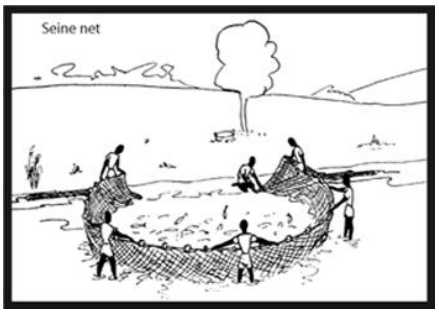

Paddle-boat

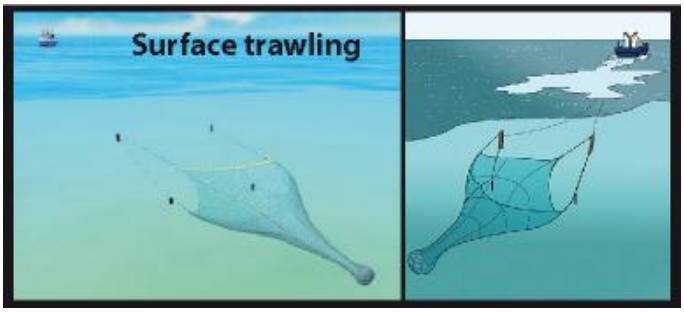

Traditional line fishing


Squid traps

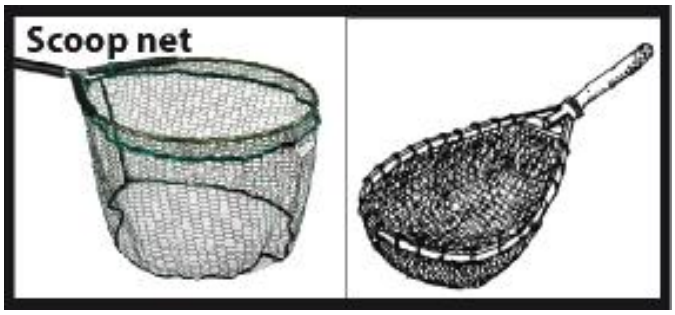

Troll line - squid fishing


Recreational fishing


Seine net


Surface trawling


Hand push net


Scoop net

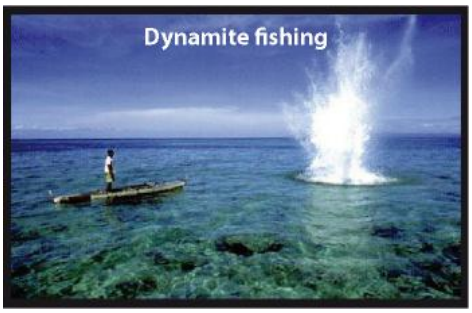

Supplied-air fishing


Spearfishing


Anchoring on the reef


Night fishing


Coral harvesting

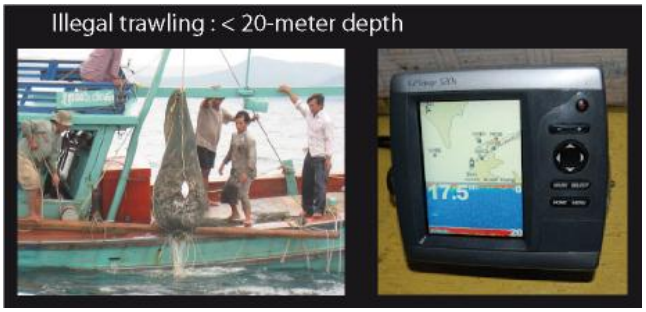

Dynamite fishing


Shell and curios collecting


Cyanide fishing


Vietnamese metal traps


Seahorse collecting

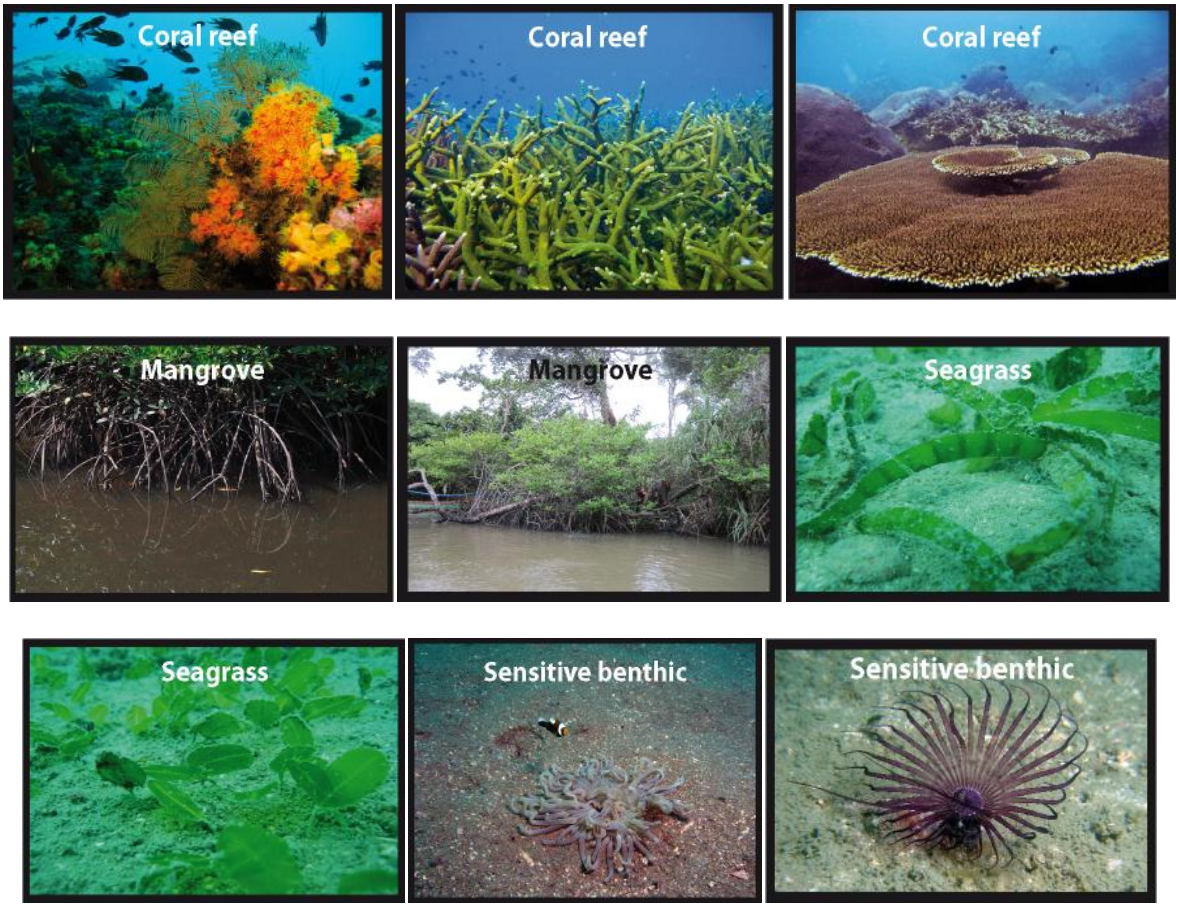

Illegal trawling : < 20-meter depth
17.5


Thai vessel

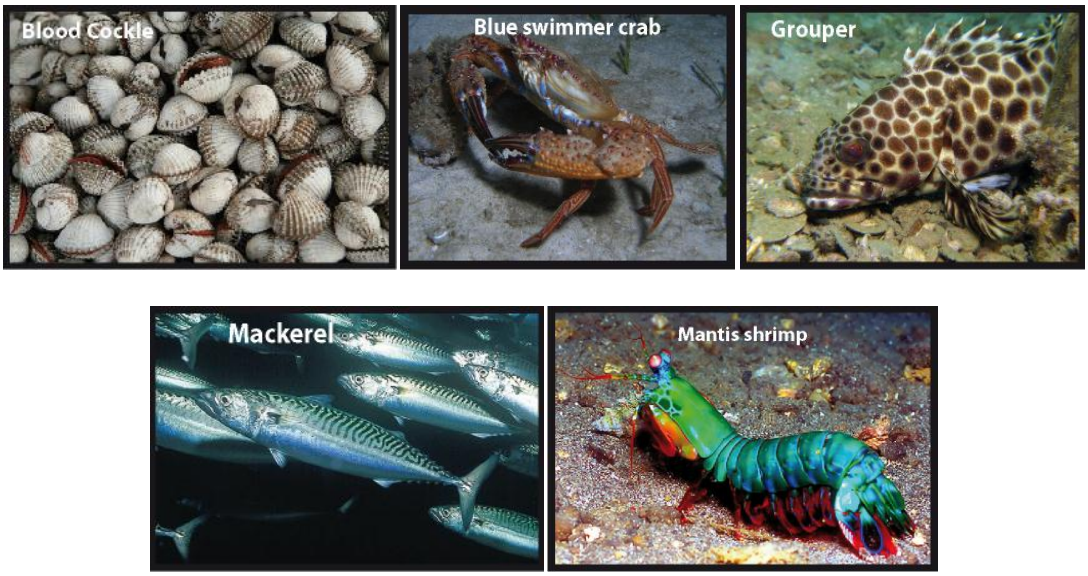

Vietnamese longlines

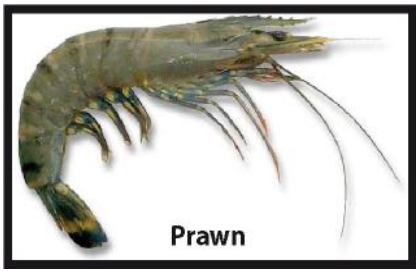

Push net

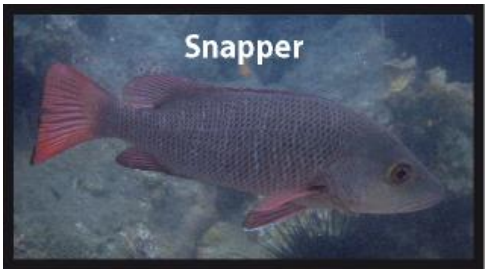
IV. HABITATS



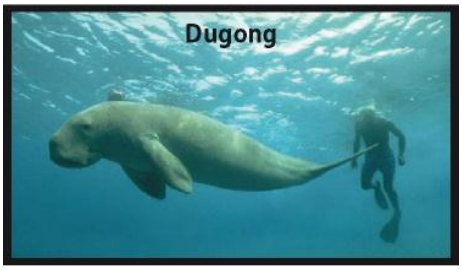
V. MAIN COMMERCIAL SPECIES







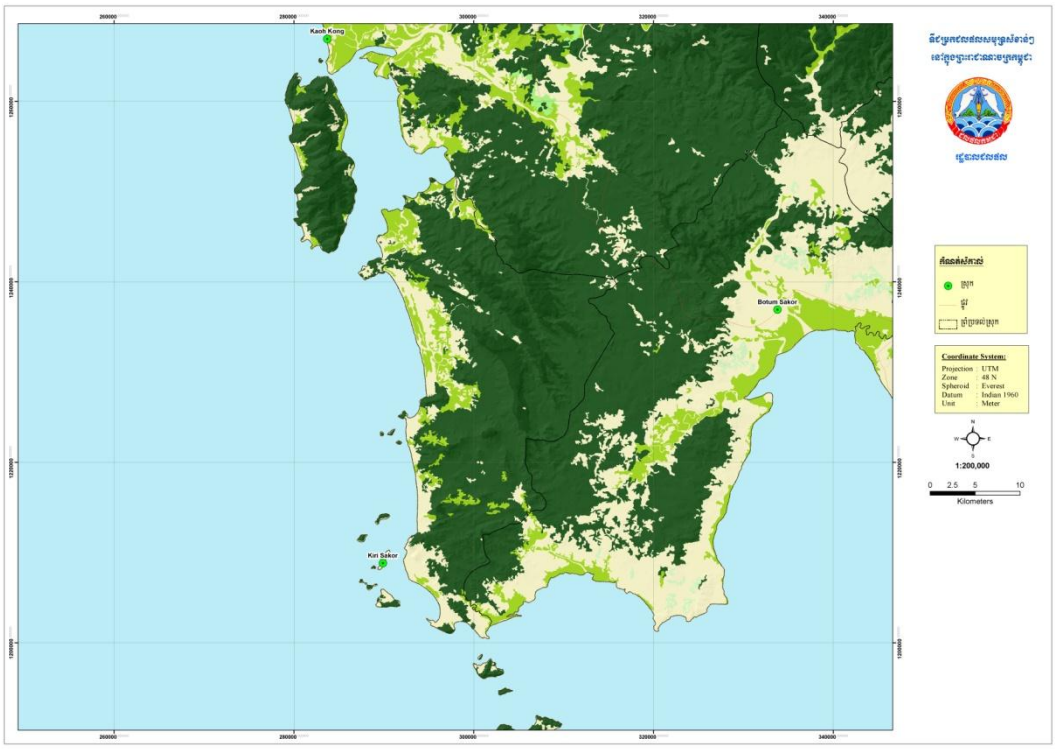
VI. MAIN PROTECTED/ENDANGERED SPECIES



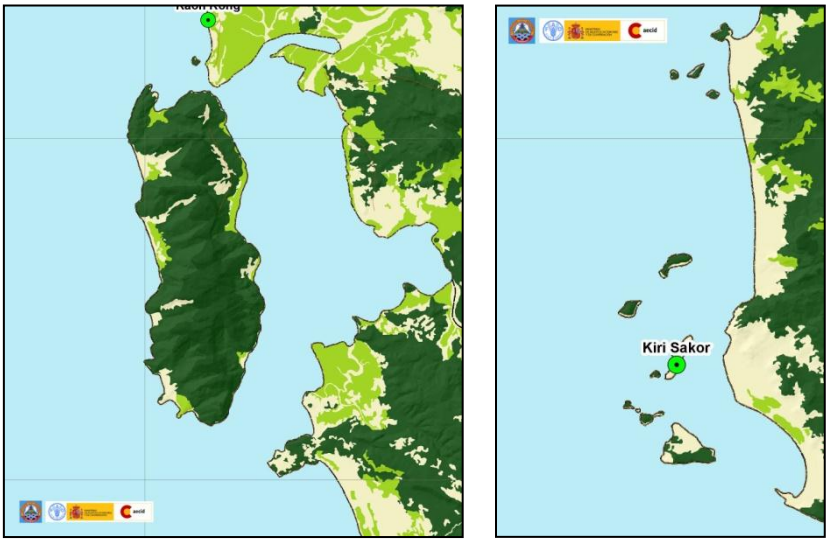
VII. OTHER ACTIVITIES

VII. MAPS (Courtesy FiA)

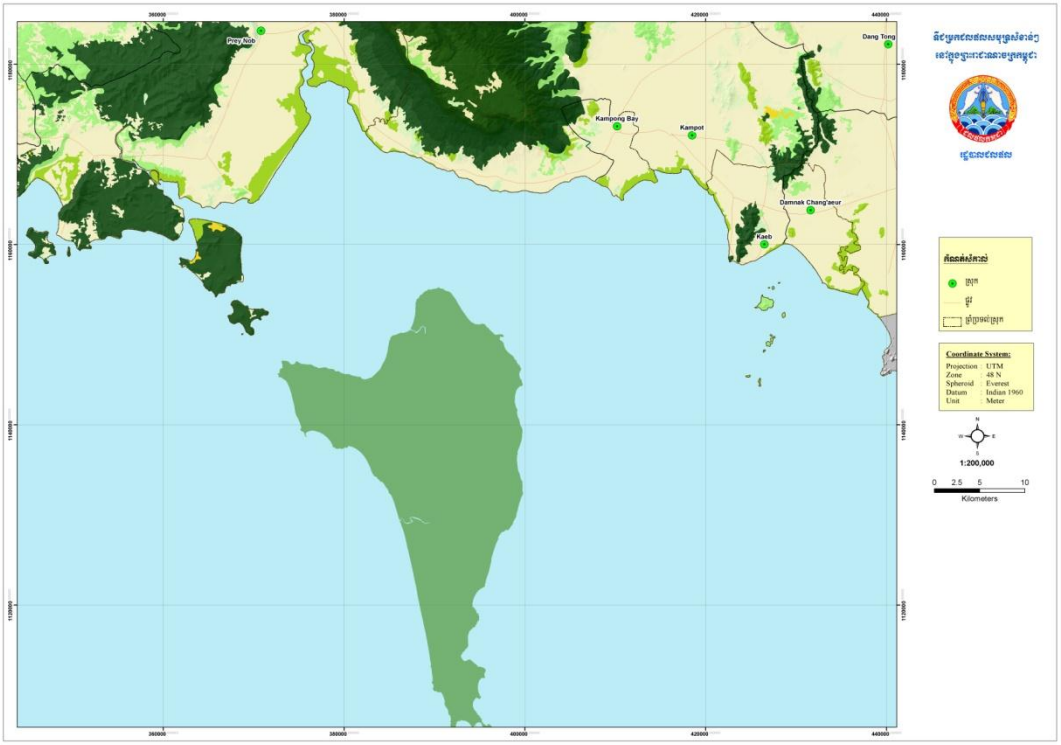
a. Koh Kong (2x3m)



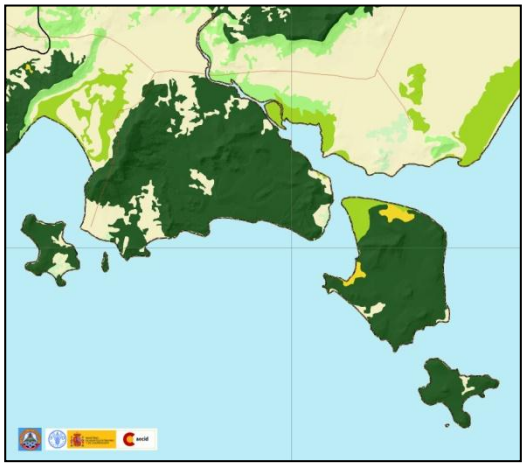
Close-ups on Koh Kong area (2x1m):



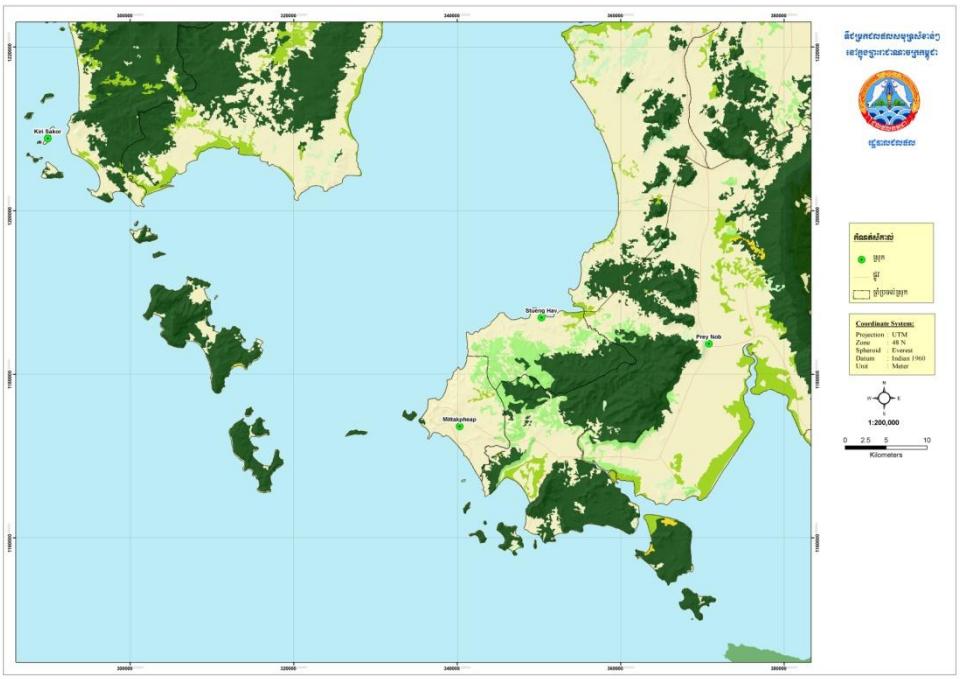
b. Kampot and Kep (2x3m)



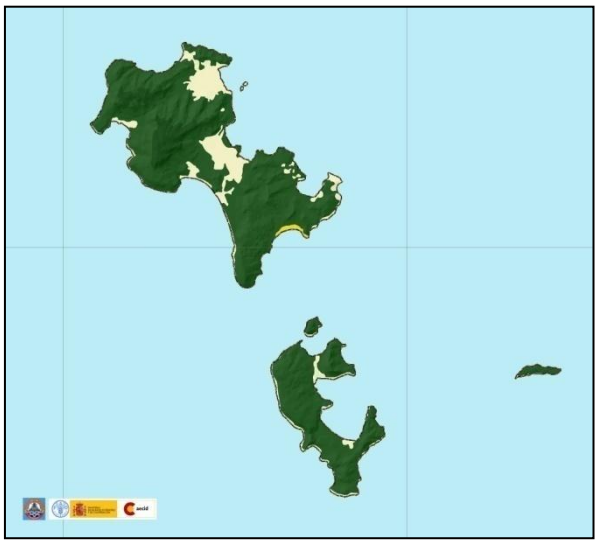
Close-ups on Kampot and Kep areas (2x1m):



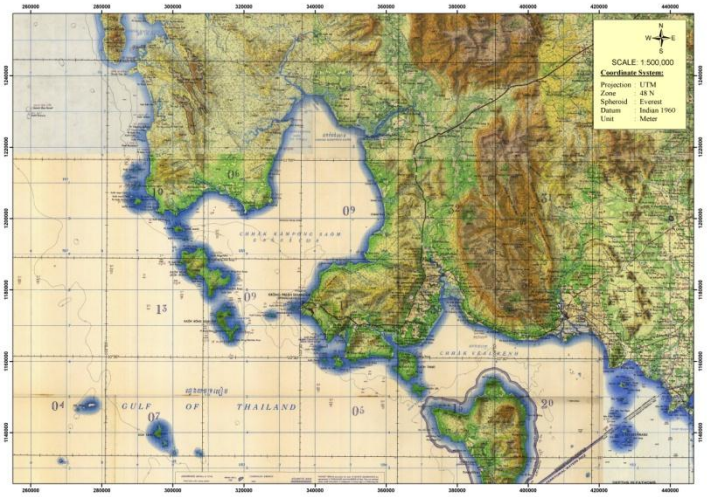
c. Preah Sihanouk (2x3m)



Close-ups on Preah Sihanouk area (2x1m):



d. Coastal Cambodia (1x1m)



Appendix 14 – Practical Activity: Safety at Sea (1), An Introduction to Emergency First Response (EFR), Training and Basic First Aid

Training Course on

Marine Biology, Marine Ecology, Safety at Sea and MCS

18-23 December 2010 - Koh Rong Samloem, Preah Sihanouk Province

SAFETY AT SEA (1)

An Introduction to Emergency First Response (EFR) Training and Basic First Aid



Objective:

In this module we will be introducing you to the basics of helping someone who may be in need of medical assistance. You will learn how to give CPR to an adult and also how to give basic first aid.

Mechanics:

1. Participants will be split into three groups.

2. One (or several) training staff members will be in charge of each group.

3. Training staff members are fully qualified. Please carefully follow their instructions.

Emergency First Response (EFR)

I. ABCD'S

a. A – Airway Open
b. B – Breathing Check
c. C – Circulation/Chest Compression
d. D – Defibrillation
e. S – Serious Bleeding and Shock Management and Spinal Injuries

II. CPR (Cardio Pulmonary Resuscitation)

a. Assess the scene and state your name.
    i. Are there any bystanders that can assist you?
    ii. Choose either "Care first" or "Call first" approach.
b. Open patient's airway and perform breathing check – Look, listen, feel for no more than 10 seconds.
c. Put patient on their back and remove any obvious obstructions from the mouth.
d. If there is no breathing, use a barrier and begin mouth to mouth resuscitation.

i. Provide breaths by pinching the nose closed and each breath is to be just over 1 second long. If you do not see the patient's chest rise, then you must reposition the head to open the airway.

ii. Provide two rescue breaths. If you do not see the chest rise, then go straight to chest compressions before repositioning the head.

iii. For chest compressions; remove obstructive clothing if necessary. To find the compression site, put the heel of one hand in the centre of the chest between the nipples. Place your other hand on top and interlock your fingers together.

iv. To deliver compressions, position yourself so that your shoulders are directly over your hands and your arms are straight (lock your elbows).

v. To provide effective chest compressions, you should push hard and fast, depressing the breast bone about 4-5cm.

vi. The speed of the compression should be 100 compressions per minute.

vii. Use a compression to breath ratio of 30 compressions to 2 breaths.

viii. Continue giving CPR until you physically cannot do any more or until help arrives.

III. Chocking

a. Try to talk to the patient. If they cannot respond, then they must be chocking.

b. Give your name and ask permission to help.

c. There are three different methods to assist a choking patient:

i. Back blows:

❶ Take a position to the side and slightly behind the patient.

❷ Support the chest with one hand and lean the patient forward.

❸ Strike the patient between the shoulder blades with the heel of your hand five times.

ii. Abdominal Thrusts:
    - ❶ Stand behind the patient and place your arms behind their waste.
    - ❷ The thrust location is located two finger widths above the naval.
    - ❸ Make a fist with one hand and place the thumb side on the thrust site.
    - ❹ Place your other hand over the fist.
    - ❺ Bend your arms outwards to avoid squeezing the rib cage.
    - ❻ Perform 5 quick inward thrusts.

iii. Chest Thrusts (used for pregnant or obese people)
    - ❶ Stand behind the patient and place arms around the body under the armpits.
    - ❷ Find the lowest rib and follow that up until you find the point where they meet in the centre.
    - ❸ Find the notch/indent of the lower half of the breastbone and place your middle and index finger on the notch.
    - ❹ Make a fist and place the thumb side on the thrust site above the notch.
    - ❺ Place the other hand over the outside of the fist.
    - ❻ Perform quick inward thrusts until the object comes out.

iv. For a choking patient, start with 5 back blows, then move on to giving 5 abdominal thrusts and then 5 chest thrusts. Continue cycle until the object is removed or the patient becomes unconscious.

v. If the patient becomes unconscious, start to administer CPR and contact emergency medical services.

I. Serious Bleeding Management:

Goal: *Demonstrate how to use direct pressure and pressure bandage to manage a serious bleeding wound.*

Direct Pressure

1. Assess the scene and remember to ask for permission to help.
2. Alert emergency services and put on appropriate barriers.
3. Place a clean cloth/sterile dressing over wound and apply pressure.
4. Release pressure periodically to check if bleeding has slowed down or stopped.

Pressure Bandage

1. While applying direct pressure on wound put a pressure bandage over the dressing.
2. If the bandage becomes soaked in blood, DO NOT REMOVE. Place another sterile bandage over top and bandage in place.
3. Continue applying direct pressure.
4. DO NOT REMOVE bandages, instead, add bandages as necessary.
5. Bandage tightly, but make sure you avoid total blood restriction (no discolouring of fingers or toes).

Recovery Position

If the patient is unresponsive and unconscious, but they are breathing and no spinal injury is suspected, it is necessary to place the patient in the recovery position.

1. Look for serious bleeding and check ABCD's. Continue to monitor ABCD'S and place patient in the recovery position.
2. Put the patient's right arm straight above their head. Hold their right arm, while you carefully roll the patient on their right side.
3. Rest the patient on their side to allow fluid to drain from their mouth.
4. Stabilize the patient by bringing the top leg over and position on the ground in a bent position.
5. Place the patient's lower arm near or under the head to stabilize and ensure that the airway remains open and obstructed.
6. Continue to monitor ABCD's.

Appendix 15 – Practical Activity : Safety at Sea (2), in Water Rescue Techniques

Training Course on

Marine Biology, Marine Ecology, Safety at Sea and MCS

18-23 December 2010 - Koh Rong Samloem, Preah Sihanouk Province

SAFETY AT SEA (2)

In Water Rescue Techniques

Objective:

During this exercise you will learn some basic techniques on how to rescue a person that may be in need of assistance in the water. We will create different scenarios that you may come across and how to act appropriately to render support.

Mechanics:

1. Participants will be split into three groups.

2. One (or several) training staff members will be in charge of each group.

3. Training staff members are fully qualified. Please carefully follow their instructions.

Scenarios:

Rescue Scenario One:

An Unresponsive Person on the Surface of the Water

1. Assess the scene and use any bystanders to render assistance or call for help.
2. Get any necessary equipment you have handy and may require to help the person.
3. Swim out to the person and try to get their attention.
4. Use any flotation devices to help create and maintain buoyancy for yourself and the victim.
5. Turn the victim onto their back and apply the look, listen, feel approach.
6. If you cannot hear, see or feel any breathing, then apply two initial rescue breaths and start to swim to shore or boat.
7. Every 5 seconds give another rescue breath.
8. Continue doing this until you reach the shore or boat. If the person is still not breathing, then proceed with providing CPR.

Rescue Scenario Two:

A Panicked/Tired Person in the Water

1. Assess the scene and use any bystanders to render assistance or call for help.
2. Get any necessary equipment you have handy and may require to help the person.
3. Swim out to the person cautiously and try to communicate with them to calm down.
4. If the victim tries to grab hold of you, use the quick reverse technique to get away from them. Or as you get close to the person, throw a life ring or flotation device to them so that they grab onto that and not you.
5. Once the person has the flotation device, keep talking to them to calm them down.
6. Grab hold of the person and start to tow them into the boat or shore.
7. Monitor the person and treat for shock if necessary.

Appendix 16 – Practical Activity: Swimming, Snorkelingand Scuba-diving training activities

Training Course on

Marine Biology, Marine Ecology, Safety at Sea and MCS

18-23 December 2010 - Koh Rong Samloem, Preah Sihanouk Province

Swimming, Snorkelling and Scuba-diving training activities

Objective:

In this activity we will be getting you to take part in some or all of these water activities. From beginner to advanced, there will be something that everyone can try, learn and enjoy in the water. We will be teaching you how to swim, snorkel and scuba dive with one of our fully qualified instructors.

Mechanics:

1. Groups are divided according to skill levels, following the results of Sunday's questionnaire. Participants' names will be called and asked to join a group.

2. One (or several) training staff members will be in charge of each group.

3. Get your equipment from your trainer (life-jacket, mask and snorkel, fins, SCUBA equipment, etc.).

4. Training staff members are fully qualified. Please carefully follow their instructions.

Swimming:

Group # 1: Absolute beginners (participants who cannot swim)

- Floating; with and without floatation devices.
- Kicking skills
- Experiencing different movements through water
- Introduction of basic swimming techniques focusing on survival strokes.

Group #2: Beginners – Intermediate

- Exploring different swimming techniques such as breaststroke, freestyle and backstroke.
- Understanding the mechanics of survival strokes.
- Demonstrate the techniques in water.
- Get participants to try.

Advanced swimmers

- Review of swimming techniques focusing on survival strokes
- Get participants to get involved in skin diving to help gain a more enjoyable snorkelling experience.

Snorkelling:

Group # 1: Absolute beginners (participants who have not snorkeled)

- An introduction to the mask, snorkel, fins and life jacket.
- Teaching you how to put them on and how to adjust the equipment so that it is comfortable.
- Practice breathing through the snorkel.
- Get into the water at waist deep and practice putting your face in the water and breathing through the snorkel.
- Now go for a snorkel and look at all the fish and corals.

Group # 2: Beginners – Intermediate

- Collect mask, snorkel and fins that fit.
- Take a life jacket if you would prefer to.
- Head a bit further out into the deeper water and watch the interactions of the ecosystem of House Reef.

Advanced snorkelers

- Collect mask, snorkel and fins that fit.
- Head out to House Reef and watch the interaction of the ecosystem.
- Try to do a few dives under the water as a skin diver.
- We will explain skin diving techniques if you would like to learn.

Scuba-diving:

Group # 1: Absolute beginners (participants who have never dived)

- An introduction to the SCUBA (Self Contained Underwater Breathing Apparatus) gear.
- A short talk about the safety of diving. Do's and Don'ts
- Equipping you with comfortable fitting gear.
- Get into the water at waist deep level and practice breathing with your regulator.
- Follow the instructions by your instructor who will guide you through the rest of your dive.

Group # 2: Beginners – Intermediate

- A short talk and questions about how much you know and remember about scuba diving.
- Equipping you with comfortable fitting gear.
- Introducing you to the buoyancy of diving and how to control it.
- Get into the water and go for a dive.
- Follow the instructions by your instructor who will guide you through the rest of your dive.

Advanced divers

- A short talk and questions about how much you know and remember about scuba diving.
- Equipping you with comfortable fitting gear.
- Go for a dive on House Reef.
- Follow your guide and be sure to keep an eye out for interesting marine flora and fauna.

Appendix 17 – Pre-evaluation form

Pre training Evaluation Form

Please write your answers in the box below

I. Knowledge, ideas and learning

1. How would you evaluate your knowledge/skills on the following subjects:

Topic	Comments
What is marine ecology? Why marine ecology study is important? List down the importance of marine ecology	
Please list down your knowledge about MCS	
What does safety at sea mean? How to ensure safety at sea?	
Please list down the type of marine biology that have economic value and those are in an endangered categories? Please describe the life cycle of those species.	
Describe MCS. How important MCS is?	

Please circle you answer

Rating
5 - Outstanding
4 - Very good
3 - Good
2 - Average
1 – Poor

Presentation	**Rate**
Marine Ecology	5 4 3 2 1
Monitoring	5 4 3 2 1
Control and Surveillance	5 4 3 2 1
Safety at Sea	5 4 3 2 1
Marine Biology, Cambodian Commercial and Protected Species	5 4 3 2 1
Marine Monitoring (Reef check and marine surveys)	5 4 3 2 1

2. Practical activities will constitute a major part of the training. How you would you evaluate your knowledge and practical skills on the following subjects:

Activity	**Rate**
Marine habitats in your Cantonment area	5 4 3 2 1
Commercial and protected species species in your Cantonment area	5 4 3 2 1
Illegal fishing and fisheries Law, activities in your area	5 4 3 2 1
Safety at Sea – EFR and in Water Rescue Techniques	5 4 3 2 1

Swimming, Snorkeling and Diving	5 4 3 2 1

3. Can you swim? Yes - No
   If Yes, do you feel confident in the water?
   5 4 3 2 1
   In the water, would you be able to help someone in difficulty?
   5 4 3 2 1

4. What are your expectations / What would you like to achieve through these practical activities?
   .....
   .....
   .....
   .....

II. Applying the Learning and Effect on Work Performance

1. Do you think that the new learning, skills, ideas and knowledge will improve your performance at work? Yes - No
   If yes/no, why?
   .....
   .....
   .....
   .....

Appendix 18 – Post-evaluation form

Post training Evaluation Form

Please write your answers in the box below

I. Knowledge, ideas and learning

1. How would you evaluate your knowledge/skills on the following subjects:

Topic	Comments
What is marine ecology? Why marine ecology study is important? List down the importance of marine ecology	
Please list down your knowledge about MCS	
What does safety at sea mean? How to ensure safety at sea?	
Please list down the type of marine biology that have economic value and those are in an endangered categories? Please describe the life cycle of those species.	
Describe MCS. How important MCS is?	

Please circle you answer

Rating
5 - Outstanding
4 - Very good
3 - Good
2 - Average
1 – Poor

2. Do you feel that your personal learning objectives were met?

Presentation	Rate	Activity	Rate
Marine Ecology	5 4 3 2 1	Activity on where are the habitats in your Cantonment area	5 4 3 2 1
Monitoring	5 4 3 2 1	Activity on where these species are in your Cantonment	5 4 3 2 1
Control and Surveillance	5 4 3 2 1	Activity – Illegal fishing and fisheries Law, activities in your area	5 4 3 2 1
Safety at Sea	5 4 3 2 1	Swimming, snorkelling and diving	5 4 3 2 1
Marine Biology, Cambodian Commercial and Protected species	5 4 3 2 1	Safety at Sea: EFR, CPR and in water rescue techniques	5 4 3 2 1
Marine Monitoring (Reef check and marine surveys)	5 4 3 2 1		

3. How would you evaluate your knowledge/skills on the following subjects:

Presentation	Rate	Activity	Rate
Marine Ecology	5 4 3 2 1	Activity on where are the habitats in your Cantonment area	5 4 3 2 1
Monitoring	5 4 3 2 1	Activity on where these species are in your Cantonment	5 4 3 2 1

Control and Surveillance	5 4 3 2 1	Activity – Illegal fishing and fisheries Law, activities in your area	5 4 3 2 1
Safety at Sea	5 4 3 2 1	Swimming, snorkelling and diving	5 4 3 2 1
Marine Biology, Cambodian Commercial and Protected species	5 4 3 2 1	Safety at Sea: EFR, CPR and in water rescue techniques	5 4 3 2 1
Marine Monitoring (Reef check and marine surveys)	5 4 3 2 1		

4. Did the training cover everything you had expected to?

Presentation	**Rate**	**Activity**	**Rate**
Marine Ecology	5 4 3 2 1	Activity on where are the habitats in your Cantonment area	5 4 3 2 1
Monitoring	5 4 3 2 1	Activity on where these species are in your Cantonment	5 4 3 2 1
Control and Surveillance	5 4 3 2 1	Activity – Illegal fishing and fisheries Law, activities in your area	5 4 3 2 1
Safety at Sea	5 4 3 2 1	Swimming, snorkelling and diving	5 4 3 2 1
Marine Biology, Cambodian Commercial and Protected species	5 4 3 2 1	Safety at Sea: EFR, CPR and in water rescue techniques	5 4 3 2 1
Marine Monitoring (Reef check and marine surveys)	5 4 3 2 1		

5. Is there additional material you think the course should have covered? Yes - No

   If so, what?

   .....

.....
.....
.....

I. Applying the Learning and Effect on Work Performance

2. Will you use the new learning, skills, ideas and knowledge? Yes - No
   If so, how?
   .....
   .....
   .....
   .....

3. Do you believe that the new learning and knowledge you have will improve you performance at work?
   5 4 3 2 1

II. Practicalities and Organization

1. Do you feel that the course was conducted well (e.g. engaging form of training delivery, length of course, professionalism of trainers, good venue)?
   5 4 3 2 1

2. Practical activities constituted a major part of the training. Were you satisfied with the way they were conducted? Yes - No
   If not, why?
   .....
   ……
   .....
   .....

III. Facilities

3. Were you satisfied with the training room and equipment?
   5 4 3 2 1

4. Were you satisfied with the accommodation?
   5 4 3 2 1

5. Were you satisfied with the food and snacks?
   5 4 3 2 1

Please feel free to leave any comments:

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Name (optional):

E-mail contact (optional):