

**USAID/COMFISH Project**  
***PENCOO GEJ***  
***Collaborative Management for a Sustainable Fisheries Future in Senegal***

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**By:**  
The University of Rhode Island (URI)  
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Coastal Resources Center, University of Rhode Island  
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World Wildlife Fund - West African Marine EgoRegion  
Environnement et Développement en Afrique-Energie  
Centre de Suivi Ecologique

Institut Universitaire de Pêche et d'Aquaculture/ Université Cheikh Anta Diop de Dakar  
Centre de Recherches Océanographiques de Dakar-Thiaroye  
Fédération Nationale des GIE de Pêche



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## I. EXECUTIVE SUMMARY

The goal of the USAID/COMFISH project is to support the Senegalese Ministry of Fisheries and Maritime Affairs, via its technical departments and particularly the DPM, in implementing the Fisheries Sector Policy Letter that enshrines Senegal's efforts to achieve sustainable management of its fisheries resources. To do so, the project develops collaborative management plans on priority stocks by establishing stock-based sustainable management units for each target stock and using the CLPA as the primary entry point. The project synergizes the institutional, administrative, socio-economic and environmental aspects of fisheries management to help Senegal to achieve collaborative sustainable management of its fisheries resources. All the activities designed this year were aimed also at improving the resilience of coastal and marine ecosystems and populations to climate change.

**On policy dialogue**, the project supported several actions this year, including:

- The establishment of a Technical Working Group (TWG) in the Department of Marine Fisheries, which is responsible for validating the periodic reports USAID/COMFISH produces as a part of efforts to develop the sardinella management plan
- The establishment of a national technical committee to spearhead thinking on the fishing capacity management plan
- The reopening of consultations on the integration of IUU fishing in Senegal's fisheries management policies
- The evaluation of catch outside Senegal's EEZ, which has made it possible to organize consultations with the Senegalese authorities (Ministry of Fisheries and Maritime Affairs) on the significance of landings from the sub-region and how they are taken into account in national statistics
- Thinking on ways to increase women's presence in fishery governance
- Consultations on ways to better address climate change in the fisheries sector
- Participating in the meetings of the National Committee on Small Pelagics to develop the management plan under CSR

**In terms of “strengthening institutional and stakeholder capacities for good fisheries governance”**, the project organized 48 workshops and trained 2,078 individuals, achieving a completion rate of 99% of the annual target of 2,090. The project strengthened the capacities of 22 national institutions (research institutes, training institutions and government departments, agencies, consultation frameworks). It also financed their research and training activities, and supported the establishment and/or re-opening of consultation platforms. There were 41 grassroots organizations (CLPA, CLP, EIGs of women processors, and MPA management committees) that received support from the project against an initial target of 32 organizations. Several training exercises were organized also on climate change when the project established Local Agreements. Apart from this, the project offered training courses on leadership to fifteen women leaders from 11 community-based organizations. These women leaders will in turn train their members during the chats they organize regularly in “mbars”, or areas for breaks from work. In this way, they can reach out to a considerable number of women who work on the artisanal processing sites in Senegal.

The production of print and audiovisual materials was another medium the project used to strengthen the capacities of fishermen on a broader scale. It took steps to: a) sign three contracts with three community radio stations in the Petite Côte for the production of 86 radio programs that shared information widely on local agreements; b) develop good practice guides, brochures and posters with

which to educate the highest possible number of stakeholders on some major issues (IUU fishing, climate change, fishing overcapacity, juvenile fishing, etc.).

**To test and apply strategies, good practices and policies**, 11 scientific studies were conducted on major topics to improve knowledge on fisheries resources, coastal community vulnerability and adaptation to climate change, and MPA governance. The studies made a substantial contribution to fisheries management.

Local Agreements were established in Mbour, Joal and Sindia, allowing over 7,000 actors to apply new rules for management and improve the management of the 334,104 ha that make up the fishing areas of these CLPAs. To apply these Local Agreements, the project supported the CLPAs in Mbour, Joal and Sindia to choose members for four technical committees: the “Surveillance and Safety-at-Sea Committee (collaborative surveillance team)”; the “Education, Information, Training and Communication” Committee; the “Conflict Settlement and External Relations” Committee; and the Scientific Committee for Management of Fisheries Resources, Environment and Collaborative Research”. In Joal Fadiouth, the members selected for the four committees were 108 in number and came from all ‘colleges’ in the CLPA. In Mbour, they were 73 and in Sindia 383. These committee members will be trained so that they contribute to implement the Local Agreements of their CLPAs.

The project contributed also to establishing three Local Agreements for the CLPAs in Rufisque/Bargny, Yenne/Dialaw and Cayar. These agreements were designed using a participatory and inclusive process with all the actors, and then presented to the Coordination and Advisory Bodies (ICCs) of the CLPAs for approval. To achieve the results set for the year, other provisions were submitted to the administrative authorities for approval (MoUs, official notes for establishing the sardinella committee, and the fishing capacity management committee). With Local Agreements, it is easier to negotiate management rules in local communities, formalize relations between CLPAs, and develop and implement stock-based management plans. It is in this respect that developing and implementing Local Agreements is one of the requirements for establishing management plans for sustainable fisheries management.

In terms of coastal and marine ecosystem management, the project finished marking the MPA boundary in Cayar and completed a study on the challenges and weakness of MPA governance. This improved the management of 41,500 ha of biologically significant areas (Cayar, Joal/Fadiouth and Bamboung MPAs).

**The program developed the sardinella management plan** alongside its work on Local Agreements. It convened a first meeting of the sardinella technical working group this year to validate the summary report on the challenges to and solutions for sardinella fisheries, as well as the proposed methodology for establishing consultation frameworks. A second meeting followed in Mbour on June 20<sup>th</sup> to review the documents on the diagnostic study on sardinella fisheries produced by consultants, and validate the activities for developing the management plan.

The project continued to build **a repository of scientific data** to support the selection and validation of management options for the development of management plans. Most of the studies commissioned by the project were finalized this year. They include scientific reports on the evaluation of landings from Senegalese pirogues fishing in the sub-region, on sardinella population dynamics in North West Africa, and on Illegal Unreported and Unregulated (IUU) fishing. There were studies also on the collection of biological data, the use of the ELEFAN program and the processing of a series of data collected by IUPA and IRD/IFAN on priority species, the mapping of stock dynamics, and the state of shrimp fisheries in Sine Saloum. This whole process ended with a first draft of the sardinella management plan, covering the nine CLPAs in the Thies and Dakar regions. Efforts to finalize and

validate this draft document will begin in 2014 via the consultation frameworks the project has established for that purpose.

**As concerns the intermediate result on “increased social and economic benefits for artisanal fishing communities”**, the project pursued efforts to promote the local label of “keccax” from Cayar by refurbishing the processing plant (ongoing), continuing to provide functional literacy classes, beginning to implement the Code of Conduct, organizing a feedback workshop on the Wolof version of the Code of Conduct, organizing tea-talks on the Code of Conduct in “*mbars*”, finalizing the study on conditions for the storage of fish, revitalizing the hygiene committee, building synergy with the USAID/YAJEENDE project in Cayar, initiating thinking on ways to establish a “revolving” credit committee, and finally, providing computer literacy training and purchasing information technology equipment and office furniture. On top of all this, the project also organized a coffee chat on women’s role in Senegalese fisheries to attract the attention of the sector’s authorities to the importance of taking a gender approach to decision making.

Some 41 grassroots organizations (CLPAs, CLPs, EIGs of women processors, MPA management committees) received support from the project. There were also 9,131 households that benefitted from the project’s support through the local agreements it developed and established, and 5,449 households that benefitted from the climate change adaptation plans it prepared.

**On climate change**, efforts are under way to set up a Steering Committee that will establish a consultation framework on fisheries. Two diagnostic studies were conducted on the state of knowledge on climate change and fisheries in Senegal’s coastal areas, and on the existing consultation frameworks on climate change and fisheries. The project conducted three vulnerability assessments in the Joal/Fadiouth, Sindia and Rufisque/Bargny CLPAs. After these exercises, three adaptation plans were proposed and validated by the ICC members of these CLPAs, making it possible for the project to meet its annual targets. Finally, a total of 2,078 individuals, out of a target number of 2090, increased their resilience to climate change and climate variability, making a completion rate of 99%. These adaptation plans are going to be finalized and implemented in 2014. A time series study on the coastline and the dynamics of land use in pilot sites is still underway with satellite images from 1954, 1978, 1989 and 2012.

## 2. INTRODUCTION

The Collaborative Management for a Sustainable Fisheries Future in Senegal project (*USAID/COMFISH*) is a five-year initiative funded by the United States Agency for International Development (USAID). The project is implemented with a Cooperative Agreement between USAID and the University of Rhode Island (URI). The main implementing partners are government departments, private sector fisheries associations, university centers and research institutes (UCAD, IUPA, IFAN, ISE, CRODT, IRD), and non-governmental organizations (NGOs) working on fisheries.

The goal of the *USAID/COMFISH* project is to support the Government of Senegal's efforts to achieve reform of its fisheries sector, as provided in the Fisheries and Aquaculture Sector Policy Letter, by strengthening many of the enabling conditions necessary for improved governance and demonstrating effective tools for ecosystem-based collaborative management of its marine fisheries. These tools are designed to improve social, institutional and biological sustainability at the same time. Provisions for local governance bodies, in a general sense, exist in Senegal's 1998 Fishing Code, and Local Artisanal Fishing Councils (CLPA) have been established. The biological sustainability of some fish stocks has been studied, but the findings are still not fully integrated in the collaborative management plans in local communities. Consequently, local management mechanisms do not fully observe the Sector Policy Letter's sustainability criteria, and most fisheries in Senegal are not managed in a sustainable manner.

The *USAID/COMFISH* Project supports Senegal's fisheries sector reform and biodiversity conservation by pursuing the crosscutting goals of improved governance, gender mainstreaming and resilience to climate change.

The project seeks to develop and replicate new models of sustainable fishing to ensure Senegal attains sustainable management of the artisanal fisheries sector. Because most of the fisheries resources at local level are shared between Senegal and its neighboring countries in the CCLME region, the project will endeavor also to harmonize artisanal fisheries governance in the sub-region. But most of its activities are concentrated in Senegal.

The long-term goal of the *USAID/COMFISH* project, in a 20-to-30 year timeframe, is to eradicate overfishing from Senegal's fisheries, so that they provide (1) a durable source of high quality protein supply to the nation, which (2) contributes to the quality of life in artisanal fishing communities, and (3) maintains the capacity of coastal and marine ecosystems to produce goods and services that are useful to and desired by the Senegalese people.

The *USAID/COMFISH* project contributes to the achievement of the following four major intermediate results:

IR 1: Institutional and stakeholder capacity strengthened at all levels of governance to implement an ecosystem-based, collaborative management approach to sustainable fisheries, to prevent overfishing, and to increase climate change resilience.

IR 2: Strategies, policies and best practices identified, tested and applied to address both climate and non-climate stressors and their interactions in marine fisheries and biodiversity

IR 3: Vulnerability assessed and capacity of vulnerable coastal communities strengthened to adapt to the impacts of climate variability and change.

IR4: Increased social and economic benefits to artisanal fishing communities provide incentives to a continued sustainable fisheries agenda and increased climate change resilience.

This report describes activities the USAID/COMFISH project implemented in FY13. It also presents the major accomplishments of the fourth quarter, a section on the project's crosscutting activities, and a last section on project management and appendices.

### **3. ACCOMPLISHMENTS IN YEAR THREE**

#### **3.1. Policy reform**

Year three was the year the project obtained results in many of the actions it had initiated for policy dialogue/reform with the authorities in charge of fisheries and environmental management.

***Progress recorded in priority fisheries development:*** A Technical Working Group (TWG) was established in the Department of Maritime Fisheries (DPM) based on Memorandum No. 00556 MPAM/DPM/ dated 3 April 2013. The group's role is to support USAID/COMFISH project efforts to develop management plans for targeted fisheries. This TWG is chaired by the Deputy Director of Fisheries. Its members include DPM technicians, Fisheries Inspectors in the project areas, experts from the USAID/COMFISH project and all other resource persons who can help develop fisheries. The TWG also validates the USAID/COMFISH Project's progress reports on management plan development and ensures coherence between the Small Pelagics Development Plan (designed at the national level) and the local management measures proposed by the project. This year the TWG met three times to: validate the sardinella technical review and the stakeholder awareness and diagnosis report produced for the sardinella management plan; review the consultation frameworks proposed by stakeholders; discuss and negotiate management rules; and validate the measures proposed for the collaborative management plans on targeted fisheries.

In the course of several different meetings, DPM worked through the Technical Working Group to consult with the USAID/COMFISH project on the need to establish a model collaborative management plan on sardinella fisheries that can be replicated in areas not covered by the project.

***National Technical Committee established to reflect on fishing capacity management plan:*** A national workshop was organized in July 2012 to share ideas and experiences on fishing capacity management in Senegal. Under the auspices of the Accelerated Growth Strategy's "Fisheries and Aquaculture Cluster", the workshop highlighted the contributions expected from the Ministry of Fisheries, Fisheries Research institutions (CRODT), the private sector (industrial fisheries and artisanal fisheries) and partners of ongoing projects and programs in Senegal. Considering how severely the sub-region is affected by this problem, WWF took extra measures via the UNDP/EU/WWF project to convene experts in the sub-region for another workshop in March 2013. This workshop addressed key issues in fisheries management and fishing capacity management, IUU fishing and catch reconstruction. Over 86 participants attended the workshop from Senegal and other countries in the sub-region, partner institutions, CSRP, and the University of British Columbia (UBC).

The objectives of the workshop were: i) to initiate reflection on Senegal's fishing capacity and possible solutions; ii) to share experience on how to manage the sub-region's fishing fleet; iii) to understand the scope of IUU fishing in the sub-region; iv) to share innovative ideas for reconstructing data on fish captures; and finally v) to draft a capacity management plan, drawing from the successes of other regions worldwide. The participants made recommendations on how to tackle and solve some of the pressing issues facing countries, by ensuring that: a) ministerial departments for fisheries take tough measures to develop the sector; b) regional and maybe international cooperation is strengthened to fight against IUU fishing and encourage the countries affected to exercise their right to legal action; and, c) a regional approach to fisheries surveillance is developed.

Following these recommendations, a meeting was held at the DPM in April 2013. This meeting proposed that the National Technical Committee on the management of Senegal's fishing capacity be established. The Minister of Fisheries and Maritime Affairs established the Committee with official memo Nr. 000822, dated June 12<sup>th</sup>, 2013. This memo set out the partner institutions and TOR assigned to the Committee. Under the leadership of the Director of Marine Fisheries, the Technical Committee will be responsible for steering the fishing capacity management process that was designed with the support of DPM, CEP, WWF and SCA. It will also validate the USAID/COMFISH project's methodology for estimating IUU fishing in Senegal.

***Discussions on IUU fishing reports and capture data reconstruction in Senegal, with DPM and in the presence of UBC experts:*** A meeting was held on June 5, 2013 at DPM to share the findings of studies conducted on IUU catch and capture data reconstruction by the USAID/COMFISH project and the University of British Columbia. This meeting, chaired by the Director of Marine Fisheries, brought together experts from the Ministry of Fisheries, WWF and USAID/COMFISH project. The participants had enriching discussions on Senegal's intervention capacity against IUU fishing at the national, regional and international level. The study findings showed that industrial IUU catches are equal to the official catch reported for Senegalese fisheries, which is why this issue needs to be addressed at the highest level.

***Meeting with DPM and partners to share reports produced by the project on IUU fishing and fishing outside of Senegal's EEZ:*** The Director of Fisheries chaired a closed meeting at DPM on June 27, 2013 with representatives of DPM, WWF and the USAID/COMFISH project to review the terms for validating documents developed under the USAID/COMFISH project. The documents were reports on IUU fishing, and on artisanal fish catch and landings outside Senegal's EEZ. It was agreed that the National Technical Committee, in charge of fishing capacity management, would also examine these documents.

***Discussions on the TOR for "the census of working women in artisanal fisheries":*** to assess women's intervention in artisanal fisheries, it was agreed that a census of those active in the sector should be conducted. WWF, ENDA TM, USAID/COMFISH and DPM held several meetings at DPM to harmonize their approaches in that regard. The final version of the terms of reference, approved by all the partners, was endorsed by the Minister of Fisheries. The importance this topic has for the Fisheries Department led the Minister of Fisheries to seek the support of all structures so that this fact-finding initiative on women's role in the fisheries sector at a national level is conducted successfully. He sent official letters to prepare the ground for the census and mobilize financial support. The study cost is estimated at 27,000,000 CFA Francs (US\$54,000), an amount clearly higher than the USAID/COMFISH project's budget provision of 5 000 000 CFA francs (US\$10,000). For that reason, the study did not take place. A bigger coalition of partners will work to make it possible to carry out this study in 2014.

***Presence in the meetings of the National Committee on Small Pelagics:*** To develop the small pelagics national management plan within the CSRP, the project attended two meetings of the National Committee on Small Pelagics: the first, on March 12, 2013, was to put together an action plan for the management of small pelagics. It brought together the USAID/COMFISH project and several other institutions including CSRP, GAIPES, CRODT, CEP, DPSP, the CCLME project, DPM, and the heads of regional fisheries services. The project was invited to share its strategy on collaborative management plans. The second meeting, on June 25, was to form a technical team that would draft the small pelagic management plan.

***Renewed dialogue to improve climate change resilience:*** To re-open dialogue, meetings were held with the National Directors of Fisheries and Environment. At these meetings, it was agreed to set up a



Steering Committee (task force set up on May 14, 2013) that reviews the state of dialogue and leads the process in better ways so that it thoroughly addresses climate change impacts on the fisheries sector.

### **3.2. Strengthening human and institutional capacities**

#### *3.2.1. Stakeholders*

The project *trained seven (7) CLPAs on fisheries legislation and CLPA management* with the support of WWF. In November 2012 it organized another training workshop in Foundiougne for forty CLPA trainers and extension workers from 10 CLPAs. The training was on the bioecology of octopus and bonga, fundraising, the use of fishing licenses, and how to collect and process fishery statistics. After this workshop, there were two other training exercises for ICC members and relay workers to improve their skills on collaborative management. These training initiatives also included a series of modules for stakeholder training on climate change and women fish processors.

**Exchange visits:** FENAGIE PECHE supported efforts to organize two exchange visits to Cayar and then to Mbour. These visits brought together actors from Joal, Sindia, Mbour, Rufisque, Bargny, Yenne Dialaw and Cayar. The objectives of the meeting were to enable actors from Mbour division to familiarize themselves with the experience and good fishing practices used in Cayar, as well as with the way their CLPA functions and makes decisions. The visits to Mbour division gave actors from Rufisque/Bargny, Yenne/Dialaw and Cayar the opportunity to share ideas on sardinella and octopus management measures and on how the Ngaparou community area functions.

**National workshop for building women's capacity in leadership:** from June 24 to 26, 2013 the project and DPM together organized a workshop in Dakar to provide training in leadership to women working in artisanal fisheries. The Department of Marine Fisheries coordinated the rollout of this activity via the Gender Office to ensure it gains better ownership of the results and to facilitate follow-up on subsequent actions. Eighteen (18) women attended the workshop from all project areas. The courses were entirely in Wolof and covered: the qualities of an effective leader, the advantages and disadvantages of leadership, how to appreciate leaders for what they are worth, how to strengthen your leadership, and what major lessons the women had learned from the training. At the end of the course, the participants were better equipped to assume their roles and responsibilities in women's organizations and in local and national fisheries management organizations (CLPA/CLP, CNCPM), so that they contribute more effectively to establish fisheries development and management plans in Senegal.

**Feedback on the national process and workshop on good practices in artisanal fisheries:** Three workshops to provide feedback on the process and results of the national contest on good fishing practices (GFP) were held from May 17 to 23, 2013 in Cayar, Foundiougne and Joal-Fadiouth. The workshops brought together actors from the CLPAs/CLPs in the areas concerned. As a reminder, this contest was organized to raise the awareness of fisheries stakeholders and strengthen their resolve to secure and pass on equivalent or better living conditions to future generations. It was intended also to promote cross-fertilization of new ideas that can be shared with other fisheries stakeholders. In fact, a fisherman and/or fisheries stakeholder who shares his life experiences with others can be a powerful tool for the transfer of knowledge, and for stimulating the kind of behavior change the project is expecting and hoping to see in fisheries resources management. Such awareness will contribute substantially to success in future efforts to design and implement fisheries development and management plans in Senegal. The objectives of these workshops were to ensure actors were better informed on: a) the ongoing process to establish and validate this initiative; b) the organization of the press visit to showcase the good fishing practices selected and rewarded; c) the organization of the

exchange visit to Ngaparou for actors in project intervention areas to share the experience of this prize contest; and, d) the lessons learned and suggestions for improvement gathered from actors at the grassroots.

Most ICC members from the CLPAs in each location attended the meetings. Recommendations for the contest in 2014 were discussed. The participants said that they were hoping to see the 2014 edition organized under the chairmanship of the Minister for Fisheries. Their key recommendations were to:

- Add a representative of artisanal fisheries to the jury
- Inform actors on the next contest with more lead time
- Involve as many people as possible in this initiative
- Organize radio and television programs to raise awareness and ensure wide dissemination of the initiative
- Host this contest each year



*Photo 1: Processed product from the award winning Community of Dione*      *Photo 2: Surveillance team of award winning CLP of Ngaparou*

***Pilot project on octopus fisheries:*** To kick-start the pilot initiative on the octopus fishery in Yoff, the project organized site visits to the Yoff fishing community to collect information on the local community and to identify the local leaders, the problems facing octopus fisheries at local level, and the needs for behavior change.

***A stakeholder consultative meeting on the Petite Cote and an awareness initiative on the management measures implemented in Mbour division:*** To promote collaborative management of local fisheries, various management measures were initiated by actors in Mbour division who are members of the CLPAs in Mbour, Sindia and Joal. These CLPAs get support from the fisheries department, research institutes and technical and financial partners through projects such as COGEPAS, GIRMAC, COMFISH, etc. To improve the effectiveness of the management measures currently in use, USAID/COMFISH and FENAGIE together provided support for an awareness and dialogue workshop on May 29, 2013 in Mbour. This workshop brought together about 130 representatives of all stakeholders: the fisheries sector (fishermen, wholesalers, processors), administrative and judicial authorities (representatives of the Director of Fisheries, the divisional officer of Mbour, the Prosecutor in Mbour, the Mayor of Mbour, fisheries Officers, national park officers, etc.), USAID/COMFISH project experts, and media practitioners. The purpose of the workshop was to conduct an in-depth analysis of the management measures implemented and make the necessary adjustments for sustainable management of octopus, cymbium and sardine fisheries in Mbour division.

*Working with FENAGIE-pêche to give actors information and idea-sharing opportunities* so that they learn about the USAID/COMFISH project approach and get more information about how they can use Local Agreements as tools for fisheries resources management. There were 48 participants in this facilitation session that took place in the project intervention areas.

### 3.2.2. Institutions

#### **Local governance institutions**

*To help operationalize CLPAs*, four (4) new extension workers (relays) received training in techniques for developing and implementing Local Agreements. During the training, these extension workers also learned the basic techniques for organizing and facilitating group meetings. At the same time, former CLPA extension workers were given refresher training on their roles and responsibilities in the implementation of local agreements.



*Photo 3 & 4: Selection of extension workers/community relays at Yene and Cayar*

*Four new facilitators were hired by the project and trained* in facilitation techniques (facilitation, participatory methods, development of action plans, report writing and the preparation of progress reports) in order to help CLPAs and fisheries services discharge their duties for sustainable fisheries management.



*Photo 5: Training of new facilitators at USAID/COMFISH*

*To implement Local Agreements*, one of the key actions is to *revitalize the local institutions* responsible for collaborative management. It is in this regard that the project took steps to organize CLPAs and make them operational. As a result of meetings in the target CLPAs it was agreed that five (5) committees and a coordination committee would be formed in each CLPA.

*Strengthening CLPA capacities in participatory surveillance for improved effectiveness in Local Agreements:* After strengthening CLPAs, the USAID/COMFISH project took further steps to enable them to begin implementing activities defined in the Local Agreements. In the CLPAs at Mbour,

Sindia and Joal Fadiouth, the project strengthened the capacity of the Committees for Surveillance and Safety at Sea to enable them to function properly.

***Discussions with local government authorities on fundraising for CLPAs:*** From February 13 to 15, 2013, WWF and the Department of Marine Fisheries (DPM) went together to Cayar and Joal-Fadiouth. Their mission was to meet the mayors, rural council presidents, municipal/rural councilors and discuss how local government areas can help find solutions for financing local councils for artisanal fishing (CLPA) in the USAID/COMFISH project's intervention areas. The objective of these meetings was to introduce CLPAs to the local government authorities and look into the various ways by which the local government could financially support these fisheries management structures. The forty-seven (47) participants who attended the meetings in Cayar and Joal welcomed the decision made by the Mayor of Cayar Commune to support the CLPA in his locality from the budget of the current fiscal year. All the participants applauded his decision.



*Photo 6 & 7: Municipal Council meetings respectively in Cayar and Joal*

The recommendations made at the end of the discussions were to:

- improve the sharing of information on CLPAs with local government possibly by using the DPM website on [www.dpm.sn](http://www.dpm.sn) as a gateway for access to all information on the Fisheries Code, the status and duties of CLPAs, as well as relevant information on fisheries in Senegal
- organize frameworks for dialogue and/or working sessions between the local authorities and CLPAs
- let local government and CLPAs jointly assess the contribution of fishing and related activities to local government revenue
- see to it that fisheries infrastructure (e.g. a fishing pier) contributes to finance CLPA operations
- ensure that local authorities contribute to CLPA operational costs
- call on local authorities in coastal communities to set aside land for fisheries activities
- request central authorities to allocate enough financial resources for local authorities to use for conservation of fishery resources
- strengthen the training of fishermen who are duly registered members of CLPAs

### **Technical services, research institutes and training institutions**

***Contribution to capacity strengthening in research and training institutions:*** USAID/COMFISH contributed to strengthen the fisheries data collection and analysis systems of CRODT, IUPA, IRD/IFAN, ISE and CSE by helping these institutions reinforce and expand their data collection mechanisms in the project's intervention areas. This same data collected was used in three Masters Degree theses and two Ph.D. theses to analyze the project's target stocks.

From June 3 to 8, 2013 IUPA organized a **training workshop on evaluation of biological stocks** and use of Electronic Length Frequency Analysis (ELEFAN) software at the Université Cheikh Anta Diop in Dakar. The goal was to teach participants how to use the new version of ELEFAN (ELEFAN in R). This was done with biological data collected by IUPA and IFAN. Thirty participants attended the workshop from USAID/COMFISH partner institutions (DPM, Ministry of Fisheries, CEP, CSRP, PRAO, CCLME, CRODT, WWF, IUPA, IFAN, UGP, and USAID/COMFISH). The facilitators at the workshop were experts from the University of British Columbia in Canada. They taught the participants all the basic elements required to use ELEFAN in analyzing the growth parameters of the project's target species using their size frequency.



*Photo 8, 9, 10, 11: ELEFAN Workshop pictures*

**Capacity building for staff in the Ministry of Fisheries and research institutes:** Under DPM's capacity building and training program, the project awarded Mr. Ousmane Ndiaye, Technical Inspector of Fisheries, a five-month training grant to the University of Rhode Island. The training lasted from December 1, 2012 to April 30, 2013 and was supervised by a team of professors and specialists in marine fisheries governance and management. Its objective was to review and study Senegal's current governance system, to learn about fisheries management in the United States, and to do a comparative study highlighting good practices and approaches that can be adapted to Senegal's system. Mr. Ndiaye attended several meetings with local, regional and national fisheries councils across communities in Rhode Island, Baltimore, Massachusetts, Maine and Alaska. Mr. Ndiaye completed a report on fisheries governance in Senegal and presented it to the URI campus community. Upon his return to Senegal, Mr. Ndiaye presented these results in July 2013 to the USAID/COMFISH team and the DPM team.

Another training grant on population dynamics and biostatistics was offered to the scientific research sector. Ms. Diop, the candidate proposed by CRODT, has a Master's Degree in biostatistics on fisheries and environment from the Université Gaston Berger in Saint Louis. Her supervisors were a team of

professors from the Graduate School of Oceanography, University of Rhode Island. Unfortunately, Ms. DIOP did not pass the TOEFL exam on time and could not be admitted to the Ph.D. program.

### **3.3. Natural resources/management plans/marine biodiversity and ecosystem conservation**

#### *3.3.1. Establishment of a scientific data repository*

The results of most studies envisaged last year were finalized and analyzed in the reporting period: IUU fishing, the landings of boats fishing outside Senegal's EEZ, collection of socio-economic data on the shrimp fisheries in Sine Saloum, collection of biological data, mapping of fishing infrastructure, and stock dynamics in time and space.

**Collection of biological data by IUPA and IRD:** In FY13, biological data collection missions were conducted on a monthly basis. The focus was on the size (length and weight) and reproduction characteristics (sex, stage of sexual maturity and fecundity) of the target species. The biological parameters studied were: size frequency, size-weight relationships, sex ratio, sexual maturity stages, size at first sexual maturity and growth. A total of 1,736 individuals were measured and weighed, including 411 round sardines, 655 flat sardines and 670 bonga. For each species, 50 individuals were collected per month to study their reproduction characteristics. All biological data collected was stored in Excel format. This data will be processed to determine the size frequency, growth parameters and reproduction characteristics.

**Validation of CRODT reports and the report on IUU fishing, and reconstruction of captures:** after the submission of study reports on fishing boat catch outside Senegal's EEZ and on sardinella fisheries in the sub-region, the project's experts gave their input and made some corrections to ensure the final reports were of highest quality. In this regard, a meeting with the relevant authorities has been scheduled to discuss the modalities for publishing the data.

On IUU fishing, the USAID/COMFISH project has already sent draft reports for review and possible approval by the technical committee set up in that respect by the Ministry of Fisheries and Maritime Affairs.



*Photo 12: IUU report presentation at DPM*



*Photo 13: Prof. Daniel Pauly (second on the left) at the report presentation session*

**Contribution to shrimp fisheries development in Sine Saloum:** The USAID/COMFISH project supports the Government of Senegal to improve scientific knowledge on shrimp in the Sine Saloum region in order to assist with management plans on this species. The data collection phase is over and the collected data has been analyzed. The data analysis suggests that about 700 tons of shrimp are harvested each year in Sine Saloum. A good portion of the catch (57%) takes place during the high season (September, October, November and December), and 85% of that catch takes place between September and April.

Overall, the monthly fishing effort followed the same trend as the catch (a drop between January and August and an increase in September) and then dropped. An analysis of the zonal distribution of fishing effort shows contrasting trends between the areas located on the coastline (Betenti/Niodior) and the inland fishing sites (far from the coast). On the coastline areas, fishing effort peaked in March, while the peak on the other sites was September/October.

The monthly average of individuals per kilogram (called the 'moule' in French) fluctuates between 143 and 213 individuals. Between January and April, there are less than 200 individuals per kilogram, while in the period from April to July, the number of individuals per kilogram exceeds 200 (smaller shrimp) and then drops from August. The moule, level of fishing effort, and total catch by fishing area and over time were determined to relate to changes in the environmental parameters of the Saloum estuary (especially salinity and temperature), which determine the migration trends and length of time juvenile shrimp spend in the estuary.

The next step is a meeting for technical validation of the document and use of the findings in 2014 to strengthen management measures in the estuarine shrimp fishery.

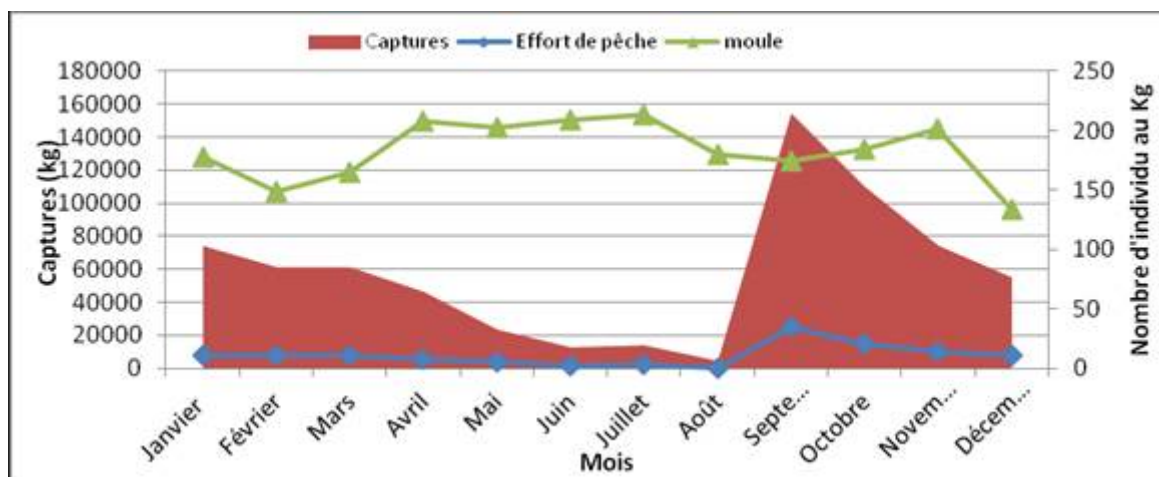


Figure 1 : Annual variation of catches, fishing effort and number of individuals per kg



Photo 14: A fisherman mending a net



Photo 15: Cooked and dried shrimp

**Support for decision-making on management plans and climate change resilience:** efforts were made to give CLPAs better access to scientific information that they can use to develop and implement management plans (stock distribution in space and time, GIS mapping). All the results obtained were





The project carried out a collaborative mapping of sardine, octopus, grouper and cymbium stock dynamics in space and in time through creel surveys. This work, as well as the processing of research data, was carried out by the Ecological Monitoring Centre (CSE). The results obtained indicate that fish stocks have been moving to deeper water in the past thirty years.



Photos 16 & 17: Collaborative mapping workshop at the Rufisque Bargny CLPA

With regard to the sardinella stock, the study area had higher quantities in the 1980s and 1990s. Fishermen say that the species was closer to the shore between the 0 and 50 m isobaths. At the time, sardinella was caught 5 to 30 km off the coast. Presently, fish stocks have moved into deeper waters (10 to 400 m isobath). Fishermen now travel between 30 and 100 km off the coast and there is no guarantee that the fish will be available in the area. Hence, they increasingly fish in waters with greater sardinella abundance such as Gambia and Mauritania.

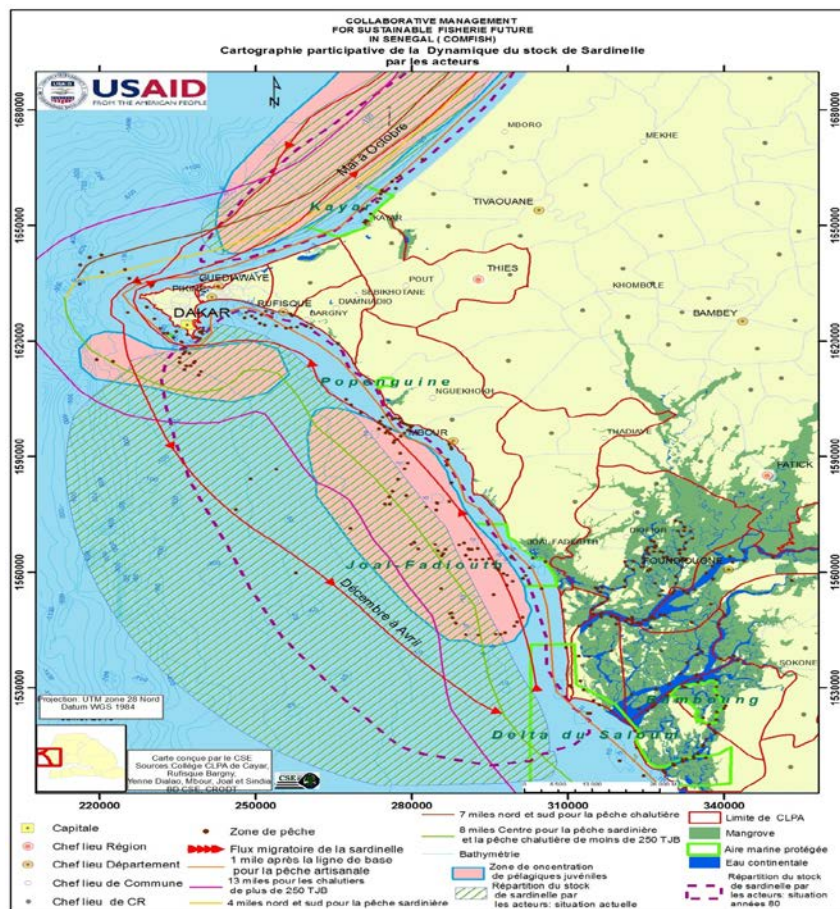


Figure 3: Sardinella stock dynamics by actors

Things are the same for octopus and grouper. They were located in shallow waters in the '80s and are now in deeper water. Coupled with this, there has been an alarming decline in the abundance of these stocks from 1980 until today. Octopus stocks have moved from a depth of 1 to 4 m to 25-50 m. For grouper, the movement has been from depths between 0-30 m to depths of 50 m located in areas about 70 km off the coast.

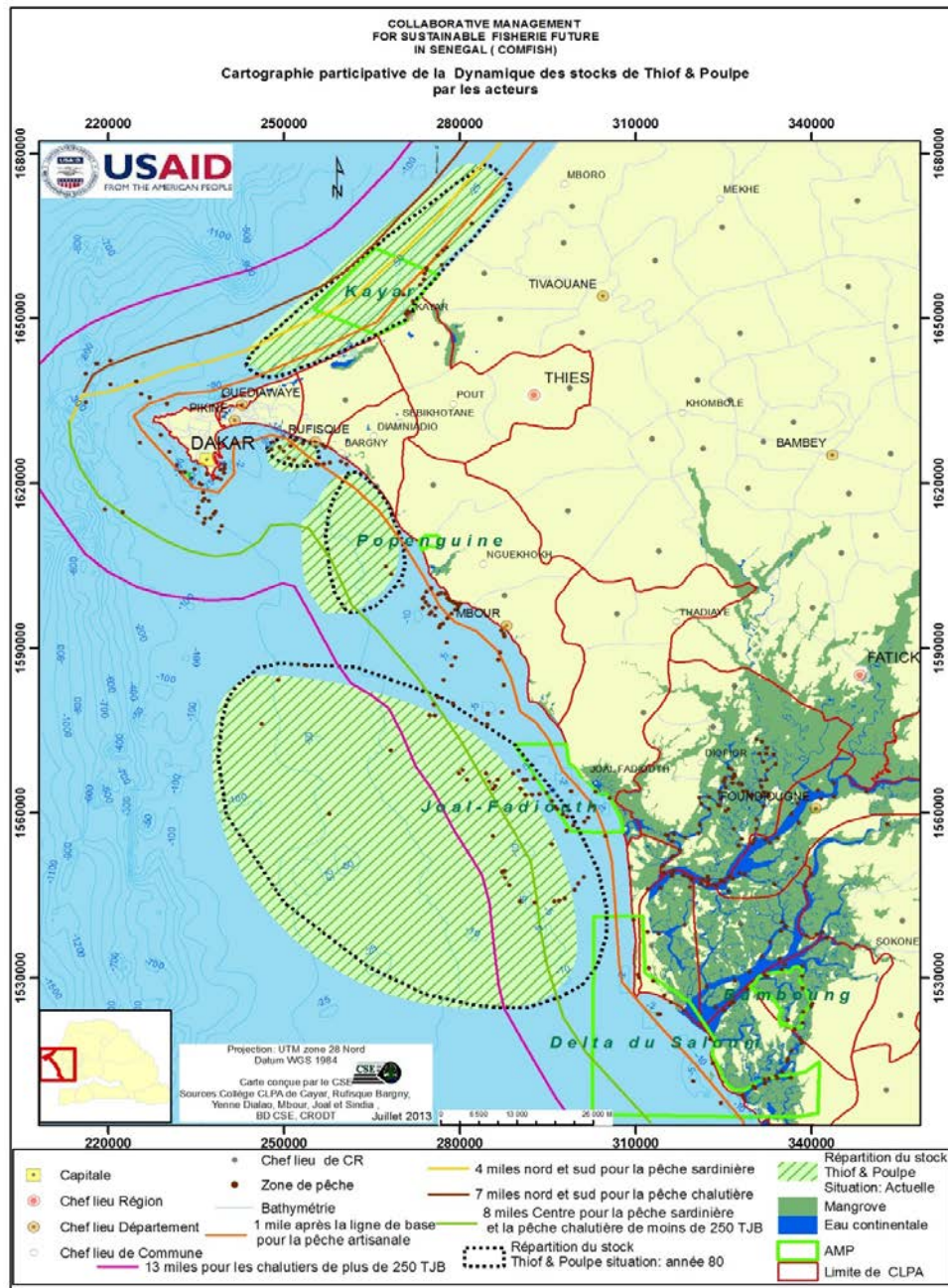


Figure 4: Octopus and thiof stock dynamics by actors

Cymbium stocks were identified in the 0 to 10 meter isobaths, but fishermen observed that from 2000-2010 the distribution area was shifting towards the 20 to 50 meter isobaths.

They observed also that all stocks have been declining continuously over the past thirty years due to **overfishing and the influence of environmental changes**. This may lead ultimately to a collapse or an extinction of some stocks.

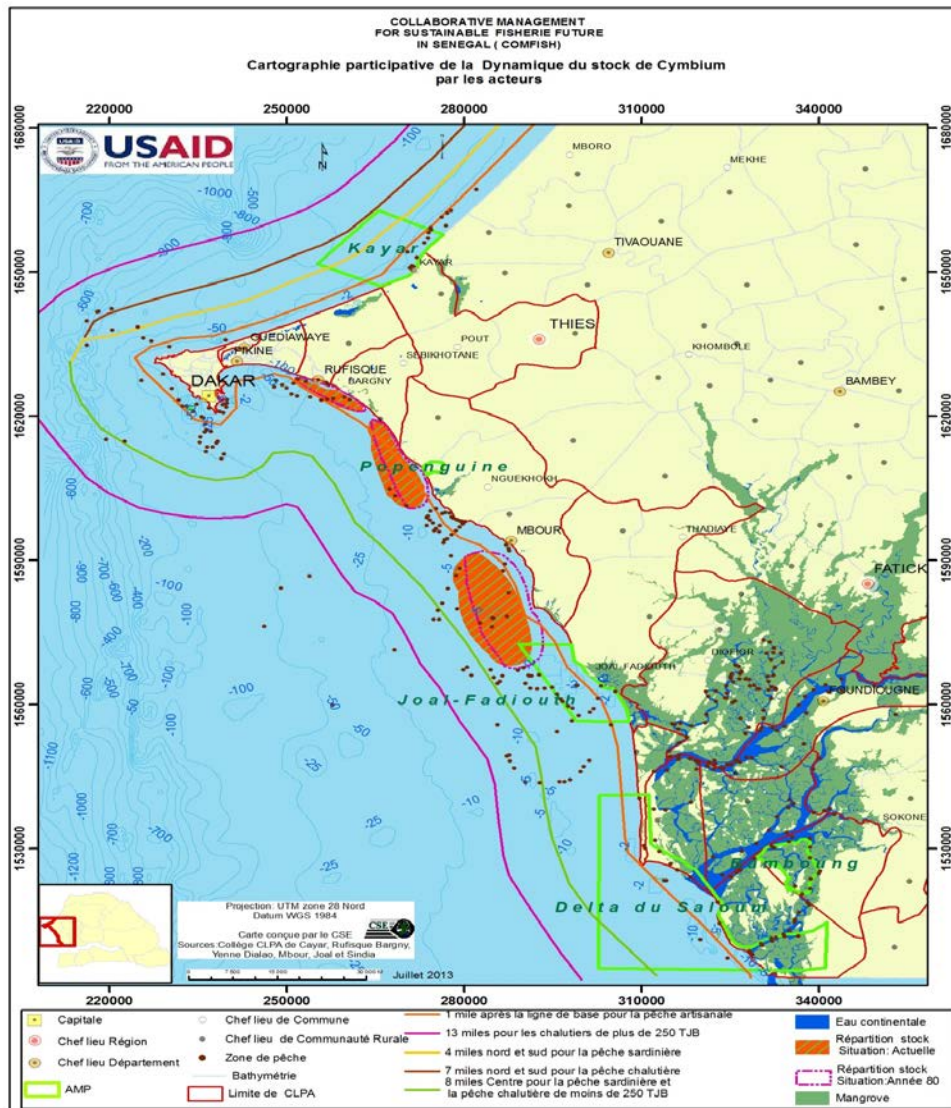


Figure 5: Cymbium stock dynamics

The decline and displacement of stocks towards deeper waters could be tied to changes in climatic conditions (disruption of ocean currents, shifts in seasonality and increased wind intensity) and adverse human activities (fishing of juveniles, increased fishing effort, introduction of new more efficient techniques). Some argue that the fishery is more responsible for this phenomenon than nature. The next step in this work will be to analyze the trends in upwelling indices as well as water temperature, and the way they influence stock distribution (in FY2014).

**Implementation of Local Agreements and collaborative managements plans on sardinella fisheries:**

It is worth noting that all the Local Agreements developed so far are being implemented. The approach used by the project is beginning to make a difference. There is a real ownership of rules by the actors who were engaged in developing the Agreements. Rules include, for example, preventing the fishing of juveniles and the introduction of biological rest periods.

**Prevention of juvenile fishing:** This was a decisive activity this year, for it became a factor in Local Agreements. This bad practice is not yet fully eradicated, but the education completed through meetings and radio broadcasts has helped stakeholders to better understand how the practice affects fisheries. The outings during the training of CLPA Surveillance Committees also played a major role in reducing juvenile fishing.

**Biological rest periods for octopus:** This initiative began in Pointe Sarène and in Nianing. Today it is taking place in Mbour division and will extend to other sites with backing from JICA and input from the USAID/COMFISH program. Each year, the USAID/COMFISH program contributes 1,000 pots. At the same time, extension workers and facilitators engage in outreach every day. The activity contributes to preserve and restore the resource, as well as to increase the fisheries sector income by helping them harvest more.



*Photo 18: Presentation of a check to ICC members in support of the closed fishing season in Mbour*

### 3.3.2. Development of the sardinella management plan

**Dialogue with actors to develop the sardinella management plan:** After DPM officially established the Technical Working Group (TWG), the emphasis was on dialogue (information and awareness) with stakeholders in the sardine sector to develop the management plan. The steps involved were to:

- Discuss with stakeholders and inform them about the process
- Gather and discuss with each category of stakeholders (fishermen, fishmongers and women processors) about the constraints and solutions to the sardinella fishery
- Collect indigenous knowledge on sardinella fisheries management for resource sustainability

Numerous focus groups (14) were organized at the CLPAs in Cayar, Mbour, Joal Fadiouth, Yenne/Dialaw Rufisque/Bargny and Sindia. The project also invited the CLPAs from Dakar Ouest, Pikine and Hann to these meetings to ensure inclusive coverage of the fishery.



*Photo 19: Women processor focus group in Rufisque*



*Photo 20: Focus group with fish traders in Cayar*

In addition to discussing with artisanal fisheries stakeholders, the project also held individual interviews with stakeholders in the industrial fishing sector, including ship owners, industrial exporters and fishmeal manufacturing plants. These meetings identified the constraints facing the actors in this

sector and gathered their proposals for sustainable management. In all, about 657 individuals were involved in these discussions.

In addition to focus group sessions, two (2) technical validation meetings were held in mid-May and mid-June with the Technical Working Group.

***Feedback and validation of study results:*** Two feedback meetings took place respectively on problem identification and solutions. These discussions identified four (4) areas of work that will form the basis of the management plan and provide material for setting management options. This will include work on:

- The requirements of the management plan
- Fishing effort
- Mesh size, minimum catch size, and fishing gear

After this, a series of feedback meetings were organized at CLPAs where management options were validated.



*Photo 21: Group work on the sector's challenges in Cayar*



*Photo 22: Technical workshop on sardinella in Mbour*

***Establishment of a consultation framework for the sardinella management plan:*** After training and educating actors, organizing focus groups to identify problems and find solutions, reviewing literature and summarizing the studies conducted by the project, a series of meetings is being held with stakeholders to establish and formalize local consultation frameworks in a collaborative manner. The process is expected to establish consultation frameworks, with all the CLPAs concerned, for inter-CLPA validation of stock-based local management measures and implementation of the sardinella management plan.

***Preparation of draft collaborative management plan on sardinella fisheries:*** Drawing on the diagnostic study on fisheries, on the consultations with all stakeholders in the fisheries sector, the project prepared management measures for the management plan now being developed. These measures were mainly on controlling access to the resource and technical measures on the size of individuals and the mesh used in fishing gear. The measures were used to prepare a draft sardinella management plan. They are summarized in the paragraphs below.

### **Controlling access to the resource:**

The artisanal fishing effort today is excessively high (17,000 vessels in 2011) to the point where it is rolling over into neighboring countries and even beyond. Hence, controlling direct access in the artisanal sector is a necessity.

As concerns fishing access rights, the Ministry of Fisheries, considering the current situation, issued Ministerial Order Nr. 1233 MEMTMI-DPM-MDT of 20 February 2006, amending Order Nr. 005916 of 25 October 2005 instituting artisanal fishing permits, to require each fishing boat owner to obtain a

fishing permit. The cost of the permit depends on the boat's length: 5,000 FCFA for fishermen on foot, 15,000 FCFA for boats between 6 and 13 meters long, and 25,000 FCFA for boats longer than 13 meters. Sardinella fishing boats belong to this last category. Although the cost is low, the vast majority of fishing boats have no fishing permits. In the light of this, it is necessary to:

- Enforce a system where authorization is required to construct any boat
- Require fishermen to pay for permits before they obtain a fishing authorization

### **Technical management measures**

The technical measures proposed when this management plan was being developed are to raise catch size and mesh sizes in fishing gear, and to create fishing zones by type of fishing.

- *Increasing the size at first capture*

Minimum fish size currently in Senegal (12 cm) is very low. Recent studies (Samba, 2011) suggest that sardine size at first sexual maturity is 22.5 and 18.3 cm FL (= fork length) (for females and males respectively). The figures are 18.3 and 17.7 cm (FL) respectively for round sardine. At the size of 12 cm, no individual can possibly reproduce at least once in its life. The fishermen themselves are asking for minimum fish size to be increased (15 cm FL applied currently in Mbour). In the current management plan, a minimum size of 18 cm (FL) has been proposed for both sardinella species.

We must also bear in mind that "for small pelagics, the type of overfishing to watch out for is not about growth but about recruitment, and that it is equally important to protect breeding adults, particularly the older ones. They are more fertile and their chances of reproducing successfully are higher than those of juveniles (larger eggs with richer reserves, and a nesting strategy better adapted than that of juveniles).

- *Adjusting fishing gear mesh sizes*

The mesh sizes in the 1998 Fishing Code were defined at a time of resource abundance. In today's context where overfishing prevails, these mesh sizes need to be revised to suit the proposed minimum catch size. The table below presents the adjustments proposed after analyzing the diagnostic study validated by all stakeholders.

To help regulate mesh sizes, a discussion on the limitation of fishing gear mesh sizes (for rotating seines in particular) could be considered in the longer term. Similar steps can be taken on monofilaments. Actually, there has been growing demand for the prohibition of monofilaments. But this is not a simple issue and needs to be handled carefully. First, the real impact of such nets must be demonstrated. Where it is proven that they are destructive, concrete measures will be proposed to prevent their use (prohibition of imports, strongly dissuasive taxes, and effective surveillance).

***Table: Proposed new mesh sizes***

<b>Type of fishing gear</b>	<b>Mesh sizes</b>	
	<b><i>Current</i></b>	<b><i>Proposed changes</i></b>
Encircling gillnets	60 mm	No change
Purse seine	28 mm	No change, but prohibited fully in coastal areas because of juveniles
Beach seine	None	50 mm
Purse seines for herring	28 mm	32 mm
Purse seines with live bait	16 mm	28 mm
Mid-water trawl	50 mm	No change

- *Zoning by type of fishery*

It is necessary to establish zoning of different types of fishing fleets to avoid conflicts between fleets and reduce biodiversity degradation (purse seines have adverse effects on biodiversity whereas gillnets (whether encircling or not) are more selective than purse seines in the size of individuals captured). The proposal is to separate the zoning of purse seines from other fishing gear (e.g. gillnets) in new legislation. This would improve the balance in fishing on the continental shelf, and on the intermediate zone between the offshore area and the coastal strip out to 6 km, where fishermen currently harvest fish today with both purse seine and gill nets.

### **Supporting measures**

The supporting measures listed below are based on wide consultations with stakeholders, and have been validated in feedback workshops.

- *Infrastructure to support fisheries management:* To develop the sector with success, investments in support structures need to be made, such as: fuel, water and ice; cold storage facilities; refrigerated trucks to transport the products inside the country; reliable water and electricity supply; and, road improvements
- *Control, monitoring and surveillance of catch:* The problem of under-reporting of fisheries statistics reminds us that a good catch monitoring system should be in place before one can propose a level of “total allowable catch.” and avoid the risk of exceeding quotas

#### *3.3.3. Support to Marine Protected Areas*

In FY13 the project achieved the following outcomes for biodiversity conservation.

***Mapping of the Cayar MPA:*** The process of marking the boundaries of the Cayar MPA with buoys was completed. The activity was lengthy because of the long buoy and delivery ship procurement process.

Prior to laying the buoys, the Cayar MPA management committee used GPS equipment to define the positions for mounting the buoys. This included the participation of local actors, the Conservation Officer, the private company contracted to mark the boundary, the National Department of Lighthouses and Beacons, a USAID/COMFISH project officer, and WWF.

The Chairman of the Management Committee, the representative of DAMCP and the representative of the contracting company took part in the buoy laying mission in January 2013. This work was supervised by the Department of Lighthouses and Beacons, which is the relevant public department in this area and by National Agency for Maritime Affairs (ANAM). A video on the Cayar MPA boundary marking process and buoy laying activity was prepared.



*Photos 23 & 24: Cayar MPA markers at the Port of Dakar (December 2012).*



*Photo 25: Buoy laying operation at the Cayar MPA*

Considering the importance of this initiative, the Management Committee held a General Assembly meeting at the Cayar MPA office on March 1, 2013 to review the entire MPA marking operation. The meeting was an occasion for the MPA Conservation Officer and the DAMCP Director's representative to inform the beneficiaries about the substantial support provided by WWF and the USAID/COMFISH project, as well as the efforts made to finance and implement the activities. All stakeholders were very appreciative. The fishing community, CLPA and MPA actors agreed to be responsible for surveillance and maintenance of the markers. They also expressed the hope that the experience and lessons gained from monitoring the markers in Joal-Fadiouth throughout 2012 would be useful in sustaining the Cayar buoy system.

**MPA studies:** A study was completed on MPA management gaps and challenges at Cayar, Joal and Bamboung and in November 2012 a study was completed on suggested indicators on biological, socio-economic and governance indicators in the Joal-Fadiouth MPA. The study on monitoring was presented to the public in Joal-Fadiouth on December 10, 2012 and the final report was shared with all the project's technical and financial partners. The two studies provide a sound and important basis for



monitoring bio-ecological, socio-economic and governance indicators as well as for improving MPA management on the sites within the USAID/COMFISH project's intervention areas.



*Photos No. 26 and 27: Study feedback session at the MPA office in Joal-Fadiouth on December 10, 2012*

The study on monitoring MPA impacts suggests that stakeholders generally have a positive perception of the Joal-Fadiouth MPA's bio-ecological effectiveness. On the socio-economic aspects, there were very mixed feelings about progress. Some actors think they are not yet seeing significant socio-economic benefits from the MPA even though the bio-ecological conditions have improved. It is the area of MPA governance that the actors' perception of efficiency was lowest.

The study on MPA management gaps and challenges at the three sites of Cayar, Joal and Bamboung was finalized in late 2012. This study was directed at understanding the effectiveness of MPAs nine years after their establishment. The findings were discussed with the Joal Fadiouth MPA Management Committee at a meeting in May 2013.

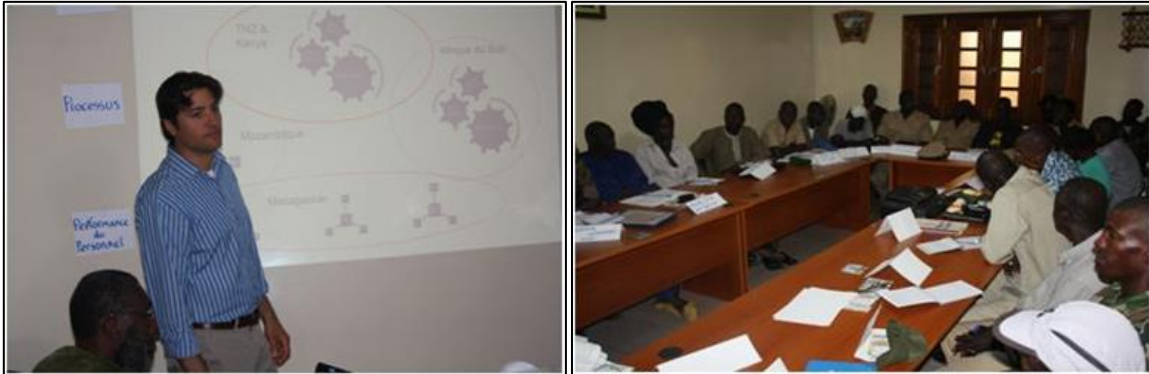
The main findings indicate that to successfully sustain the MPA governance systems studied, significant shortcomings must be addressed:

- Innovations in the national law on MPAs
- Creating a para-public institution for MPA management (for more flexibility in management and fundraising)
- Expanding the spatial boundaries of some MPAs and permission for different types of use
- Establishing a Management Council to replace the MPA management committees, and which may include local actors, local government, natural resource management institutions, scientists and private entrepreneurs
- Establishing a Scientific and Technical Committee for MPAs
- Setting up a proper surveillance system and sustainable funding mechanisms
- Strengthening technical and organizational capacity
- Developing alternative income generating activities so that people around the MPAs concerned can deal with the many restrictions

A discussion on implementing these recommendations was discussed with the Joal Fadiouth MPA management committee and the USAID/COMFISH project in May in Joal- Fadiouth. The management committee sent the project's partner (WWF) a proposal on July 9<sup>th</sup> with a description of the key activities to be implemented and a partnership agreement with the management committee was signed in August 2013. By the terms of the agreement, support will focus on operationalizing the manage-

ment committee, on MPA surveillance and on building capacity for MPA management. The results of the activities conducted in this partnership will be available in October and in the first quarter of 2014.

**Core competencies of MPA staff:** In July, a workshop was held to discuss experience in other countries of East Africa (the WIO-COMPAS program) in certifying core competencies required for marine park rangers and administrators. The goal was also to review management of MPAs in Senegal and human resource capacity.



*Photos 28 and 29: Trainer (Glenn Ricci, left) and a partial view of the meeting room (right)*

The Director of National Parks and some MPA managers were interested in applying the WIO-COMPAS certification program in Senegal.

### **3.4. Crosscutting themes**

#### *3.4.1. Adaptation to Climate Change*

**Vulnerability assessment and climate change adaptation planning:** Addressing climate change is a vital step for establishing sustainable fisheries management in Senegal. The project has therefore been pursuing activities to strengthen the capacity of fishing communities and institutions for improved resilience to climate change. Climate change related interventions have been going on at two levels: the policy level, to help initiate dialogue between all stakeholders for a better response to climate change in Senegal's fisheries policy; and at the community level, where coastal community vulnerability assessments have been performed and adaptation plans developed and validated in the Joal/Fadiouth, Sindia and Rufisque/Bargny CLPAs. At the same time, the literature for "improving knowledge on climate change and fishing in the coastal areas of Senegal and the Sub-Regional Fisheries Commission (SRFC)" has been summarized to better understand national and sub-regional trends in coastal community vulnerability.

**Consultations for the integration of climate change issues in the fisheries policy:** A series of meetings were held with key structures such as DPM, DEEC, COMNACC, CSE, and ENDA REPAO to reaffirm the USAID/COMFISH project's approach to climate change and opportunities for further consultation. At the end of these discussions, a Steering Committee was established for more efficient dialogue on climate change in the fisheries sector and the marine and coastal environment. The members of this committee come from DPM, DEEC, COMNACC, FENAGIE pêche, CSE, CRODT, DAMPC, ANACIM and USAID/COMFISH. It was proposed that the Committee should also include education institutions and research institutes working on climate change and fishing (Laboratoire de Physique Atmosphérique, IUPA, IRD/IFAN and ISE).

In the last quarter, the first action plan on the diagnostic study of consultation frameworks already in place on climate change, fisheries and the marine and coastal environment was developed to identify the weaknesses and reasons why these frameworks do not function properly. At the policy level, major

reforms need to be made and stakeholder dialogue expanded to cover a broader range of issues on sustainable fisheries. Following the study, it was proposed that a national coordination committee on fisheries and climate change (CNCP/CC) be set up and possibly become a part of COMNACC's system.

**Coastal community vulnerability assessment:** An assessment of coastal communities in target sites was conducted with the following activities:

- Intervention sites were surveyed and the most vulnerable identified
- Stakeholder training workshops
- Data collection, analysis, and validation and sharing of findings on population resilience
- Development of adaptation plans with stakeholders and approval of these plans by the ICCs in the CLPAs concerned
- Land use, livelihood and environmental change mapping. This included an analysis of climatic parameters such as rainfall, temperature, winds and sea level for two periods of time (1981-2010 and 2016-2045), and a time series mapping (1954, 1989, 2007, 2012) of land use trends.

A socio-economic survey of women processors and household heads in fishing communities was also conducted. Interviews were done with fisheries officers, CLPA extension workers and local authorities.

The results show a vulnerable population. There are low literacy levels in these communities and high dependency on fishing. The main income-generating activity in the Rufisque/Bargny, Sindia and Joal/Fadiouth CLPAs is fishing and its related activities (processing and marketing of fishery products). Consequently, fishermen have relatively low and unstable monthly income levels, averaging between 100,000-300,000 FCFA per month due to low and unstable quantities of fishery product landings. Lower income is observed among women fish processors (typically less than 25,000 CFA/month). Fishing and its related activities is hampered by:

- Overfishing and destructive fishing practices (underwater diving, the catch of juvenile fish, fishing with explosives, use of mono-filaments etc.)
- Modification of the coastal and marine environment
- The lack of training for young fishermen, leading to practices detrimental to the environment and to safety
- Decline in fish abundance and consequent reduced returns from fishing and time requirements to fish because of the migration of stocks toward deeper waters
- The high cost of inputs for artisanal fish processing
- The lack of adequate infrastructure (piers, engine fuel stations, warehouses, water and sanitation facilities, ice machines, transport, and cold storage facilities)
- Inadequate hygiene and cleanliness at the landing and processing sites

**Environmental changes:** Analysis of the area's changing climatic parameters over the period from 1981 to 2010, and the projections for 2016 to 2045 which were done using a scenario from the Intergovernmental Panel on Climate Change (IPPC) show the following:

- **Rainfall:** The downward trend now being observed will continue in the period from 2016 to 2045. But, a comparative analysis of observed data and predicted data suggests that the trend will be going upwards in the future. Also, variability will be higher in the future (predicted standard deviation of 414 mm) compared to the present (observed standard deviation of 194 mm). The projections are marked also by extreme conditions (heavy rain) which will be more frequent.

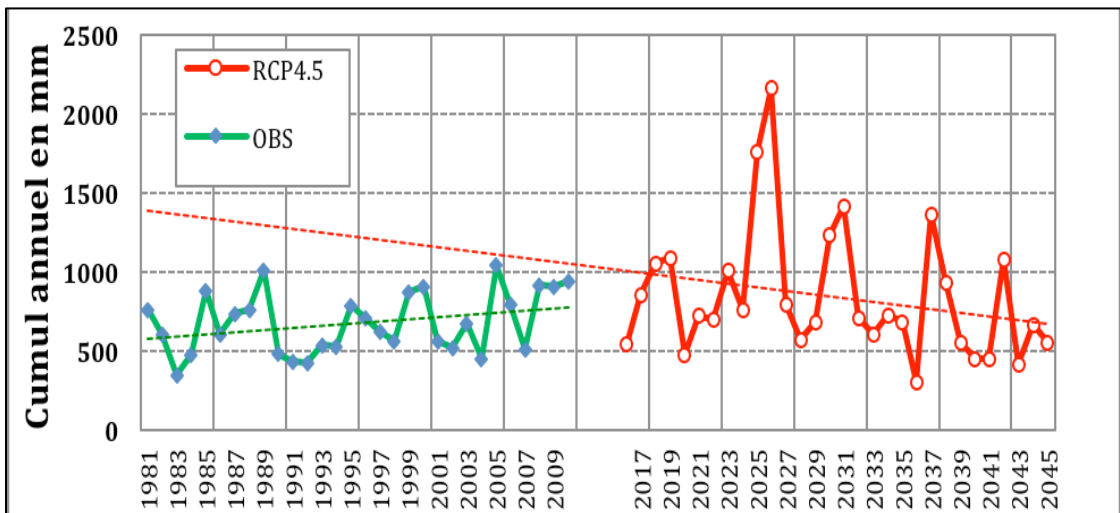


Figure 6: Evolution of rainfall observations (OBS) and predictions with the CESM (RCP4.5) and CMIP5 Runs on Senegal's coastal region (Joal to Rufisque)

- **Temperature** was already rising in the area in 1981 and this trend will continue in the future. According to projections, minimum temperature will increase by 1.4°C and maximum temperature by 1.5 °C

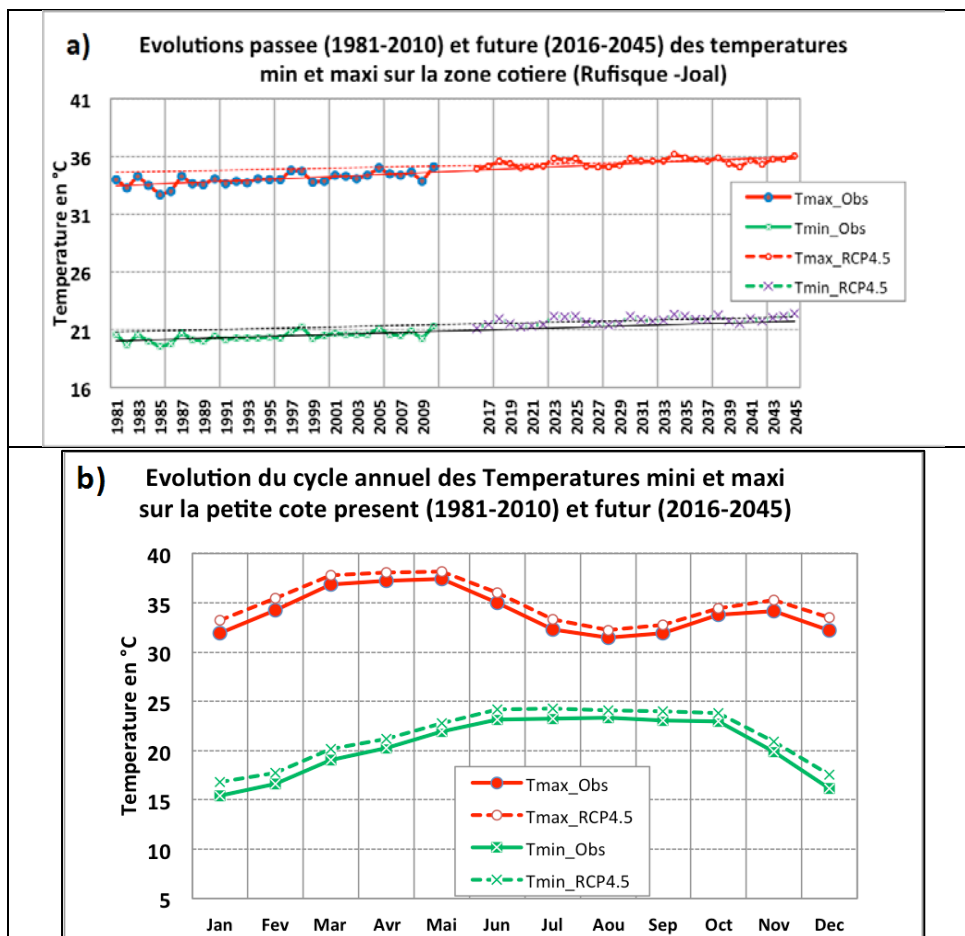


Figure 7: Present and future variation in maximum and minimum temperatures: a) over time; b) in the season (30-year average)

- The **sea level**, which was relatively low from 1981 to 2003, surged by 5 cm from 2005. This increase will continue in the next three decades

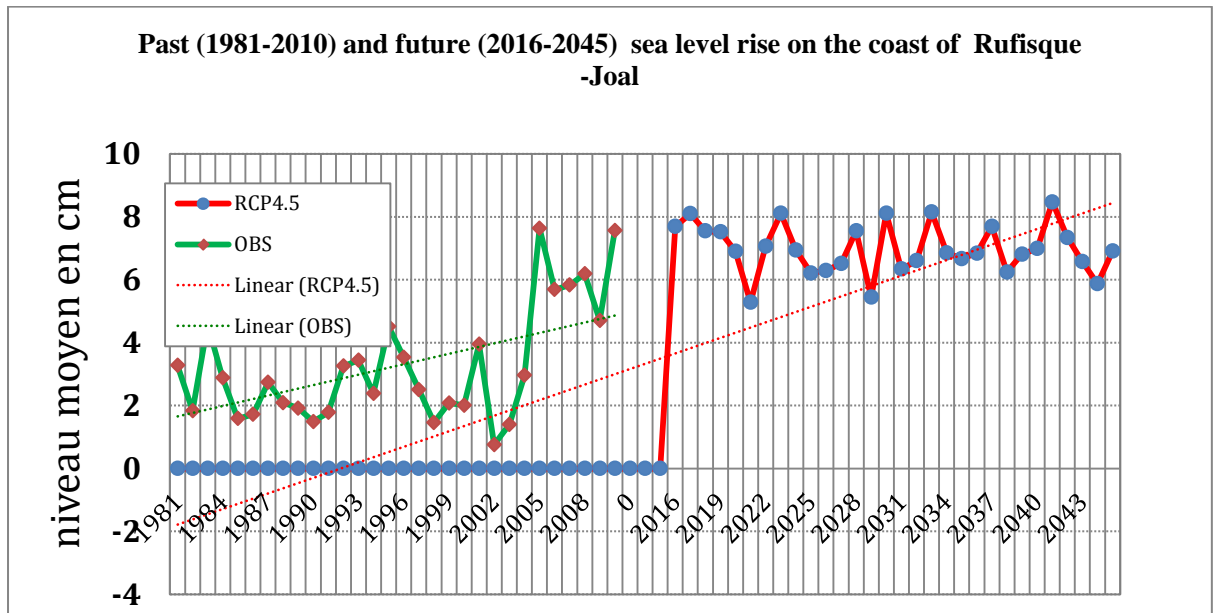


Figure 8: Present and future average sea level increase on the shores of Joal Rufisque

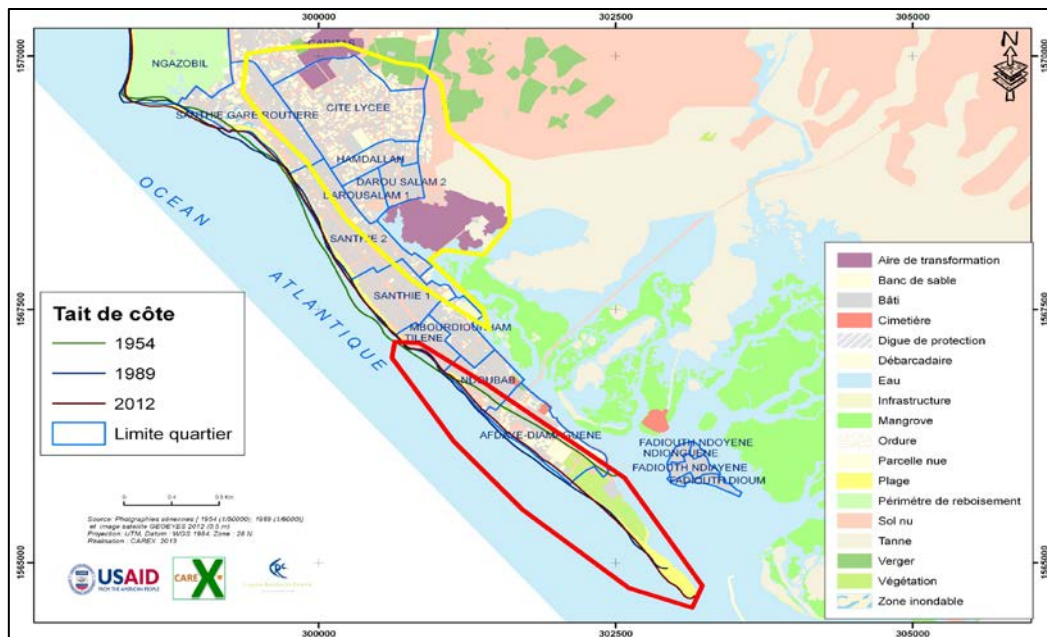
The projections simulated by the CSM model indicate potential negative impacts on the coastal environment, ecosystems and people. These results provide a better understanding of the climate of today and tomorrow in the area that stretches from Joal/Fadiouth to Rufisque/Bargny.

*The dynamics of land use from 1954 to 2012* highlight three major facts on the sites studied:

- A sharp decline in sandy beach areas
- A substantial increase in buildings (homes) and infrastructure concentrated on the shorefront
- Agriculture off the coastal strip is predominantly rainfed

As concerns *the evolution of the coastline from 1954 to 2012*, the trends observed have been as follows:

In Joal/Fadiouth, the period from 1954 to 1989 corresponds to an accretion phase, conducive to the growth of population and settlement in this naturally vulnerable area. The second period, from 1989 and 2012, witnessed considerable erosion that affected almost all coastal areas (Afdaye-Diamaguène, Ndoubab, Tilène, etc.).



**Figure 9: Flood and erosion hazards in Joal/Fadiouth**

The coastline dynamics in the Sindia CLPA from 1954 to 2012 show periods of erosion, in some places, interspersed with accretion phases. Erosion was most intense during the second phase particularly in the Saly community where high rates of erosion were observed. The lack of protection structures and sustainable adaptation strategies exposed the population to the impacts of encroachment from rising sea levels.

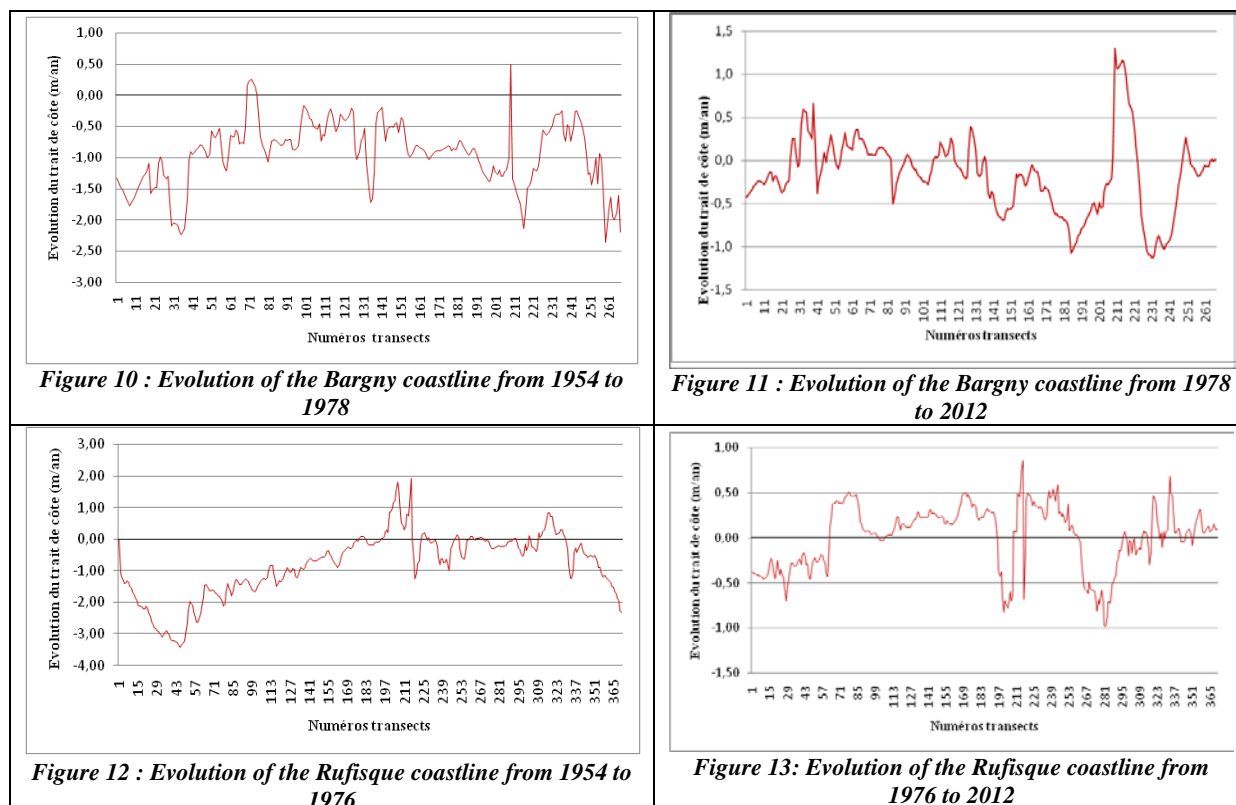


**Photo 31: Old building engulfed by the sea in Nianing**



**Photo 32: Gas station at risk of coastal erosion in Saly**

The trend curves on the Rufisque/Bargny coastal area show that the coastline continually receded over a period of about fifty years, with periods of very severe erosion (in Bargny Guedj, in the Ndiolmane and Gouye Dioulancar neighborhoods and in Rufisque, Keuri Souf and Cité Bata), interspersed with phases of slight accretion. From 1976 to 2012, erosion slowed down in Rufisque after protection structures were built in some coastal neighborhoods to mitigate its impacts. The lack of protection structures in Bargny aggravated erosion, causing the population to move inwards.



**Strengthening the capacities of stakeholders on climate change issues:** The project conducted a series of training exercises to strengthen stakeholders’ capacity to understand climate change and its impacts on their locality and on adaptation options. Overall, 782 people were trained during FY13.

**Adaptation plans:** CLPAs in the zones covered took steps to approve three (3) adaptation plans this year. These plans were developed as a key next step to the climate change vulnerability assessments. They focus on practical measures to address the most pressing problems identified by the fishing communities. The major recommendations were divided into integrated resource management measures, structural measures (construction of infrastructure) and non-structural measures. These included, among other things:

- Strengthening the capacity of the local fishing community through training on climate change issues (causes and impacts on the fisheries sector) and outreach on Good Fishing Practices and indigenous knowledge on resource conservation
- Strengthening research to improve scientific understanding of the status of fisheries resources
- Testing the development of fish farming
- Improved infrastructure development at fish landing sites: fish drying ovens, fish drying racks, fermentation tanks for dried fish, warehouses, sanitary facilities, rest areas, and lighting
- Establishment of new community marine areas
- Strengthening the capacity of women fish processors: in all the CLPAs studied, there is a need to enhance processing techniques and compliance with quality and hygiene standards, and develop new retail markets, including exports to African, Asian and Western countries
- Improved CLPA facilities: to function properly, especially when it comes to holding meetings and providing services, construction is needed at the CLPAs in Rufisque/Bargny, Sindia Nord and Sindia Sud, and Joal/Fadiouth
- While seawalls are not the best solution to prevent erosion, in some cases they are necessary. This is needed most urgently in Bargny, Bargny-Minam and Sendou

- Strengthening communication, early warning systems, environmental monitoring, and disaster preparedness



*Photo 33: Community representatives validating adaptation plan in Rufisque*



*Photo 34: Community representatives validating adaptation plan in Ngaparou*

### 3.4.2. Gender

**Support to implement the fisheries sector women's empowerment Strategy developed in 2012:** To strengthen the capacities of women in the fisheries sector so that they can better protect their interests in decision making, a Strategy for the empowerment of women in the fisheries sector was developed, complete with an action plan, and submitted to DPM and other project partners. The project has been disseminating the **Women's Declaration** that was developed alongside the strategy. It is also carrying out a number of activities in the action plan of the strategy. The project implemented a training program on literacy, leadership, hygiene and quality, labeling, climate change, etc. to strengthen the role, returns, social capital, and resilience of women in the artisanal fishery sub-sector.

**Innovative approaches for strengthening women's capacities:** Educational tools tailored to the culture and education level of women (singing, dancing, "tama", "cora", images and documents translated into Wolof) were used to help them better understand and engage in group presentations and discussions with other fisheries experts. This innovative methodology created a friendly environment and resulted in very little time, women leaders able to understand and implement strategies and tools once reserved for experts and intellectuals. The project is continuing to build synergies with partners (ENDA GRAF, WWF, AAPC, APTE) to raise funds and implement the activities in the Strategy in partnership with USAID/COMFISH.

One of the project's flagship accomplishments was to establish the Cayar artisanal processing facility. In addition to the physical structure and facilities, this involved the preparation and approval of a Code of Conduct, supporting women to begin using renewable energy (biogas), and providing training in leadership together with DPM's gender office. This training benefitted most women processors in Cayar (over 200) and other CLPA women leaders.

**Completion of the modern processing facility:** By the end of FY13, work on the modern processing facility was almost complete, only needing painting, tiling, flooring and installation of doors. Some of the equipment, such as ovens and drying racks will be installed after the flooring of the courtyard is complete. The technical monitoring committee periodically conducted site visits to review progress and make recommendations.





*Photo 35& 36: Visit of modern processing site under construction followed by site visit debriefing; Photo credit, APTE, 2013.*

**Functional literacy courses:** Literacy classes continued until the end of September 2013. The instructors (all women) have been concentrating on the Code of Conduct, established by the USAID/COMFIH project, to not only teach women to read and write, but also to educate them better on how to follow the Code.

The instructors are led by a supervisor who conducts regular field missions to assist the instructors and build their capacity. During each mission, they discuss the weaknesses they still have and suggest ways of improving subsequent classes. At the end of this second phase, the supervisor will do an evaluation to assess the level of the learners and instructors, as well as the relevance of the subjects covered.

At the same time, the instructors are working on a document of good practices that could serve as a guide for artisanal processing and a manual for all women processing fishery products in Senegal.



*Photo 37: Women in class*



*Photo38: Reading exercise on the blackboard*

**Promoting the Code of Conduct:** Efforts to raise awareness of the Code of Conduct are being pursued through chats in "mbars", so that all women become conversant with the content of the Code. The objective has been achieved, as chats have been held with all women working on the site. The project visited all the "mbars" on the site together with the chairperson of the executive management committee and other leaders.

Some rules of the Code are now being applied, such as the hygiene standards on the site, the rules for maintenance of processing equipment, organization of marketing activities, and fish processing. To

apply some of the other rules, first requires other enabling conditions in place. For example, to apply the rules that prohibit braising on the ground, the prerequisite is to repair ovens.

Women will begin wearing coats next year when working in the processing facility. The order has already been placed. In this regard, all the women agreed with this measure and have each paid a contribution of 1,000 FCFA.



*Photo 39 & 40: Chat session: dancing and singing during the chat session. Photo credit, APTE, 2013.*

**Revitalizing the hygiene committee:** The project supported the hygiene committee at the processing site by organizing regular meetings with the chairperson. These meetings are used to assess the regularity of the cleaning sessions initiated by the committee and the control operations in individual areas. They are used also to review any problems or challenges encountered. Cleaning equipment is now available on site as well as garbage cans and a cart and donkey for moving trash.

**Micro-credit “revolving” fund:** A Memorandum of Understanding was prepared and shared with the women and the Fisheries Department in Cayar. After discussing with the women, it was agreed that the credit fund should be established in November 2014, the date when production is planned to begin.

**Study on fish storage conditions:** The goal of this study was to test keccax, prepared under good hygienic conditions, using different types of packaging to see how the product reacts inside the packaging, and then provide indications on the product’s estimated expiration date. The study was conducted by two university professors (a biologist and a veterinarian) and a fish technologist. Multiple sardine samples were tested, prepared under the supervision of consultants who made sure the rules of hygiene were strictly followed.

Tests to characterize the smells, flavors and colors perceived were done on samples of keccax to have and select a list of relevant and hopefully distinctive descriptors. During these tests, the panel or jury for sensory analysis, made up of two women fish processors and 3 fishery officers from the fisheries unit in Cayar, was asked to give marks for the attributes on a scale of 4 (“good”) to 0 (“poor”).

The main conclusions of this study were:

- Salt-free keccax is much more difficult to produce and maintain than salted keccax, regardless of the species of sardine and the type of packaging used for storage (drying is slower, and therefore fungal growth, etc. are more difficult to avoid)
- Salted keccax, produced from flat sardine, seems to withstand storage conditions better
- The fast deterioration of salted keccax, made from round sardine, can be tied to its high fatty acid content, or the oxidation process that is faster in the presence of oxygen (bad sealing and

small leakages due to fish bones that can pierce some plastic bags). The rapid deterioration can be attributed also to the braising conditions, if not done properly.

- The color, texture, taste and smell of the finished product remain unchanged with plastic packaging, containers, or bowls
- Packaging keccax in a plastic container is a better way to maintain its organoleptic characteristics

This study gave clear indications on proper ways of storing keccax. It also gave a rough indication of the product's life cycle if all the required hygiene standards are met. With these specifications, the product will meet the requirements of certain special markets (supermarkets).



*Photo 41& 42: Tested containers. Photo credit, APTE, 2013*

***Building synergy with the USAID/YAJEENDE project:*** The women in Cayar hosted a delegation from USAID/YAJEENDE on June 6<sup>th</sup>, 2013. USAID/YAJEENDE is a USAID nutritional support and food security project. To implement its activities, the USAID/YAJEENDE project trains Service Providing Agents (APS) whose role is to facilitate access to basic nutritional foods for populations living in disadvantaged areas. It is in this respect that the project established a partnership with APTE to link the women fish processors in Cayar with the APS, all supported by USAID projects. The USAID/COMFISH project Director initiated this process and is the one facilitating the partnership. The delegation to Cayar included 12 APS from Matam and Tambacounda, as well as a USAID/YAJEENDE technical team of three (including two facilitators and a nutritionist).

This USAID/YAJEENDE delegation was received in Cayar by the marketing committee and women leaders. They discussed the products available on the processing site, the terms for collaborating with APS, and product availability and price ranges. The Cayar women processors used the occasion to showcase some of their finished products and to watch a film on the work of the APS.

At the end, the participants were happy with this initiative. To them it was an important step for both projects. It showed there are opportunities for synergy between USAID projects and for trade between the actors. The facilitators also want to explore other forms of partnership on training and the exchange of products.

At the same time, the USAID/JAYEENDE project's Dakar office is discussing with APTE to find ways of working together on sanitation. USAID/YAJEENDE wants to capitalize on certain experiences in sanitation, especially concerning waste management, where APTE has extensive experience in Senegal. APTE is currently implementing two projects on waste recovery and management in the Joal and Mbour municipalities with funding support from the EU.



*Photo 43 & 44: The USAID/YAJEENDE delegation visits the processing site; the delegation meeting with fish processing women in conference room. Photo credit, APTE, 2013*

**Visit to the national biogas program in Cayar:** Before installing a domestic bio-digester in the modern processing plant, the project organized a visit to Cayar with APTE's various partners in this initiative. Among them were a team from the National Biogas Program, a team from ISRA (National Institute for Agricultural Research) and a lecturer from ESP (Ecole Supérieure Polytechnique). The mission was to review progress in the bio-digester feasibility study. They team observed the work environment of the women processors in Cayar, discussed the production rate with them and looked at the substrates that could fuel the bio-digester. Before the delegation from the National Biogas Program (GNP) went to see the women fish processors in Cayar, they visited the Société de Gestion des Abattoirs du Sénégal (SOGAS), which had already installed a bio-digester.

The visit to SOGAS was a key step because it helped the delegation understand how a biogas production unit works. This year, SOGAS installed a 4000 m<sup>3</sup> bio-digester to recycle waste from slaughterhouses into biogas. The goal was for SOGAS to generate close to 50% of its power needs. The various installations of the bio-digester facility were visited and its power supply system explained, with demonstrations. The bio-digester's power supply system includes a waste digestion tank (3m). The waste used in it comes from animal entrails, blood and wastewater. The delegation also spent a lot of time during the visit listening to explanations about the bio-digester system's maintenance process, an important issue with regard to the sustainability of this innovative equipment.

This project activity is aimed at natural resource conservation, renewable energy, and mitigation of carbon dioxide emissions.



*Photo 45& 46: Visit to the industrial bio-digester, visiting delegation in Cayar. Photo credit, APTE, 2013*

**Computer literacy training:** The project provided the Cayar women IT equipment consisting of a desk-top computer, a power backup device, a printer and a camera, and followed this up with a training session in Cayar from September 25<sup>th</sup> to 27<sup>th</sup>, 2013. There were 10 women in the training exercise, selected on the basis of their level of general education and computer literacy.

The training introduced the participants to the Internet, its functions and benefits. The Internet is a vital gateway for these women, especially in terms of communications, marketing and labeling the products processed in the Cayar plant. At the end of the session, the trainer created an email address for each EIG. There are plans to create a website for the women processors in Cayar.



*Photo 47 & 48: IT Trainees with the chief of service and the unit head of the fisheries department. Photo credit, APTE, 2013*

### *3.4.3. Governance /Decentralization*

**Developing relations between local government and CLPAs:** With the support of WWF, a series of meetings were organized between the local government (CL) within the project's intervention areas to find solutions for sustainable financing of CLPAs. The purpose of these meetings was to give the local government authorities in those areas a better understanding of the roles that CLPAs play in the sustainable management of fisheries resources, and then discuss possible ways for providing support to the CLPAs. A mission led by WWF and the Department of Marine Fisheries (DPM) visited the local communities of Cayar and Joal-Fadiouth from February 13 to 15, 2013 to examine how the local authorities in these areas were involved in efforts to finance CLPAs so that local actors feel more empowered.

During these meetings, all the mayors or their representatives underlined the fact that they had little information on the roles and missions of CLPAs, or on their activities. They also emphasized that they lacked information on what fishing and its related activities represent in the local economy, even though some observers maintain that close to 80 or 90% of the local economy in Joal-Fadiouth or Cayar is based on the artisanal fishery.

### **Implementing Local Agreements**

- *Implementing the Local Agreements of the CLPAs in Sindia, Mbour and Joal-Fadiouth*

The project has developed an approach for giving CLPAs stronger capacity to apply Local Agreements. The goal is to contribute in transforming CLPAs from passive bodies to action-oriented entities engaged in collaborative management for a sustainable fisheries future. This was why the project took a series of initiatives towards the three CLPAs with Local Agreements to strengthen their

capacity to better apply management rules and measures. Efforts are now turned towards recruiting more field workers, disseminating the Local Agreements, establishing technical committees in each CLPA and providing training to its members.

***Recruitment of more field workers:*** Four (4) facilitators were recruited to support the implementation of Local Agreements in the Sindia, Joal-Fadiouth and Mbour CLPAs. These facilitators are based at fisheries control points and work closely with the CLPA secretaries to help deliver the action plans developed for the implementation of Local Agreements.

***Training the new facilitators:*** This training is one of the activities the project conducts to give facilitators stronger abilities to interact with CLPA representatives. Trainers includes, for example: facilitation techniques, techniques for convening producers and CLPAs in the implementation of collaborative management, and training on the objectives of the USAID/COMFISH project.

***Retraining of extension workers (relays):*** Community extension workers have been established in each CLPA, as a part of the effort to connect CLPAs with resource persons capable to sustain project activities. These extension workers played a decisive role in developing Local Agreements. A refresher session was held on the process of implementing Local Agreements and the roles they should play in support of CLPA representatives.

***Establishment of Technical Committees in each CLPA:*** The project supported three (3) CLPAs to establish Technical Committees so as to strengthen their capacity to implement Local Agreements. The roles of these committees are to support CLPA action plans for informing actors at the grassroots level, mobilizing funds from within CLPAs to implement activities, monitoring fisheries resources, preventing and settling conflicts, etc. The Technical Committees have representatives from each college and are headed by a chairperson and a secretary. All the Committees were installed in plenary and in a participatory manner. Gender issues were at the center of discussions with a view to having more women representatives in ICCs. Five committees were established in each CLPA, namely:

- The Surveillance and Safety-at-Sea Committee (Collaborative Surveillance Team)
- The Awareness, Information, Training and Communication Committee
- The Conflict Settlement and External Relations Committee
- The Scientific Committee for Fisheries Resources Management, Environment and Participatory Research
- The Finance and Partnership Committee for Infrastructure Management and Social Action



*Photo 49: Joal Fadiouth CLPA plenary for the designation of committee members*

**Training on collaborative surveillance and safety of artisanal fisheries:** The Surveillance and Safety-at-Sea Committees in three CLPAs received training on collaborative surveillance. Three different CLPAs sent a total of 37 members to the workshop. During the training, a module and a guide on collaborative surveillance were developed and validated. The areas covered were: the context for collaborative management, types of offenses in the fisheries sector, inspection techniques and tools for surveillance, procedures for reporting offenses, safety at sea, and the roles and responsibilities of the surveillance officer.



*Photo 50: Participants in the collaborative surveillance training*

**Dissemination of Local Agreements:** The dissemination of local agreements is an ongoing activity in the implementation process. Apart from proliferating documents, other strategies have been used to reach the highest possible number of stakeholders. These include: awareness meetings (36) in colleges and the signing of MoUs with 3 community radio stations (La Côtère in Joal-Fadiouth, and Radio Dunya in Mbour and Popenguine/Ndayane) to improve actors' awareness of sustainable fisheries resources management.

***Development of new Local Agreements for the Cayar, Yene/Dialaw and Rufisque/Bargny CLPAs***

New Local Agreements were developed for the Cayar, Rufisque/Bargny and Yene/Dialaw sites. This is part of the strategy to develop Local Agreements in all the CLPAs important to the sardinella artisanal fishery. When all the CLPAs key to the sardinella fishery are on board and made operational, it will be possible to get formal agreement across the CLPAs (Sustainable Management Unit, or UGD) to an approved Fisheries Management Plan. The activities performed in FY13 to establish new Local Agreements are described below:

**MoUs between CLPAs and the USAID/COMFISH project:** MoUs were signed to formalize the partnership between USAID/COMFISH and CLPAs for developing and implementing Local Agreements. The ICC in each CLPA held a meeting to validate these documents and obtain approval from the administrative authority heading the CLPA.

**Establishment and training of extension workers:** 3 workshops were organized in each CLPA for each one to choose its extension workers. The Yene/Dialaw and Cayar CLPAs selected one extension worker, while the Rufisque/Bargny CLPA selected two extension workers due to its size. These extension workers were taught the techniques of developing and implementing Local Agreements, facilitation, organizing group meetings, using factsheets, taking notes and writing meeting reports. CLPA secretaries, responsible for supervising the extension workers, also took part in the training.



*Photo 51 & 52: Selection of extension workers in Rufisque/Bargny and Cayar*

***State of fisheries resources management:*** to ensure effective delivery of the Local Agreement, the project organized focus group meetings to know the exact state of fisheries resources management. It met with the various categories of actors (fishmongers, fishermen and women processors) to discuss the challenges facing the different fisheries and their suggestions for improved management measures. The project organized over 48 sessions in the three (3) CLPAs with close to 900 participants.

***Identification of stakeholders and inventory of fishing gear:*** To establish a baseline on fishermen and the equipment they use, CLPA extension workers conducted surveys with the support of project facilitators. This provided a basis for good analysis on the current state of fisheries resources and previous management initiatives. The surveys gathered information on the number of fishermen and their equipment. Fishermen represent a high percentage of all people involved in the fisheries supply chain in all CLPAs (Cayar 68%, Rufisque/Bargny 67%, and Yenne/Dialaw 62%). The percentage of artisanal fish processors relative to all in the fishery sub-sector in Yenne/Dialaw, Rufisque/Bargny and Cayar CLPAs is 28%, 22% and 3%, respectively.

The surveys identified 12 types fishing gear with a variety of fishing lines: single lines, octopus lines, longlines and ice lines. The distribution of gear varied from one CLPA to another. Cayar has a higher number of single lines (69% of the fishing gear), while Rufisque/Bargny and Yenne have a predominance of gillnets, respectively 26 and 94% of fishing gear.

***Validation of Local Agreements:*** The local actors and those in the technical services were truly dynamic throughout the process of developing Local Agreements in the Cayar, Rufisque/Bargny and Yenne CLPAs for sustainable fisheries resources management. After the actors validated the Local Agreements, they were submitted for approval by the administrative authorities (district officer in Bambilor, and Senior divisional officers in Thies and Rufisque).





*Photo53: Validation of Local Agreements at Yenne/Dialaw CLPA*

#### *3.4.4. Communication/education*

Communication activities in FY13 focused largely on disseminating Local Agreements. The project signed and rolled out partnership agreements with three (3) community radio stations. It placed emphasis also on raising the public profile of its activities (media coverage of major project activities, production of videos, and success stories).

***Support for dissemination of Local Agreements:*** to help disseminate the Local Agreements of the Joal, Mbour and Sindia CLPAs and contribute to establish management plans for priority species, the project met with the relevant CLPAs and fisheries services to identify three (3) community radios in its intervention areas that it could sign partnership agreements with. It chose Radio *la Côtière* in Joal, *Radio Dunya* in Mbour and Radio *Kondafé* in Ndayane (Sindia). Before making these choices, the project surveyed fisheries actors and local fisheries service representatives to find out which radios ran programs on fisheries and were the most popular in these areas. Based on the MoUs signed with these three community radios, each one spends an hour each week on programs dealing with fisheries. The radios run these programs together with extension workers from USAID/COMFISH. From February 22, 2013, when the MoUs were signed, until September 30, 2013 when the year ended, 86 programs were planned, presented and broadcast on various topics of interest to the project, and on key issues for local fishing communities (e.g. sustainable management of sardinella or octopus, safety at sea, fishing permits, the role and operationalization of CLPAs, Local Agreements, the objectives and approaches of the USAID/COMFISH project, etc.). These programs were produced according to a schedule of topics that CLPAs submit each month to the partner radios via the project's extension workers.

***Support for dissemination of the Declaration of women in the fisheries sector:*** To help improve dissemination of the Declaration of women in the fisheries sector, the project and its partner radios ran special programs with the women leaders who took part in developing the strategy for strengthening women's role in fishing. The radio programs educated listeners on several issues and helped to raise the project's profile.

***Strengthening the capacity of extension workers in radio broadcasting techniques:*** In order to improve the impact of radio programs on fishing communities, particularly on behavior change, the project organized a training workshop on techniques for presenting information on radio. The training was for six community extension workers from the CLPAs in Joal, Mbour and Sindia. It was delivered

together with the project's partner radios. This gave participants the occasion to discuss the key stages in presenting a radio program, to share tips on how to present a program effectively and to deal with the questions, criticism and comments. Participants simulated a radio program broadcast with all the necessary equipment (microphones, mixing console, and speakers). The training was an opportunity also to strengthen working relations between community extension workers and community radio coordinators. Other training workshops are planned for FY14 to improve communication between community extension workers and the stakeholders in the fisheries sector.

***Evaluation of partnership agreements with community radios:*** Another highlight in FY13 was the assessment of the partnership agreement (PA) signed with community radios: La Côtier, Dunya and Kondafe. This evaluation was done by a team comprising the project's Communication Officer, community extension workers and a facilitator. It involved several meetings with representatives of grassroots communities, the local fisheries administration, and community radios to determine how the agreement was carried out (e.g. program format, duration and number of broadcasts) and how actors reacted to the programs.

The evaluation confirmed the interest of fishing communities in the project's radio programs. There were 32 telephone calls on average each month, making 256 calls in all. For several fishermen, the radio programs helped them understand what CLPAs are, the role they play and how they function. This made it easier for them to become active members of the CLPAs in their localities. But to allow even more fishermen to listen to the programs, the respondents suggested that the time when the program is broadcast in Joal (initially from 4pm to 5pm every Thursday), should be changed to 9pm the same day, or rebroadcast at that time. The fishermen suggested also that using other communication channels, such as wrestling contests (Mbapatt) and local/private television channels (through roundtables, public debates, and street interviews) would help strengthen communication with stakeholders.

The fishermen in Mbour proposed that the project should organize at least two radio programs a week to communicate better with stakeholders, and that radio hosts/community extension workers should be trained. They also suggested that the project organize special programs in the field to interact directly with actors.

### **Project visibility**

To increase the USAID/CONFISH project's visibility, efforts were made this year to facilitate media coverage of the project's flagship accomplishments, produce videos and publish success stories on its most impactful experiences.

***Media coverage:*** Three of the project's flagship activities received considerable media coverage. These were the press conference organized for the *Elefan* system training workshop, the coffee chat the project organized together with the Alliance for Sustainable Fisheries, and the regional Workshop on IUU fishing that took place in March 2013.

A press conference was held on the theme of climate change impacts on Senegal's socio-economic and political stability. Several media outlets covered the event, including TV channels, radio stations and print media groups such as the West Africa Democracy Radio, Sud FM, Walf FM, SEN TV, RDV TV, and online news outlets (see links below).

1. [http://www.aps.sn/articles.php?id\\_article=114326](http://www.aps.sn/articles.php?id_article=114326)
2. [http://www.aps.sn/articles.php?id\\_article=114329](http://www.aps.sn/articles.php?id_article=114329)
3. [http://www.lesoleil.sn/index.php?option=com\\_content&view=article&id=29472:peche--le-rechauffement-climatique-menace-les-ressources-halieuques&catid=51:economy&Itemid=63](http://www.lesoleil.sn/index.php?option=com_content&view=article&id=29472:peche--le-rechauffement-climatique-menace-les-ressources-halieuques&catid=51:economy&Itemid=63)

4. <http://www.journalbic.com/economie/2290-a-cause-de-la-peche-illicite-leconomie-senegalaise-perd-chaque-annee-300-millions-dollars.html>
5. <http://xibaaru.com/un-expert-souligne-les-effets-negatifs-du-rechauffement-climatique-sur-les-stocks-halieuistiques/>
6. <http://apanews.net/news/fr/article.php?id=201829#sthash.ZwQsq0Sr.dpuf>

The coffee chat on: "The place and role of women in sustainable fisheries management in Senegal" was also covered by a number of the national press organs: APANEWS, RTS, SEN TV, Sud FM, RFM, Walf FM, APS and 8 online media outlets.

The USAID/COMFISH project succeeded this year also to attract the attention of a large part of the Senegalese public to the problem of IUU fishing through extensive coverage of the March 2013 regional workshop on IUU fishing. The event and issues discussed were covered by one press agency (APANEWS), 5 online information sites (see hyperlink below), six radio stations (RTS Radio, SUD FM, ZIK FM, Nostalgie, Teranga FM, FM Sénégal), and three print media outlets (le Soleil, L'Obs, le Quotidien), and 2 TV channels (TFM, APA television News).

The hyperlinks are as follows:

1. [http://www.newsbcc.com/S%C3%A9n%C3%A9gal/Affaires/Le\\_S%C3%A9n%C3%A9gal\\_perd\\_annuellement\\_300\\_millions\\_de\\_dollars\\_%C3%A0\\_cause\\_de\\_la\\_/244116/](http://www.newsbcc.com/S%C3%A9n%C3%A9gal/Affaires/Le_S%C3%A9n%C3%A9gal_perd_annuellement_300_millions_de_dollars_%C3%A0_cause_de_la_/244116/)
2. [http://www.lesoleil.sn/index.php?option=com\\_content&view=article&id=26609%3Ale-senegal-perd-annuellement-300-millions-de-dollars-a-cause-de-la-peche-illicite-dapres-un-expert&catid=140%3Aactualites&Itemid=119](http://www.lesoleil.sn/index.php?option=com_content&view=article&id=26609%3Ale-senegal-perd-annuellement-300-millions-de-dollars-a-cause-de-la-peche-illicite-dapres-un-expert&catid=140%3Aactualites&Itemid=119)
3. <http://modou-modou.com/perde-annuelle-de-300-millions-de-dollars-par-la-peche-illicite/>  
[http://www.seneweb.com/news/Economie/le-senegal-perd-annuellement-300-millions-de-dollars-a-cause-de-la-peche-illicite-expert\\_n\\_89957.html](http://www.seneweb.com/news/Economie/le-senegal-perd-annuellement-300-millions-de-dollars-a-cause-de-la-peche-illicite-expert_n_89957.html)
4. <http://www.souslemanguier.com/nouvelles/news.asp?id=19&idnews=45226&pays=300&cat=&rub>
5. <http://www.icilome.com/nouvelles/news.asp?id=19&idnews=28585>

**Production and dissemination of videos:** The project produced a series of videos that include the handover ceremony between the COGEPAS Project and the USAID/COMFISH project (February 2013); IUU fishing; training of extension workers in radio broadcasting techniques; and biological rest periods for octopus. Most of these audiovisual materials were posted on YouTube and shared also with the project's key stakeholders and partners.

The project also developed other tools, such as photos and a bi-weekly publication on various project activities (Local Agreements, workshops, adaptation plans, etc.). The photos are available in the project's photo database. As for the bi-weekly, it is published in the newsletter USAID/Senegal produces under the same name.

[https://www.youtube.com/watch?v=WYYHH-aD\\_a4&feature=g-hist](https://www.youtube.com/watch?v=WYYHH-aD_a4&feature=g-hist)

**Success stories:** Four (4) success stories were published on: 1. the functional literacy program in Cayar; 2. the innovative communication method the project has introduced to keep women in the fisheries sector better informed, more knowledgeable and actively involved in fisheries discussions; 3. the impact radio programs are having on strengthening CLPAs.

**Other activities:** To contribute further in increasing the project's visibility via the press, contacts were established with REJOPRAO (the Network of Journalists for Responsible Fisheries in West Africa) to cover project activities. This network, and another like-minded network called GREP (Press and Environmental Research Group), regularly cover the project's initiatives.

Also, to help eradicate bad fishing practices and enhance marine biodiversity conservation, the USAID/COMFISH project organized a press trip to Ngaparou and Dionewar Falia. After the trip, a

magazine was produced on the exemplary fishing techniques and processing practices of these communities, which received an award in June 2013 for their innovative and sustainable practices. Copies of the magazine were distributed to major CLPA players on the ground, as well as to over forty partners of the USAID/COMFISH project. Looking at the success of this press trip, another trip with media practitioners will be organized in FY14 on the project's other major areas of interest.

#### 3.4.5. Science and Technology

**Training in climate change (renewable energy sources):** A consultant and expert in renewable energy sources facilitated this workshop on renewable energy sources/climate change. The 25 women fish processors who attended the event shared ideas on the possible renewable energy sources to use in processing fish in Cayar. The trainer focused on helping the participants understand climate change through the changes observed. He also educated the women on the way climate change works and the impacts it has on development, and then involved them in discussions on mitigation and adaptation measures. The two renewable energy sources considered to be relevant to the communities concerned were biogas and wind energy.

**Modeling environmental parameters and sardinella fisheries in Senegal:** The project performed modeling of sardinella fisheries in Senegal, using catch per unit effort (CPUE), sea surface temperature index; coastal upwelling index, and the AMO (Atlantic Multi-decadal Oscillation) Index. The environmental modeling exercises conducted so far have indicated that climate change has an impact on sardinella landings in Senegal. However, the modeling exercise is not yet considered to be robust enough for fisheries management planning.

**ELEFAN stock evaluation method tested:** From June 3 to 8, 2013, IUPA served as the venue for a training workshop on the use of the new Beta version of ELEFAN IN R developed for USAID/COMFISH by Daniel Pauly's group at the University of British Columbia. This workshop is also described on p. 13 of this report.

## 4. PROJECT MANAGEMENT

### 4.1. Strategies/mechanisms/partnership

Monthly meetings were organized with strategic partners such as WWF, ISE, CSE, APTE, FENAGIE, IUPA and IFAN/IRD. Throughout the year, these technical meetings reviewed the activities and constraints encountered on the ground.

At the same time, a certain number of meetings were held to build collaborative strategies for lasting impact in project interventions. These were:

- Working session with the Embassy of Japan, technical services and the Joal CLPA coordination committee to discuss construction of the Joal CLPA center
- Technical meeting, held with the Chief of Post in Joal, on the follow-up of activities COGEPRAS began on Thiof management
- Meeting with DPM on integrating USAID/COMFISH project into the drafting of the Management Plan on Small Pelagics under the CSR
- Drafting of MoUs with CCLME and FAO to involve them in sardinella management plan development
- Synergy building with the USAID/YAJEENDE project to identify markets for the processed seafood products produced by the women in Cayar

## 4.2. Lessons learned

The lesson on the importance for long-term success of local actor engagement (local authorities, DPM, CLPAs, fishing community, etc.) in strategies the project uses to establish management plans for priority stocks continues to be confirmed. All project initiatives are preceded by a preliminary courtesy visit to the local authorities to inform them and ask them to be our advocates to the community, so that they enlighten them and convince them to play an active role throughout the process of establishing sustainable management units for target stocks.

In FY13, impacts of the project are beginning to be noticeably felt on the ground. A growing number of actors, including public authorities, are applauding the approaches and tools used by the project. With this development, we are enjoying greater recognition and acceptance among stakeholders. The authorities are also more disposed to include USAID/COMFISH fisheries experts in most of their ongoing processes. The following points show that the project is progressively gaining ground in the sector's decision-making cycles:

- The USAID/COMFISH project has joined the team responsible for developing the small pelagics management plan (sardinella)
- The DPM Small Pelagics Committee invited the project to present its model for developing the sardinella management plan
- The authorities have requested the project to take part in implementing DPM's action plan for Senegal's Small Pelagics Committee. Acknowledging the effectiveness of the project's approach to involve communities in fisheries management before establishing UGDs, and to strengthen institutional capacity and stakeholders at all levels of governance, the authorities have requested the project to replicate the same models in other areas/CLPAs not covered by project interventions.
- The project has been invited to give substantive support in current efforts to develop fisheries. It is worth noting, however, that most of the scientific data we collect in our research is sensitive. This requires us to give feedback to, and obtain validation from the authorities before releasing the material publicly.
- Project experts were involved in drafting the introductory document for the Inter-Ministerial Council on Fisheries

These repeated requests the project receives from decision makers and local communities attest that the project is contributing effectively to the Government of Senegal's efforts to implement its fisheries sector Policy Letter. The project obviously cannot do everything, owing to time and resource constraints. So, to maximize impact and ensure the sustainability of its interventions, the project must not spread itself too thin. It should focus on areas where its contributions can bring about significant positive changes in the fisheries sector.

Given the very positive impact of communication on our activities, this aspect of the program should be maintained to continue to educate and give visibility to fisheries issues and progress being made.

A threat to the USAID/COMFISH project is the recurrent institutional instability at high levels of government. In barely three years, we have seen two new ministers who do not necessarily have the same values and ways of working. What is even more disturbing is that they may have completely different, or even opposing visions and policies for developing the fisheries sector. This can slow down processes that the project puts in place for sustainable fisheries governance.

Another lesson is the difficulty of managing expectations. The stakeholders are expecting a lot from USAID/COMFISH, but resources and time frame are finite, and there are external factors (e.g. institutional instability) that the project cannot control.

## ANNEXES

### ANNEX 1: Table of indicators

Indicators	FY13 target	Actual Q 1	Actual Q 2	Actual Q 3	Actual Q 4	Total	% of target	Deviation	Remarks
<b>IR 1: Institutional and stakeholder capacity strengthened at all levels of governance to implement an ecosystem-based, co-management approach to sustainable fisheries, to prevent over-fishing, and to increase climate change resilience</b>									
1. By 2016, there is a 75% increase in the composite index of CLPA management effectiveness in USAID / COMFISH sites	Na	Na	Na	Na	Na	Na	Na	Na	
2. Number of individuals who received short-term training on productivity in agriculture or food security (4.5.2-7 indicator, FTF)	2090	598	114	415	951	2078 H=1424 F= 654	99%	-12	
3. Number of written and audiovisual productions developed for capacity building of collaborative management institutions and fisheries actors	9	0	3	0	6	9	100%	0	1 guide on good processing practices, one guide on collaborative surveillance, 1 poster and 3 brochures on the results of the vulnerability assessment, three contracts with community radios on the Petite Côte
4. Number of research and educational institutions, government agencies, consultation frameworks and NGOs having strengthened their capacities with the support of USAID / COMFISH	17	2	7	5	3	22	129%	+5	DEEC, ANACIM, DAMCP, etc. Much more organization participated and benefited from the project activities like trainings etc.

Indicators	FY13 target	Actual Q 1	Actual Q 2	Actual Q 3	Actual Q 4	Total	% of target	Deviation	Remarks
<b>IR 2: Strategies, policies and best practices identified, tested and applied to address both climate and non-climate stressors and their interactions in marine fisheries and biodiversity</b>									
5. Number of action plans and/or projects developed to support the fisheries management process	7	1	1	1	3	6	86%	-1	3 CC adaptation plans approved by the actors in Quarter 4 Action plans and guides for the CL drafting process
6. Number of scientific studies contributing to support management plans for sustainable management units	11	3	1	4	3	11	100%	0	2 CC studies and 1 mapping
7. Number of synergy areas created in the process of establishing sustainable management units	4	1	0	2	0	4	100%	0	COGEPAS, Japan Embassy, Go-WAMER project, Yajeende and Ongoing synergy with CCLME will continue in 2014
8. Number of policies / regulations and administrative procedures analyzed	13	2	0	0	19	21	162%	+8	More laws analyzed than planned during the development of the three local agreements
9. Number of policies / regulations and administrative procedures drafted and presented to the public / stakeholders for consultation	6	0	0	1	6	7	117%	+1	3 CC adaptation plans and 3 local agreements submitted to ICC members for approval and one code of conduct with the women processors in Cayar

Indicators	FY13 target	Actual Q 1	Actual Q 2	Actual Q 3	Actual Q 4	Total	% of target	Deviation	Remarks
10. Number of policies / regulations and administrative procedures submitted for formal adoption	6	0	6	2	0	8	133%	+2	6 COMFISH-CLPA MoUs and 2 official notes. More documents than planned initially.
11. Number of policies / regulations and administrative procedures approved with the assistance of the USG	5	1	0	8	0	9	180%	+4	6 COMFISH-CLPA MoUs and 2 official notes. More documents than planned initially.
12. Number of policies / regulations and administrative procedures approved and whose implementation is ongoing	4	0	3	0		3	75%	-1	Implementation of local agreements has begun in Mbour, Joal and Sindia. But, the MPA strategy is still not validated
13. Number of new technologies for fisheries management in place	4	0	0	0	3	3	75%	-1	3 local agreements established. Some delays in receiving the ELEFAN software package.
14. Number of players having established new rules for collaborative management of fisheries resources	15000	0	0	0	10056	10056	67%	-4944	The actors identified in the three CLPA are smaller in number than estimated initially



Indicators	FY13 target	Actual Q 1	Actual Q 2	Actual Q 3	Actual Q 4	Total	% of target	Deviation	Remarks
15. Number of producers and others who have applied new technologies or management practices with the assistance of the USG (4.5.2-5 indicator FTF)	20,940	0	7,685	0	0	7685	37%	0	Actors in the Mbour, Joal and Sindia CLPAs.
16. Number of hectares of significant biological importance and / or containing natural resources under improved management with the support of the U.S. government	327,104	0	41,500	292,604	0	334,104	102%	+7000	The 7,000 ha of the Bamboung MPA were not targeted initially
17. Number of hectares in areas of significant biological importance under improved management with the assistance of the U.S. government	34,500	0	41,500	0	0	41,500	120%	+7,000	The 7000 ha of the Bamboung MPA were not targeted initially
<b>IR 3: The vulnerability of coastal fishing communities are assessed and adaptation strategies are implemented to increase resilience to the impacts of climate change</b>									
18. Number of individuals who received training on climate change with the assistance of the U.S. Government	950	403	0	132	247	782	82%	-168	There were fewer actors than anticipated in workshops

<b>Indicators</b>	<b>FY13 target</b>	<b>Actual Q 1</b>	<b>Actual Q 2</b>	<b>Actual Q 3</b>	<b>Actual Q 4</b>	<b>Total</b>	<b>% of target</b>	<b>Deviation</b>	<b>Remarks</b>
19. Number of climate change vulnerability assessments conducted with the assistance of the U.S. government	3	0	0	0	3	3	100%	0	3 vulnerability assessments conducted in Joal-Fadiouth, Sindia and Rufisque
20. Number of laws, policies, agreements, protocols, or regulations on climate change proposed, adopted, or implemented with the assistance of the U.S. Government	3	0	0	0	3	3	100%	0	3 adaptation plans developed and validated by the ICCs in the 3 vulnerability assessment sites
21. Number of people having increased their ability to adapt to the impacts of climate variability and change through the assistance of the American Government	2,090	598	114	415	951	2,078	99%	-12	Training beneficiaries

Indicators	FY13 target	Actual Q 1	Actual Q 2	Actual Q 3	Actual Q 4	Total	% of target	Variance	Remarks
<b>IR 4: Increased social and economic benefits to artisanal fishing communities provide incentives to a continued sustainable fisheries agenda and increase climate change resilience</b>									
22. Number of for-profit private food security enterprises, producers organizations, water users associations, women's groups, businessmen and women's associations, and CBO having received support from the U.S. Government	32	11	4	19	7	41	128%	+9	CLPAs and CLPs, MPAs and women's EIGs of women processors benefitting from project activities. There are more organizations than planned
23. Number of rural households benefiting directly from the assistance of the U.S. Government (4.5.2-13 indicator FTF)	5,449		5,449		3,682	9,131	168%	+3,682	CLPA households in Cayar, Rufisque, Yenne, Sindia, Mbour and Joal with CLs and adaptation plans

**ANNEX 2: Financial report**

Budget Line Items	FY13 Approved Annual Budget	FY13 Fourth Quarter Spending				Total spent FY13	Total spent since the beginning of the project	Balance of 2013 Budget	% of annual budget spent
		July-13	August-13	September-13	Total Quarter4				
(a)	(b)	(c)	(d)	(e)	(f) = (c)+(d)+(e)	(g)	(h)	(i)=(b)-(g)	(j)=(g)/(b) * 100
a Personnel	\$324,546	\$17,137	\$16,087	\$27,669	\$60,893	\$297,104	\$962,617	\$27,442	92%
b. Students	\$0	0	\$0	\$0	\$0	\$0	\$3,500	\$0	0%
c. Consultants	\$808,538	\$66,132	\$68,296	\$65,308	\$199,736	\$902,166	\$2,859,612	-\$93,628	112%
d. Other Direct Costs	\$190,109	\$5,980	\$6,898	\$2,210	\$15,088	\$205,806	\$546,470	-\$15,697	108%
e. Subcontracts	\$352,962		\$15,144	\$64,877	\$80,021	\$340,134	\$1,365,777	\$12,828	96%
f. Travel	\$317,117	\$14,673	\$25,889	\$412	\$40,973	\$190,457	\$365,950	\$126,660	60%
g. Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$103,463	\$0	0%
h. Tuition	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0%
i. Total Direct Charges (sum of 6a-6h)	\$1,993,273	\$103,922	\$132,314	\$160,475	\$396,711	\$1,935,667	\$6,207,389	\$57,606	97%
j. Indirect Costs	\$429,081	\$27,020	\$30,464	\$24,856	\$82,339	\$425,575	\$1,129,122	\$3,505	99%
k. Totals (sum of 6i-6j)	\$2,422,354	\$130,941	\$162,778	\$185,331	\$479,050	\$2,361,242	\$7,336,512	\$61,112	97%

Note: Subcontract and Consultants does not assume encumbered contracts for quarterly reporting

**ANNEX 3: Environmental monitoring FY 13 EMMR**

Category of Activity	Environmental Threats	Mitigation Measures Taken	Who is Responsible for Monitoring?	Sources of Verification	Monitoring Method	Frequency of Monitoring
1. Education, technical assistance, training, etc.	No environmental impacts anticipated as a result of these activities.	No mitigation measures taken for this quarter	Project Manager	Education, technical assistance, training and other materials and reports	Review of materials	Quarterly
2. Reduce post-harvest losses and improve product quality	<p>Improved facilities could result in disturbance to critical resources and sensitive ecosystems, changing access to water by animals, people and vegetation, or degrading water resources, sedimentation of surface waters soil erosion, or contamination of groundwater and surface water</p> <p>Increased harvests and threat to overfishing due to increased demand from improved quality</p> <p>Potential impacts of water supply &amp; sanitation activities include damages to natural or sensitive ecosystems, depletion of freshwater resources, creation of stagnant water that could create breeding opportunities for water-borne disease vectors, contamination of water sources causing increased human health risks</p> <p>Land use change, degradation of water quality, increased human health risks from contamination of water, soil, and food by human pathogens, degradation of estuarine and marine and surface</p>	<p>The technical monitoring construction committee is functional. The purpose of this committee is to monitor the evolution of construction and to evaluate its compliance with validated plans. It organizes a tour of site every 15 days. During these visits questions are raised and improvement measures proposed</p> <p>After the development and validation of Cayar processing unit's code of conduct, a debriefing session was organized with women processors for its</p>	Project Manager	<p>Construction plans/ designs and photos of all facilities constructed</p> <p>Mgt. plan, MSC cert. or other evidence of measures to prevent overfishing</p> <p>Construction plans/ designs and photos of all facilities constructed</p>	<p>Review of materials and site inspection</p> <p>Review of materials</p> <p>Review of materials and site inspection</p>	Quarterly

Category of Activity	Environmental Threats	Mitigation Measures Taken	Who is Responsible for Monitoring?	Sources of Verification	Monitoring Method	Frequency of Monitoring
	shallow groundwater water quality adversely affecting both human and ecosystem health	<p>implementation.</p> <p>The different rules in this code of conduct have been translated into Wolof in the form of poems and songs that will be introduced in the literacy classes.</p> <p>In order to ensure the hygiene and quality of products in the processing unit and prevent the spread of diseases, the project is in the process of revitalizing the safety committee.</p> <p>The project has made available to women processors cleaning's materials (wheelbarrows, shovels, brooms, mufflers, etc.). Women processors organize a cleanup of the site twice a month.</p>				
3. Enhance fisheries value chains	Increasing the value of fish and product eco-labeling can give incentive to increase fishing effort and contribute to overfishing.	No value chain activities this FY	Project Manager	Management plan, MSC certification or other evidence	Review of materials	Quarterly

Category of Activity	Environmental Threats	Mitigation Measures Taken	Who is Responsible for Monitoring?	Sources of Verification	Monitoring Method	Frequency of Monitoring
				that measures are being taken to prevent overfishing		
4. Improve fishing community resilience to climate change	<p>Alteration of nearshore sediment patterns resulting in displaced or accelerated erosion of beachfronts from inappropriate construction</p> <p>Natural habitat destruction or degradation, degradation of marginal lands land water; marine pollution from soil erosion or use of agricultural chemicals; reduced water availability from water storage or diversion for irrigation; bio-diversity loss from land fragmentation, conversion to agricultural use, or introduction of exotic species</p> <p>To be determined through environmental screening processes</p>	TBD	Project Manager	TBD via env. screening	TBD via env. screening	Quarterly