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)
In Partnership With:

Coastal Resources Center, University of Rhode Island
United States Agency for International Development / Senegal
Ministère de l'Économie Maritime
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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COASTAL RESOURCES CENTER
University of Rhode Island

1. EXECUTIVE SUMMARY

The goal of the USAID/COMFISH project is to support the Senegalese Ministry of Fisheries and Maritime Affairs (AAPC), via its technical departments and particularly the Department of Marine Fisheries (DPM), in implementing the Sectoral Policy Letter (LPS) that guides national efforts on the sustainable management of marine fisheries. The LPS has several objectives, including: (i) to restrict the use of unsustainable fishing methods by introducing Best Management Practices (BMPs); (ii) to increase the income of artisanal fishermen; (iii) to help fishing communities adapt to the impacts of climate change; (iv) to strengthen fisheries' resilience to climate change impacts on fish stocks; and finally, (v) to strengthen economic/biological sustainability with bottom-up collaborative management in compliance with the Fishing Code of 1998.

At the USAID/COMFISH project's launching ceremony, the Ministry of Fisheries underscored the limited progress to date on collaborative, participatory management through Local Artisanal Fishing Councils (CLPAs). In 2011, DPM and USAID/COMFISH found that this came from a critical lack of functional convergence in the space between priority stock distribution areas and the jurisdictions of the local institutions (the CLPAs) designated to manage those stocks. Actually, the geographical areas under CLPA jurisdiction were removed from stock areas. So, the measures taken by villages or CLPAs to control those stocks did not work. DPM and USAID/COMFISH agreed therefore to implement a concept for addressing these two concerns (geographic and biological). The idea was simply to create one Sustainable Management Unit (SMU) per fish stock. Each SMU would include all village/CLPA fishermen harvesting the same stock. It would also have a collaborative management plan, using fishermen's local knowledge and scientific knowledge together to achieve biological and socio-economic sustainability in target fisheries. A gender strategy would be designed for these plans to achieve food security and boost socio-economic viability.

To establish the SMUs, the USAID/COMFISH project did a preliminary participatory diagnosis in year two. The exercise identified:

1. The six priority species. One was sardinella - the first priority species chosen to have an SMU, which the project would establish with DPM and other partners;

2. The institutional and legal frameworks to create and/or strengthen for the process. This was how Local Conventions (LCs) on Fisheries were chosen as the main legal instrument for actors on the ground to negotiate the rules for fisheries management at the local level. The project actors accordingly deployed a three-step strategy to establish the ***first three local conventions*** (for the CLPAs in Sindia, Mbour and Joal Fadiouth) that Senegal validated and approved officially. This is why local conventions are a major innovation in Senegal's marine fishing sector. Ten facilitators, *hired* from the CLPAs, led and facilitated the process during fifty workshops and discussion groups.

The project took action to begin implementing these local conventions and to finalize three more CLPAs in Cayar, Rufisque/Bargny, and Yenne/Diallao in 2013. The goal was to ensure that by the end of 2013, the six local conventions established for the six CLPAs contribute to create the SMU on sardinella, the species that makes up over 80% of the fishing effort on this stock.

3. The strategies, policies and approaches to develop and implement for the SMU process. To establish the SMUs on priority species, the project needed a scientific basis that would provide deeper understanding of the potential yield of exploitable fish stocks. It had therefore to adopt an advanced scientific approach without losing sight of local empirical knowledge on fishery resource management. This was why USAID/COMFISH took steps in fiscal 2012 to initiate a series of scientific studies, data collection initiatives and biological, socio-economic and environmental

analyses in partnership with four key partners (CRODT, IUPA, UBC and LABEP/IRD) to support the implementation of collaborative management plans. The overall results achieved in 2012 are outlined in *Table* (2). The fish stocks and the fisheries that they support are an integral part of the natural resources in the marine and coastal ecosystem. This latter also contains mangrove forests, arable land, pastures, woodlands, wetlands and drylands, watercourses and abandoned farmland. Any change in one component of the ecosystem can disrupt the natural course of events in all productive resources in the marine and coastal ecosystem, whether this occurs directly (i) by a drop in rainfall, increased salinity, high temperature, frequent storms, and the change in rainfall seasonality; or indirectly by (ii) in-migrating communities that leave the hinterland to the coastal areas due to desertification,. It is in this regard that the USAID/COMFISH project and the Ecological Monitoring Centre (CSE) studied the soil dynamics and mangrove ecosystems in three CLPAs from 1979 to 2011. The findings of these studies suggest that the changes observed in natural land use and coastal area coverage result from the combined effects of climate change and population growth. These, in turn, influence the system's natural production. The data has been mapped and analyzed, and a summary of the changes between fisheries and land use patterns will be done in 2013.

All the information obtained in the course of these studies will be analyzed and processed in early 2013, and then included in the collaborative management plans.

The direct impacts of climate change on fishing communities were addressed in fiscal 2012 by (i) training over 300 fishermen in nine CLPAs to identify the main causes of climate change in their areas (e.g. coastal erosion, movement of stocks/migration of fish, pressure from populations that migrate due to desertification). This work will continue in 2013 with coastal community vulnerability assessment for 3 CLPAs and the establishment of participatory climate change adaptation plans for these communities. A preliminary study on climate change suggests that Senegal's fishing sector is one of the most vulnerable to climate change in the world. It is for this reason that a tool was identified for diagnosing the indirect effects of climate change on stocks, the welfare of fishermen and food security. The USAID/COMFISH project and its key project partners will test this tool on sardinella in fiscal 2013.

In terms of intervention strategies, the *USAID/COMFISH* project established a key component for ***capacity development*** (covering institutional and individual capacities, as well as the gender approach**)**. It designed a strategy for developing the capacities of women in the fishing sector. It also submitted an action plan for building the capacities of women in the fishing sector to DPM and the other project partners. These efforts were to enable the women to protect their interests better in the decision-making process. A methodology for involving women in planning was also developed. Teaching/learning tools, suited to the women's level of understanding, were used to help them assimilate training by consultants and discussions after the training. This innovative methodology created a learner-friendly environment adapted to the situation and reality of these women. In record time, they developed a **plan of action for training** and prepared a **declaration of women in Senegal's fisheries sector.**

To help about 400 women fish processors modernize their equipment, develop their production capacities, improve their working conditions and increase their profits, the *USAID/COMFISH* project initiated efforts to improve the techniques for artisanal processing and storage of fishery products in ***Cayar.*** The main activity in this initiative was ***the establishment of a modern artisanal fish processing unit*** to develop a local label of products from the artisanal fish processing facility in Cayar (roasted, salted and dried sardinella commonly called "keccax" in local language). To take this process forward, the project in 2012 conducted: (i) an audit of fish processing infrastructure in Cayar; (ii) microbiological analyses of dried fish (*keccax); and (iii)* training on climate change, hygiene and

quality, literacy education, leadership, environmental monitoring and the standardization of fish processing units.

The USAID office in Washington D.C. did a cost-benefit analysis on this activity and found a high internal rate of return on the investments in improved processing techniques and product quality.

The project also pursued other capacity development initiatives and fisheries scientific research with local/national actors and institutions so that they are better equipped to establish Sustainable Management Units on priority stocks. The first findings of this fisheries research will be available in FY2013. In addition, the project worked together with WWF to support marine biodiversity conservation. The activities included marking the MPA boundary in Cayar and providing equipment to Joal's eco-tourism center to support fishermen who are now working as eco-guides.

The Alliance for Sustainable Fisheries played a decisive role in establishing SMUs during the reporting period: *(i)* disseminating the project's results at all levels during coffee chats on new subjects and tools; and (ii) making recommendations directly to local authorities in charge of fisheries management.

LIST OF ACRONYMS AND ABBREVIATIONS

ACCC	Adaptation to Coastal Climate Change in West Africa
AGS	Accelerated Growth Strategy
AO	Agreement Officer (USAID)
AOR	Agreement Officer's Representative (USAID)
APTE	Sanitation, Fisheries, Tourism and Environment
BRPs	Biological Reference Points
CCLME	Canary Current Large Marine Ecosystem
CLP	Local Fisheries Councils
CLPA	Local Artisanal Fisheries Councils
CNCPM	National Consultative Council for Marine Fisheries
CoMNAC	National Committee on Climate Change
CONIPAS	National Fisheries Stakeholders Council
COPEM	Council of NGOs and POs active in the Marine Environment
CPUE	Capture per Unit Effort
CRC	Coastal Resources Center
CRODT	Oceanographic Research Center, Dakar - Thiaroye
CSE	Ecological Monitoring Center
CST	Scientific and Technical Committee
DAC	Department of Community Areas
DAMCP	Department of Community Marine Protected Areas
DEEC	Department of Environment and Classified Establishments
DITP	Department of Fish Processing Industries
DPM	Department of Marine Fisheries
DPN	Department of National Parks
DPSP	Department of Fisheries Protection and Surveillance
ENDA	Environnement et Développement en Afrique-Energie
FENAGIE	National Federation of Fisheries EIGs
GDRH	World Bank Sustainable Management of Fishery Resources Project
GMPs	Good Management Practices
ICC	Coordinating Mechanism and Council
ISRA	Agriculture Research Institute of Senegal
ITA	Institute of Food Technology
IUPA/UCAD	Institut Universitaire de Pêche et d'Aquaculture - Université Cheikh Anta Diop
LC	Local Convention
LPS	Fisheries and Aquaculture Sector Policy Letter
MEPN	Ministry of Ecology and Nature Conservation
MPA	Marine Protected Areas
MPAM	Ministry of Fisheries and Maritime Affairs
MRAG	Evaluation Group on Marine Research
MSC	Marine Stewardship Council
NAPA	National Action Plan for Climate Change Adaptation
PAP/PGP	Fisheries Development Plan/Fisheries Management Plan
PMP	Performance Management Plan
PRAO	World Bank-funded West Africa Regional Fisheries Program
PRSP	Poverty Reduction Strategy Paper
PMP	Performance Monitoring Plan

SC	Steering Committee
UCNP	USAID-COMFISH National Program Coordination Unit
URI	University of Rhode Island
USAID	United States Agency for International Development
USG	United States Government
V&A	Vulnerability Assessment and Climate Change Adaptation
WAMER	West Africa Marine Ecoregion
WWF-WAMPO	World Wildlife Fund – West Africa Marine Ecoregion Program Office

2. INTRODUCTION AND CONTEXT

The Collaborative Management for a Sustainable Fisheries Future in Senegal project (USAID/COMFISH) is a five-year initiative (February 14, 2011 - September 30, 2016) funded by the United States Agency for International Development (USAID). It is implemented through a Cooperative Agreement between USAID and the University of Rhode Island (URI). The project's main executing partners include government agencies, the private sector, non-governmental organizations working in coastal areas and in the fishing sector, universities (UCAD, IUPA), research institutes (CRODT, IRD/IFAN) and NGOs.

The goal of the USAID/COMFISH Project is to support the Government of Senegal's fisheries sector policy, in accordance with the Fisheries and Aquaculture Sector Policy Letter, by strengthening the prerequisites for improved governance and promoting the use of effective management approaches and tools. These tools address both the social and institutional/biological aspects of sustainability. On the whole, provision has been made for local governance organs in the Fisheries Code of 1998 as well as through the creation of Local Fisheries Councils (CLP) and Local Councils of Artisanal Fisheries (CLPA). Research has also been conducted on the biological sustainability of some fish stocks, although the findings are still not integrated fully into collaborative management plans. Hence, local collaborative management mechanisms do not fully meet the sustainability criteria enshrined in the Fisheries Sector Policy Letter. This means therefore that most fisheries in Senegal are not managed in a sustainable manner.

This Annual Report describes the activities performed in FY12 by the USAID/COMFISH project. It covers the progress made and constraints encountered as well as the activities planned for 2013.

The report has five sections. The introduction describes the context of fisheries in Senegal. It has been revised with more recent data and new knowledge acquired in 2012. Part one describes the project's main findings, strategies and performance. These have been revised to reflect the adjustments made to the project, based on the new knowledge gathered on the ground, and particularly on CLPAs. Part two describes in detail the project's accomplishments in year two. Part three covers the project's crosscutting activities, such as communication and monitoring of environmental compliance. And, part four deals with project management.

Importance of fisheries to the economic and food security situation in Senegal, based on latest available data (2009-10): Marine fisheries play a crucial role in food security, the improvement of livelihoods, local and national economic growth, and the social well-being of communities in Senegal. The fisheries sector, including industrial and artisanal fisheries, employs close to 600 000 workers either directly or indirectly, and accounts for about 17% of the workforce. It produces 47% of total protein intake and 70% of animal protein consumption in Senegal. Fishery exports made up over a third of all exports (about 30%) between 1997 and 2002.

Trends in the fishing effort, landings and stocks: According to CRODT estimates, the number of fishing boats increased from 8,488 in 1980 to 13,420 in 2006. These estimates may have omitted (i) the vessels owned and/or registered in Senegal, but fishing in foreign waters; and (ii) the vessels moored in Senegal, but not used actively for fishing. A more recent boat census (2011), led by DPM/COPE, reported between 17 000 and 18 000 registered vessels. This census was conducted in order to create a national registry that would identify the entire fleet of boats in Senegal - to have effective management measures - and generate revenue from royalties. It possibly included vessels active in foreign waters or those that were not active. The actual number of active artisanal vessels is probably between these two estimates, calculated for different purposes and at different times. Although the exact increase in artisanal fishing effort since 2006 is not yet known, these trends show

that it is significant and may have resulted in part from the increase in the coastal population. Meanwhile, the number of industrial fishing vessels fell from 176 to 119 between 1997 and 2006, and this has been progressing since then.

Fishing is often perceived in Senegal as a livelihood of last resort. The difficulties affecting the agricultural sector due to climate change and desertification have caused many to go into artisanal fishing. The total landings from artisanal and industrial fisheries combined were relatively the same for a decade and estimated annually to be about 400 000 tonnes until 2004. In this same period, the ratio of artisanal fishing in the supply chain and the domestic and foreign markets progressed steadily. Today, artisanal fishing provides 94% of fish, 63% of mollusks and 25% of shellfish landed in Senegal.

In fiscal 2012, USAID/COMFISH, in partnership with CRODT, launched a sampling system to accurately estimate the volume of catches landed in Senegal from third countries. The first results that were reported in November 2012 did confirm the important contribution that catches from outside Senegal make to the landings recorded in the country. The results showed also that:

- Food security in Senegal could be affected by the vulnerability of Senegalese fishermen who are at risk of being prohibited from fishing in the waters of neighboring countries. The gap observed between the fishing effort and fishing capacity - in particular artisanal fishermen's ability to catch fish and exploit fish stock productivity – may be far bigger than expected;
- Several ongoing assessments on key stocks need to be revised in light of the latest available data;
- The existing fisheries management strategies, and some of the management plans of the Ministry of Fisheries (DPM), are likely going to be revised.

It is not possible today to know all about fisheries in Senegal, because there are still significant gaps in data on fish landings and the fishing effort. These gaps result from the use of different sampling systems, which have in the past produced different and sometimes unusual results. CRODT set up a traditional system for collecting data on catches and the fishing effort since 1974, and has produced results that are carefully controlled and managed since 1981. This data is used for stock assessments. In 1950, ten years before independence, Senegal launched an equally important data collection system that is now managed by the DPM on the basis of careful monitoring of fish sales. The two data collection systems have been harmonized and produced regularly converging estimates of landings in the last decade. On the whole, there has been correspondence between the data from CRODT and that from DPM. The data from these sources will be used to achieve the goals for which it was gathered: (i) the data from CRODT to assess stocks and fisheries; and (ii) the data from DPM for economic and especially for macroeconomic considerations.

The data from both CRODT and DPM shows that there is renewed interest in Senegal's fisheries sector. Assuming that labor in the sector remained stable at about 15% - there are chances this figure has increased – the sector's GDP per capita in 2009 dropped to 65% of the value in 2005. This makes a decline of 35%. It is an estimate similar to the 20% drop observed between 2004 and 2006 in the fish landings on major landing ports. The impact is felt also in food security. We must bear in mind also that the fisheries sector employs 600 000 persons, or 15% of the workforce. It yields about 2% of GDP, while the remaining 85% of the Senegalese population generates approximately 98% of GDP. This shows the fisheries sector is not only suffering from the effects of the prevailing poverty; it is now on a declining economic trend.

Main challenges to sustainable fisheries management in Senegal: In fiscal 2011-12, USAID/COMFISH and CRODT identified some key data on fish landings. It showed that the

combined landings of the project's six priority species - sardinella, cobo, octopus, white grouper and white shrimp, all selected in a participatory manner and approved by DPM – had increased from 194 000 tons in 1991 to 250 000 tons in 2001 and 300 000 tons in 2010. However, the increase in landings – for round sardinella, white grouper and other species - was skewed by the inclusion of landings from foreign waters, a trend which probably started from the mid to late 1990s. These foreign landings have progressed steadily since then, and probably at an increasing rate. There are assessments under way to review and update this data.

There is evidence that many or most fisheries in Senegal are exploited at full capacity or above the authorized fishing effort. If the fishing effort on Senegal's coastal stocks continues to rise and the marine ecosystems - which depend on fisheries in Senegal - are increasingly degraded by destructive fishing methods, then the effects of climate change, and pollution also, on local stocks will increase and even exceed breaking point. This may be the case already in some areas.

Importance of climate change in fisheries management:

Effects of climate change on fishing communities: At the beginning, the USAID/COMFISH project had a "climate change" component that covered coastal community vulnerability and adaptation to natural climate change threats, such as coastal erosion, habitat loss, the rise in sea level (estimated between 0.5 and 1 meter in the next 50 to 100 years), increased frequency of marine storms and influx of saltwater into groundwater. Given the serious impacts that physical threats could have on coastal communities, the project will assess coastal community vulnerability to such effects in year two and three, and develop coping strategies for such communities. The first results of this strategy are shown below, as follows:

Direct effects of climate change on landings: From August to October 2011, the project introduced a methodology for identifying stocks at risk of climate change in Senegal and for building their resilience to such threats. The tool will be used on fisheries in Senegal. It is described in the project's 2012 annual work plan. When the tool is used with appropriate data, it identifies the effects of specific climate change variables (e.g. temperature) on landings and CPUE, using the comparable effects of excessive effort on these variables. The project committed to work with CRODT and identify data for this activity in fiscal 2012. But it could not meet the initial targets before October 2012 and has carried the work forward to 2013.

Implementing a sustainable fisheries management strategy in Senegal: A sustainable fisheries management strategy requires:

- A plan for fishery management capacities, including climate change adaptation and per unit effort (CPUE)
- Identification of sites where the major impacts of climate change on coastal communities may occur
- The development of models that distinguish between the effects associated with excessive fishing effort and those associated with climate or environmental change
- The development of the new "ecosystem value chain" approach
- The development of an action plan for a nation-wide integrated fisheries information system to be used in implementing the steps mentioned above

All the above elements are necessary for the *USAID/COMFISH* project to fulfill its mission: to promote *the sustainable management of artisanal fisheries in Senegal with scientific evidence,* using CLPAs as institutional mechanisms and legal instruments and the DPM community-based management approach enshrined in the 1998 Fisheries Code and the Fisheries Sectoral Policy Letter (LPS).

Collaborative management of artisanal fisheries in Senegal: USAID/COMFISH flagship activity

In line with the LPS, the Ministry of Fisheries has established Local Councils of Artisanal Fisheries (CLPA) to develop management plans for large coastal fishing communities that have many CLPs and fishermen, and to synergize and coordinate collaborative management plans initiated by those CLPs.

However, these CLPAs are too small to cover the unit stocks or the fisheries they are supposed to support and manage, so that the effort on each stock unit is in harmony with productivity on the entire stock. At the end of 2011, the project introduced the concept of Sustainable Management Units (SMU, i.e. units that manage the entire stock in a sustainable manner). The DPM has agreed in principle to endorse it as a basis for the sustainable management plans the project is proposing for target stocks. Therefore, most activities in 2012 focused on diagnoses. They focused also on developing and implementing strategies, approaches and tools to entrench the SMU concept.

To help establish the SMU on sardinella stocks, the USAID/COMFISH project in 2012 supported the significant management measures DPM had taken at the village level to establish CLPs and CLPAs, and to institute three local conventions on Marine Fisheries in Sindia, Mbour and Joal. It did so in the hope that each CLPA, with assistance from USAID/COMFISH and its project partners, would in turn develop its own specific Participatory Management Plan (PMP), for example, on sardinella stocks. All these activities were initiated to implement MPAM's overall strategy for sustainable fisheries management on the ground, in accordance with the LPS. The work was designed also to support the LPS strategy, aimed at supporting economic growth in Senegal by improving the conditions required to attract investment, expand trade and increase wealth through improved management of the fisheries sector.

Objectives and strategies of the project

The main goal of USAID Senegal is to support the Government of Senegal in reforming the fisheries sector in accordance with the 2008 Fisheries and Aquaculture Sector Policy Letter (LPS). This commits the Ministry of Fisheries and Maritime Affairs (MPAM), through its technical departments and particularly the DPM, to ensure continuous supply of fishery products and revenue from fishing in order to guarantee food security for the people in Senegal whose population growth rate is on the high side. This was why the USAID/COMFISH project embarked in 2012 on efforts to support DPM in marine biodiversity conservation, institutional capacity development, the use of science for good fisheries governance, climate change vulnerability assessment, training and the provision of increased economic benefits to fishing communities (including women processors).

Given that most of the important marine resources in the Canary Current Large Marine Ecosystem area (CCLME) are shared between Senegal and its neighboring countries, the project approached CCMLE in July 2012 and the two institutions agreed informally to support the harmonization of artisanal fisheries governance at the sub-regional level, although the overall focus of USAID/COMFISH activities remains in Senegal. This cooperation is particularly important in sardinella fisheries, which represent 70% of Senegal's artisanal fish landings and are designated as the country's main priority stock both by DPM and the *workshop on Fisheries that took place on July 22-24, 2011*. USAID/COMFISH approved this selection on one key condition: that the SMU for the sardinella species – designed with a stock-based approach - and its Development Plan would cover the entire West African sub-region, considering that sardinella is a migratory species harvested in at least five West African countries all in the CCLME.

Under this component, USAID/COMFISH and CRODT formed a small working group in July 2012 to conduct a detailed and in-depth study on the sardinella stocks in Senegal and the CCLME. The study

was to review all available data from Senegalese partners and cover a time period from 1950 to the present day. This data has been used to model sardinella fisheries in Senegal. A first draft of the study was produced for an internal review in September 2012 before it is finalized in January 2013. The key findings and assessments (i) will be included in the draft PMP on sardinella, which is being prepared to go into the main SMU on sardinella.

3. MAJOR PROJECT ACTIVITIES AND ACCOMPLISHMENTS

PLANNED ACTIVITIES AND TARGET RESULTS FOR YEAR TWO

Year two activities and expected outcomes are outlined below:

IR 1. THE INSTITUTIONS AND ACTORS AT ALL LEVELS OF GOVERNANCE HAVE STRONGER CAPACITIES TO INCREASE THEIR RESILIENCE TO CLIMATE CHANGE AND IMPLEMENT COLLABORATIVE MANAGEMENT WITHIN THE FRAMEWORK OF SMUS

WORK PLAN ACTIVITIES	EXPECTED RESULTS
• Develop institutional capacities to improve local fisheries governance and strengthen collaborative management organs for enhanced, accountable and sustainable management of local resources; • Train fishermen, women and fishers' association to form a pressure group for good fishing practices; • Strengthen professional organizations and fisheries management institutions and support them to establish operational consultation frameworks; • Provide leadership training to DPM, COPEM, CRODT, IUPA, etc.; • Empower management, research, training institutions as well as NGOs and actors at national level to improve information, experience sharing and communication systems on fisheries (establishing a partnership for a fisheries research, education and awareness building program on marine fisheries);	• A strategy for developing the capacities of CLPAs is designed and support for its implementation provided; • The role and duties of CLPAs in collaborative management are reinforced; • A framework for consultation and dialogue is established in fishing villages or areas through the "Alliance" between organs for collaborative management to improve support for local conventions and the establishment of management plans; • A strategy for the empowerment of women in the fisheries sector is developed and support for its implementation is provided; • Exchanges between fishing communities are promoted; • Efforts are made through the IUPA to reinforce the fisheries information, experience sharing and communication system, as well as the capacities of actors, NGOs and institutions collecting data on the fisheries sector; • A system for sharing knowledge between scientists, fishermen and managers working to promote the assessment of Senegal's fisheries stocks is established; • A country level process to build a partnership for facilitating the exchange of required data and knowledge by institutions involved in Senegal's fisheries stock assessment is initiated; • A process to identify the problems in the fisheries information system is put in place; • CLPAs publish the results of surveys and recommendations on management measures taken at the workshop on assessment of priority stocks; • Two high-level public servants are sent to the University of Rhode Island to pursue studies on the population dynamics and economy of marine fisheries; • An exchange visit to the United States of America is organized for four members of the Partnership Coordination Council (DPM, CRODT, IUPA, and fisheries sector practitioners). • Professional institutions and organizations are given leadership training.

IR 2. STRATEGIES, POLICIES AND GOOD PRACTICES FOR BUILDING RESILIENCE TO CLIMATE CHANGE AND COPING WITH DESTRUCTIVE AND UNSUSTAINABLE MARINE RESOURCE USES THAT POSE A THREAT TO BIODIVERSITY CONSERVATION IN THE WEST AFRICA ECOREGION ARE TESTED AND APPLIED

WORK PLAN ACTIVITIES	EXPECTED RESULTS
• Conduct a literature review on small pelagic fisheries, including: • An estimate of the indices of sardinella abundance by GLM; • A calculation of environmental indicators; • A representation of the space-time variability of the environment; • A series of studies on scientific knowledge of the species, landings, fishing effort, fishing potential, as well as a literature review on the priority stocks; • A series of studies to help develop a strategy for assessing the fishing effort and the captures made by Senegalese fishermen who fish in the sub-region and land their catches in Senegal; • A proposal for studies to help develop a strategy for assessing the effects of excessive fishing effort/capacity on biodiversity and food security (develop TOR); • Support for the establishment of a program using radar and aerial photographs of MCS systems to calculate the volumes of illegal fishing in Senegalese waters; • Preliminary socio-economic studies to help develop the Sine Saloum Bonga and coastal shrimp development plan; • Production of participatory GIS maps using the database with information on the selected stocks, CLPAs, administrative governance units, etc.	• Ecological and biological knowledge on sardinella is produced; • The population dynamics of sardinella in the North West Africa region is understood; • The space-time variability of the West African coastal environment is understood; • The key environmental factors that influence the dynamics of sardinella stocks exploited in West Africa are determined; • Areas for collaboration with programs and partners on the ground are defined; • Scientific knowledge on the priority stocks is reinforced to help develop local conventions and resource management plans; • Socio-economic studies are conducted to help implement the coastal shrimp development plans initiated by the Department of Fisheries; • CLPAs are supported to do a mapping of fishing areas and zones so as to improve the implementation of local conventions; • The CLPAs in Joal, Mbour and Sindia are supported in negotiating and elaborating three local conventions for sustainable fisheries management; • A workshop on MSC is organized for fisheries managers in Senegal; • A strategy and an MPA managers training plan are developed; • A marking of the Cayar Marine Protected Area is done; • The development of ecotourism, as an alternative activity to support the management of the Joal-Fadiouth MPA, is supported; • Biological, socio-economic and governance indicators are developed to monitor and evaluate the effectiveness of MPAs as a fisheries management tool.

IR 3. COASTAL COMMUNITY VULNERABILITY ASSESSMENT AND CAPACITY BUILDING FOR RESILIENCE TO CLIMATE CHANGE IS DONE

WORK PLAN ACTIVITIES	EXPECTED RESULTS
• Develop the capacities of trainers, partners and actors on climate change issues; • Finalize the assessment of coastal community vulnerability to climate change in the target CLPAs through focus groups, and organize a follow-up evaluation workshop on the vulnerability and potential coping strategies of coastal communities; • Support three target CLPAs in defining climate change adaptation measures; • Work with local actors to develop a plan of action including strategies for building resilience to climate change; • Organize a meeting with representatives of DPM, CLPs,	• Coastal community vulnerability assessments are done; • Climate change adaptation strategies are developed and an action plan prepared by communities with support from the project; • Discussions are held with the Ministry of Fisheries on the need to mainstream climate change issues into the sector policy; • Trainers and actors' capacities on climate change issues are developed at national level and in the three CLPAs targeted by the project.

CLPAs, CoMNAC (National Committee on Climate Change), DEEC and other entities to examine climate change issues and the lessons learned in fishing communities, as well as to discuss the need for mainstreaming climate change issues into the fisheries sector policy.	

IR 4. SUSTAINABLE FISHERIES MANAGEMENT INCREASES SOCIAL AND ECONOMIC BENEFITS FOR FISHING COMMUNITIES AND IMPROVES THEIR RESILIENCE TO CLIMATE CHANGE

WORK PLAN ACTIVITIES	EXPECTED RESULTS
• This component covers three aspects on project intervention sites, namely: value chain analysis, enhanced fishery processing and storage techniques, and an assessment of coastal communities' perception of their social well-being.	• A study on sardinella value chains is conducted; • The Manetoulaye Guene GIE's processing unit is refurbished and equipped to the required standard; • The barriers to good processing practices are understood and overcome; • Training on hygiene and quality, literacy skills and leadership is organized; • A baseline on how stakeholders perceive their social well-being is established.

SUMMARY OF YEAR TWO ACCOMPLISHMENTS BY COMPONENT

Project IR's	Year 2 results
• Institutions and actors have stronger capacities for collaborative management in SMUs and increased resilience to climate change**:**	• CLPAs have reinforced their roles and duties in collaborative management by training staff on the legal, administrative and technical aspects of CL development and stock management, and by using CLs as tools for management; • The partnership between the Alliance for Sustainable Management and the USAID/COMFISH project informed civil society and public officials about the collaboration and dialogue framework needed for collaborative management; • A new communication tool with music, dance, myths, songs and stories was identified and tested during the three-day Gender Workshop (March 2012) to close the gap between fisheries management actors; • A strategy and action plan was developed and adopted for the mainstreaming of gender into the fisheries sector: its budget of USD 1.5 million requires a partnership between NGOs, donors and the government; • Important exchanges between local fishing communities and national/local decision makers were facilitated and training provided to some actors. About 4000 fishermen received training on local conventions, management measures and the roles and responsibilities of CLs. Some 394 fishermen in three CLPAs received training on climate change. • The results/recommendations of the July 2011 workshop on priority stock assessment and the DPM/USAID/COMFISH management strategy for CLPA/SMU were disseminated and discussed in CLPAs during the workshops for training on CL organized for fishermen. • Administrative and fisheries officials – Deputy Director of DPM, a technical adviser of the Ministry of Fisheries, the Director of CRODT, the APTE gender program officer and a representative of WWF – went to URI for a 2-to-3 week training course on leadership in climate change and fisheries. • A technical adviser in the Ministry of Fisheries was chosen to go to URI as a Senior Scientist. A junior scientist from CRODT will be chosen to attend the Graduate School of Oceanography at URI as a student on fisheries management. Their training in URI will be on scientific research targeting the key

	interventions of the USAID/COMFISH project (CLPA/SMU based governance and sardinella population dynamics).
• Strategies, good practices and policies for building resilience to climate change and for coping with destructive, unsustainable marine resource uses that pose a threat to biodiversity conservation are identified, tested and applied.	• The first three local conventions (CLs) on marine fisheries in Senegal were developed, validated and approved officially by the CLPAs and Divisional/Sub-Divisional Officers in Sindia, Mbour and Joal-Fadiouth. These CLs will be implemented in 2013; • Biological and ecological data on sardinella, cobo, shrimp, white grouper and other priority species were produced in partnership with CRODT, IUPA and LABEP/IRD; • DPM and CRODT data on landings was studied. The differences identified between this data and regional data will be examined in 2013 to support the participatory management plans (PMP) based on SMUs. This is a first step towards the establishment of integrated fisheries research. • A study on sardinella population dynamics in North-West Africa was launched in July 2012 by USAID/COMFISH and CRODT, and will end by January 2013. The preliminary findings suggest that the study will provide input to the PMP and support CRODT and DPM in their sardinella stock management efforts; • The study on sardinella outlines vital space-time environmental indices on Senegal, compiled by CRODT from 1991 to 2010. The data will be used during climate change vulnerability assessments. • The socio-economic surveys on shrimp in Sine Saloum began in November 2012, building on the USAID/IUCN technology 2002-05. This activity is scheduled to end by March 2013 and will support efforts to establish plans on coastal shrimp. • Protocols were signed with partners such as CRODT, UBC, CSE, IUPA, ISE, LABEP/IRD, WWF, FENAGIE and APTE to build synergies on the ground. • In partnership with CRODT, the USAID/COMFISH project got access to scientific data from 1991 to 2012 on the project's six priority species. This data was used to develop CLs and support the PMPs on sardinella and other species. • Problems with data on sardinella were identified and updates done. The updated data was used to develop draft PMPs necessary for the SMU on sardinella (September-October 2013). • A mapping of fishing and stock distribution areas was done for three CLPAs, using scientific knowledge as well as local knowledge provided by fishermen. This mapping made it possible for the project to convince fishermen on the need for them to use SMUs, not CLPAs, as the basis for fisheries management, and to entrench all their PMPs in those SMUs. • At the initiative of USAID, a small working group on IUU fishing was set up in February 2012. Over 150 vessels, measuring 180m LOA, were found to be involved in IUU fishing with average reported catches of 50 tons per day. So far, the best estimate of reported IUU landings is between 250 000 and 350 000 tons per year. These landings are composed mainly of sardinella. The landings of artisanal fisheries are around 250 000 tons per year. Therefore, it is likely that IUU fisheries and artisanal fisheries are competing for the same resource. The study on IUU fishing will end in 2013. • The identification of the training strategy for MPA managers was postponed to 2013 to devote more resources and effort to the establishment of SMU/CLPA and the creation of CLs. • The marking of the Cayar MPA is under way. • The USAID/COMFISH project provided support to equip the Joal ecotourism center. The support was designed to assist fishermen who withdraw from the MPA to become eco-guides. The office is going to open officially in 2013.
• Climate change vulnerability assessment and adaptation plans are established.	• The project provided training on climate change to partners and actors to develop their capacities at national level (three workshops) and in CLPAs (nine workshops); • The assessment of coastal community vulnerability to climate change was postponed to 2013;

	• The USAID/COMFISH project organized meetings with MPAM and MEPC on the importance of including the impacts of climate change and the role of MPAs in fisheries management; • The project continued with CLPAs to develop action plans on climate change adaptation strategies for 2013; • CSE conducted a mapping of variables (26). The project used the data on 1979, 1999 and 2011 to substantiate the impacts of climate change on natural production systems and land use in three CLPAs, focusing on mangrove areas, land loss from poor rainfall and/or salinization, the expansion of settlements, and changes in land use.
• Fishing communities enjoy increased social and economic benefits as well as higher resilience to climate change.	• The project began to refurbish the sardinella processing unit of Gie Manetoulaye Guène; • Women fish processors received training on good processing practices that enhance product quality, on leadership, standardization, environmental monitoring, climate change, etc. • A baseline survey was conducted on stakeholders' perception of social and economic well-being; • A cost/benefit analysis was done by the USAID/Washington DC office. It concluded that improving the quality of keccax will be a good investment for FtF;

USAID/COMFISH project results for 2012 contributed to the US Government's global initiative on climate change, the Feed the Future (FtF) program and the biodiversity conservation effort. These results will also contribute directly to USAID Senegal's "Economic Growth" program objectives, which are to improve natural resource management and inclusive growth in the agricultural sector.

REPORTING ON PROGRESS MADE

The approach that the USAID/COMFISH project takes to establish management plans for priority fisheries is to create the conditions for enhanced fisheries governance in Senegal. This process of creating the conditions for enhanced governance is at three levels:

- **At the local level in communities and on the field**: the project trains actors and establishes efficient and functional consultation frameworks. This makes it easier to include the local level in planning and decision-making on fisheries;
- **At the intermediate, or technical and scientific level**: the project develops the capacities of fishery technicians, research institutes and academicians to facilitate the mainstreaming of scientific and technical data in the planning process.
- **At the strategic and policy level**: the project provides policy makers with scientific and technical knowledge that is vital for informed and consistent decision making.

The project's results in these areas are summarized below, as follows:

3.1. Strengthening human and institutional capacity

At the level of actors, the CLPA's role and duties in collaborative management was strengthened.

The project reinforced the institutional framework for fisheries governance and the means of intervention – colleges, local committees, ICC, the decision making process and stakeholder involvement – by using relay workers, chosen by CLPAs among their members, to provide training. These courses took place during the development of local conventions. The relay workers this year were ten in number and came from the first three CLPAs targeted in 2011 - Sindia, Mbour and Joal. Their role was to improve CLPA intervention capacities and assist in developing and implementing the CLPAs' management procedures. These community workers also led all the efforts for the local convention by organizing focus groups during the diagnostic studies on CLPAs. Further, FENAGIE and WWF, the partners of the project, conducted activities to raise awareness among, and build the

capacities of ICC members and other stakeholders on the roles and responsibilities of CLPAs in sustainable fishery resource management.

WWF, in line with its strategic plan, organized seven capacity building workshops in the project target area between August and September 2012. The workshops on one hand addressed specific areas of the law and regulations for "establishing, organizing and operationalizing CLPAs". On the other, they covered the roles and responsibilities of CLPAs in fishery resource management.

In Sindia, Mbour and Joal CLPAs frameworks were established for stakeholder consultation and dialogue to garner support for local conventions and facilitate the delivery of management plans. The ICC is the most important framework for consultation on fishing sites. It includes all fishery sector stakeholders in the CLPA, such as administrative authorities, technical services and persons in the fisheries trade. The USAID/COMFISH project worked through this body to initiate important consultative talks, aimed at promoting collaborative fisheries management through local conventions developed by consensus in the CLPAs of Sindia, Mbour and Joal. This was how the first local conventions on marine fishing in Senegal were developed and validated by the CLPAs themselves, even before their chairpersons, who happen to be the Divisional or Sub-Divisional Officers on these localities, accepted to give official approval.

It was at this stage that dialogue to initiate stock-based management plans began. At the same time the project opened discussions, via workshops and the work of consultants, to identify opportunities by which formal relations could be established between the CLPAs as the second framework for stock-based consultations at communal and/or provincial level.

Efforts to obtain formal approval from the competent authorities have been initiated, and the rollout phase is expected to begin in year three.

The project's initiatives to establish relay workers at the CLPAs and develop their skills for data collection, sustainable fisheries management, and climate change issues were well appreciated by the administrative authorities and technical services, for the approach will help strengthen thr management frameworks established at local level.

A CLPA capacity development strategy is developed and presented at a national workshop: the target components of this strategy are summarized below and include: *(i)* promoting good governance in local fisheries; *(ii)* developing and operationalizing sustainable management units for priority stocks; *(iii)* establishing an information system for the sustainable management unit; *(iv)* developing the capacities of CLPAs to make them operational; *(v)* developing the entrepreneurial skills of women in the artisanal fisheries sub-sector; and *(vi*) building synergy between all stakeholders in the fisheries sector to enhance sustainable fisheries and implement the necessary attendant measures.

The action plan for this strategy is going to be implemented in year three.

A strategy for the empowerment of women in the fisheries sector is developed and support provided to implement it: The *USAID/COMFISH* project takes a gender approach to its work. This was why it developed and gave DPM and other partners a strategy and an action plan to empower women in the fisheries sector by building their skills, so that they can better protect their interests before decision makers. Some activities on the action plan are implemented by *USAID/COMFISH* in its current work plan. At the same time, synergies are being developed with other partners - Enda GRAF, WWF, MPAM, APTE – to mobilize resources for activities *USAID/COMFISH* cannot implement.

A declaration by women – including their values and criteria – for promoting women's involvement and solutions to their concerns in efforts to establish management plans and in the fisheries policies in Senegal, was produced.

An appropriate methodology for involving women in the learning process is developed: Teaching/learning tools (myths, tales, music, traditional songs and dances), tailored to women's level of education, were designed and used to help them easily understand presentations and the discussions after said presentations. This completely innovative methodology was used to create a learner-friendly environment suited to the condition and realities of the targets (women in the fisheries sector). It was thanks to the methodology also that the **Plan of action** for empowering women in the fisheries sector and the **declaration of women in Senegal's fisheries sector** were developed in record time.

A baseline study on CLPA effectiveness and operationalization on project sites is conducted: this baseline was to measure how the project contributed to help CLPAs function better as local frameworks for fisheries governance. It covered the 7 CLPAs targeted by the project, including the CLPAs in Sindia, Foundiougne, Yenne-Dialaw, Rufisque-Bargny, Mbour, Joal and Cayar.

To operationalize the CLPAs and improve communication between stakeholders, ***ten community relay workers and fisheries officers from the CLPAs were trained*** on the techniques for facilitating meetings, using fact sheets, taking notes in meetings, preparing meeting minutes, etc. These relay workers also provided technical support for data collection to fisheries services and played a decisive role in the establishment of SMUs.

As concerns capacity development for management institutions: representatives of management institutions (DPM Deputy Director), fisheries research institutes (Director of CRODT), local stakeholder groups and project staff attended a course on leadership, organized by the University of Rhode Island's "Fisheries Leadership Institute". The course empowered the participants to develop new areas for partnership and learn new tools and principles they could apply to fisheries policies in order to achieve sustainable fisheries management in Senegal.

Scholarships for higher education: two graduate scholarships for short training courses were granted to staff engaged in fisheries research and management at the Ministry of Fisheries and the Oceanographic Research Center, Dakar Thiaroye (CRODT). These two scholarships in the field of fisheries governance and the scientific evaluation of fisheries resources will contribute to the development and pursuit of research plans and sustainable collaborative management in Senegal.

3.2. Natural resources/management plans/biodiversity conservation and marine ecosystems

The goal of this component of the *USAID/COMFISH* project is to put effective strategies in place for supporting fisheries policy reform initiated by the Government of Senegal to improve fisheries governance (i), and to avoid poor management practices and methods when developing management plans (ii). The idea is to ensure that management plans include conservation activities, biodiversity conservation, and especially climate change vulnerability assessment and adaption planning.

3.2.1. *Establishing a scientific basis for the creation of sustainable management units on priority stocks*

The project designed a number of activities this year with the goal of using effective strategies to support fisheries policy reform, improve fisheries governance and discard poor management practices in the efforts made to develop management plans. Accordingly, scientific knowledge on priority species and/or stocks was developed further to assist with the development of local conventions, good fishing practices and biodiversity management and conservation during the establishment of these plans. The studies covered a dozen themes and the results are presented in the sections below:

Compiling statistics on the fishing effort, catches and the hydro-climatic environment from 1999 to 2010: To get a deeper understanding of fisheries dynamics and the status of target stocks, the USAID/COMFISH project requested CRODT to provide statistics spanning over 20 years from its databases on artisanal fisheries at the sites in Cayar, Mbour and Joal. The focus in this exercise was on

collecting and analyzing data on the general trends in the fishing effort, the changes observed in the climatic environment and the landings of the project's six priority species for a period of twenty years.

Evolution of the fishing effort in the target areas

On the Cayar site, angling heavily dominates the fishing effort, followed by purse seine and fixed nets. It was noted that beach seine activity developed considerably from the early years in the 2000 decade. The fishing effort with the group of other gear has expanded in recent years with the development of hawk fishing and underwater fishing. On the Mbour site, the fishing effort is dominated also by angling, followed by the fixed net method. On this site, purse seine activity is relatively high. The fishing effort with gill nets and beach seine fluctuates quite a lot, while the effort of the group of other gear has been progressing during the entire period.

But unlike the Cayar and Mbour sites, the fishing effort in Joal consists mainly of three relatively equivalent fishing gear, namely: angling, fixed nets and gill nets. The number of fishing trips made with purse seine is also considerable.

Climatic environment: On the Cayar site, the temperature has been on the rise with some usually warm periods. Upwelling was on a diminishing trend in the early 2000s.

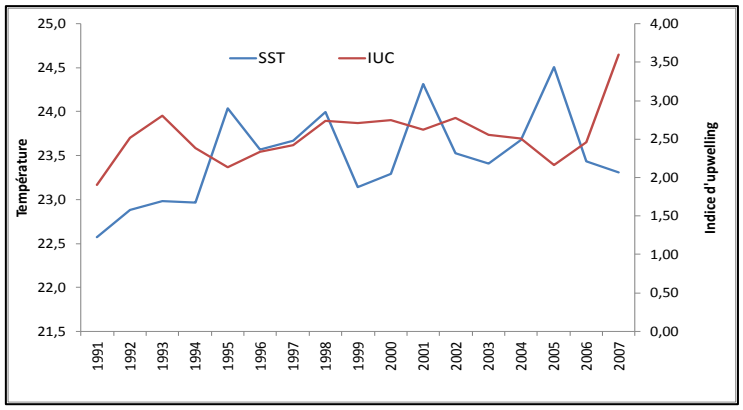


Fig. 1: Surface temperature and upwelling index in Cayar

On the whole, the same trend was observed on the coastal area, and particularly on the Mbour and Joal sites, where upwelling has been relatively stable, although it declined slightly in the early 2000s.

General catch trends: On the whole, two sardinella species, the flat and round sardinella, have been strongly dominating catches on all the sites since the beginning of the series, although there has been a progressive decline in recent years. For the other priority species, notable fluctuations have been observed in octopus catch levels on the **Cayar** site. Bonga captures were abundant only in the early 2000s. White grouper catches have been on a long and progressive decline. In **Mbour,** octopus catches are quite considerable, but their levels vary considerably. The harvesting of ***white grouper*** and ***Bonga*** has remained at relatively low levels. In recent years, however, there has been a net recovery in the harvesting of ***white grouper***, but the quantities of ***Bonga*** have generally been on a declining trend throughout the period. In the village of **Joal,** as on the other sites, octopus catches varied considerably during the period between 1991 and 2010. As in Mbour, ***white grouper*** captures increased significantly in recent years after a period of decline. Joal, unlike Cayar and Mbour, receives significant landings of coastal shrimp. But these captures have been declining since the late 90s.

The diagram below illustrates the annual magnitude and fluctuation in landings on the three sites.

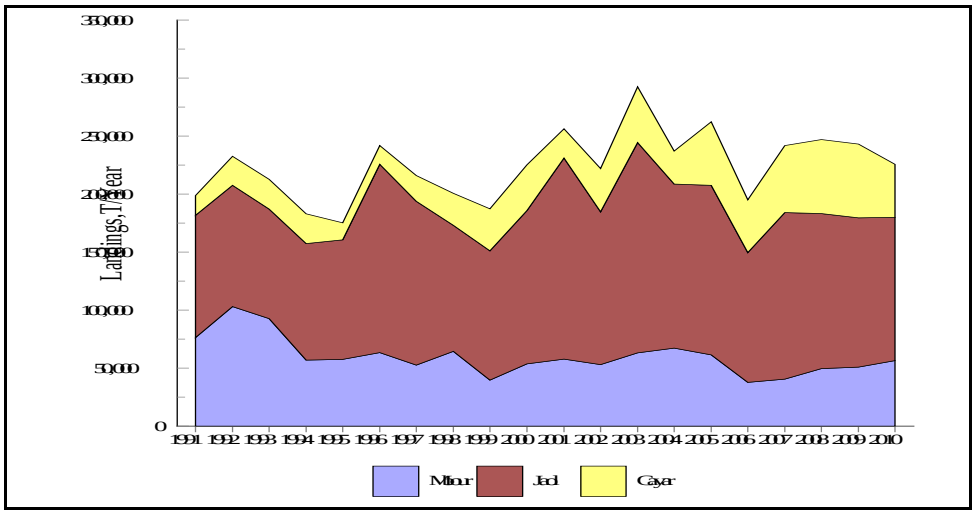


Fig. 2: Total landings of all the species in Mbour, Joal and Cayar

The initial findings of this study show that the statistics gathered over a period of two decades constitute a good starting point for understanding and developing the six priority stocks – round sardinella, flat sardinella, Bonga, coastal shrimp, white grouper or "***thiof***" and octopus – on the three pilot sites in Cayar, Mbour and Joal. They help us have a deeper understanding of the dynamics of fishing and the status of catches for priority species/stocks, as well as the relation between these and the evolution of the hydro-climatic environment. We note that there is a steady increase in total landings on the main artisanal fishing ports. Landings were about 300 000 tons in 2003 before falling to about 220 000 tons in 2010. This drop of 80 000 tons or 27% in six years must have had severe consequences on the incomes of fishermen. The 27% reduction in the quantity of animal protein available to the people in Senegal (72% of which comes from the landings in Senegal) must also have had a significant impact on protein sources and food security. Special attention will be paid to these issues and their implications for the Feed the Future (FTF) initiative.

The population dynamics of Sardinella (Sardinella aurita and Sardinella maderensis): environmental, biological and socio-economic constraints

A study by CRODT has produced bio-ecological and socio-economic knowledge on round sardinella (Sardinella aurita) and flat sardinella (S. maderensis) fisheries. This first summary gives us deeper insights to the population dynamics, the biological inventory of stocks and fishing capacity, the key environmental factors affecting stock dynamics, the variability of the resource in space and in time, and the state of exploitation of stocks.

Bio-ecological knowledge: In terms of geographical distribution, *the round sardinella* is found on the continental shelf that has salty, non-turbid water with temperatures below 24°C. It may even fall below the thermocline in the hot season to depths between 200 to 300 meters. As for *the flat sardinella*, it occupies an area that is smaller than that of the round sardinella. It is euryhaline, lives also on the continental shelf in the coastal zone, and is often more abundant in the vicinity of estuaries, and preferably in waters with temperatures above 24°C.

On migration, the studies show that there is a single stock of *round Sardinella* in the Senegal-Mauritania region and it is characterized by the presence of juveniles along the coastal areas. These observations confirm that there are two important nurseries: one in Mauritania and the other on the Senegalese coast south of Dakar. The adults migrate seasonally over the entire range of the stock, while the younger individuals (juveniles and reproducers) migrate in a limited area within the

nurseries. As for the *flat sardinella*, it is less active and less inclined to migratory behavior than the round sardinella.

Two nurseries of ***flat Sardinella*** were identified in the Senegalese-Mauritanian zone. On growth and reproduction, it was observed that the ***Round Sardinella*** laid eggs during the spawning season at locations between 30 and 50 meters deep. Their larvae are concentrated in large nurseries, located particularly in Gambia, in the Cape Verde peninsula and along the Mauritanian coast. Among the flat Sardinella, spawning occurs in areas closer to the coast at locations between 10-50 m deep and is continuous throughout the year. The juveniles and young reproducers remain in the coastal areas. The sardinella grow very fast and measure 18 cm on average after one year.

Stock assessment: To ensure better stock management, estimates of the biomass and exploitable quantities of the stock have to be done. This section describes the different methods for estimating stocks. These include direct evaluation through instantaneous assessment of the total biomass and indirect assessments with mathematical tools.

Biomass**:** in the Senegambia area, flat sardinella biomass estimates have witnessed several variations with a general upward trend from 1995 to 2006. They increased regularly in the last decade, climbing from 174 000 tons in 1996 to 504 000 tons in 2006. The estimated average biomass for the period was 425 000 tons. As for round sardinella, relative stability was observed in its biomass with a marginal increase in the same period, when the biomass went from 200 000 tons on average between 1995 and 1996 to 209 000 tons in 2006. The estimated average biomass during this period was 210 000 tons.

Abundance/CPUE indices**:** Production models have often been used to determine the state of sardinella stock exploitation. These models, also called general production models, consider the stock as a whole, in particular the total abundance (by weight or number) and study its evolution, the effects of fishing effort, etc.. Several estimates have been made in this manner by analyzing the abundance/CPUE indices obtained from the statistics collected during the period.

The flat sardinella abundance index (CPUE) for artisanal fisheries was fairly stable in Senegal for the period from 1990 to 2003, and then it increased sharply until 2009, reaching the maximum value in the series (3.5 tons/output). A significant drop in the CPUE on round sardinella was observed in 2010. As for the CPUE on flat sardinella in the Senegalese area and for artisanal fisheries, it has generally been lower than that of the round sardinella over the past two decades, fluctuating around a ton/output from 1990 to 2002, and then recording a marginal increase in 1996, before shooting up from 2002 to 2004 to reach the maximum value of the series at 2 tons/output. Since 2004, flat sardinella abundance indices are returning gradually to the average of 1 ton/output observed in the 90s.

Fisheries dynamics: The two main types of gear used in artisanal fishing of sardinella in Senegal are the purse seine and gill net. The purse seine is between 250 and 300 m in length and can go 40m deep. It allows you to encircle the shoal of fish in the direction they are going. As for the gill net, it consists of layers of floating nets that vary in length between 250 and 450 m and can go between 10 to 12 m deep. Fishermen encircle the shoal of fish they see on the surface of the water (Clupeidae in general). The fish get caught in the nets as they try to escape the tight circle. The net is then hauled into the canoe and the fish are unraveled one by one.

With reference to the censuses of 1997 and 2005, one sees that the number of encircling gill nets has more than doubled. Regarding purse seines, the increase was barely 30.7% during this period.

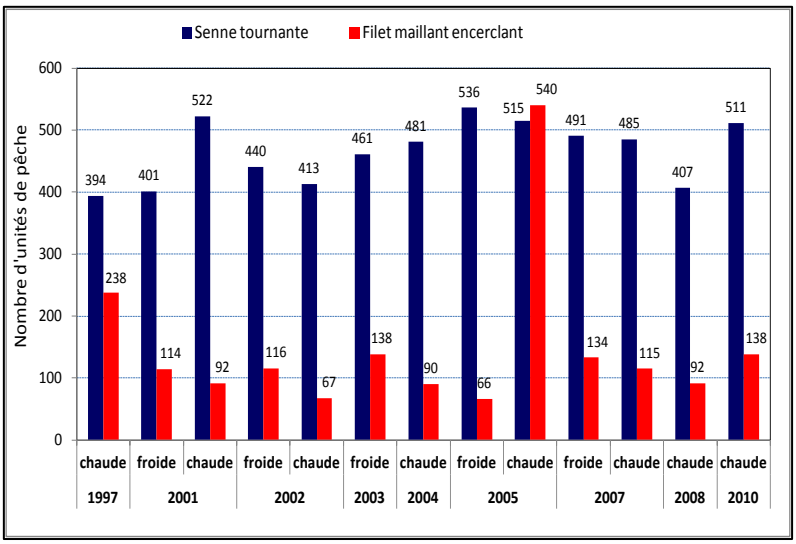


Fig.3: Number of artisanal fishing units by fishing gear

In terms of fishing trips with purse seines, the past thirty years have witnessed an evolution in two phases. The first was a sharp increase between 1981 and 1993 from 27 441 to 62 470 fishing trips, followed by a stable phase with about 60,000 trips per year that however recorded some quite significant changes. Since 2004, the fishing effort of purse seines has been on a decline. But this decrease relates to the licensing requirements (about 300 licenses per year) of the Mauritanian government. As a direct consequence, much of the activity, including purse seines, has moved to St. Louis. As regards the effort of gill nets, particularly on the sites in Mbour and Joal, the fishing effort has remained stable at a level slightly above 20,000 trips per year.

The Government of Senegal considers industrial fishing of sardinella as an extension of artisanal fisheries. When a few fishing vessels began to be used in fisheries in the early 90s, this led to a significant expansion of the industrial fleet for pelagics to a record 29 boats in 1992. In fact, these new vessels included some Russian pelagic trawlers, which operated until 1996. After the Russian ships departed, the number of sardine fishing vessels in activity was no more than 6 per year. And this number even dropped in recent years and now stands at three ships per year.

Evaluation of landings and the state of stock exploitation: In artisanal fisheries, small pelagics are by far the largest component of landings, averaging 224 000 tons per year, or 76.7% over the period from 1981 to 2010. Flat sardinella and round sardinella are the predominant component in the exploitation of small pelagics. This is why sardinella landings over the last five years have sometimes even exceeded 70% of the total landings from artisanal fisheries.

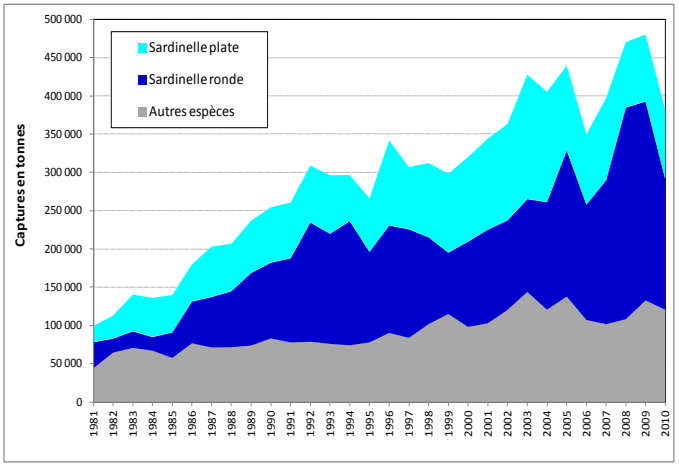


Fig.4: Importance of sardinella in Senegal's artisanal fisheries

In industrial fishing, the two species of sardinella (round sardinella and flat sardinella) are predominant and can represent up to 95% of the landings of pelagic species. At the beginning of the series, there was a very rapid decline in landings between 1981 and 1988 from 31,863 tons to 4199 tons. The advent of new vessels as from 1989 propelled landing levels to 57,803 tons in 1992. After the Russian vessels left in 1996, the landings fell back to their usual level in the late '80s. Moreover, there was a gradual erosion of landings that were almost negligible in 2006-2007.

To conclude, we note that understanding these elements is a key first step for the management of fisheries. This study suggests that the assessments in recent years show stocks are severely overfished at present. Indeed, the current biomass represents about half of the target biomass, and current fishing mortality per unit fishing effort is about three times the target fishing mortality per fishing effort. The stock of *Round Sardinella* (and probably of *flat sardinella* also) is currently overfished. This overfishing is a serious threat to the sustainable exploitation of the fishery.

Evaluation of landings of Senegalese canoes fishing in the sub-region: characterization of survey sites and the fishing effort

Given the scarcity of fishery resources in the waters under Senegalese jurisdiction, artisanal fishers have developed certain strategies to deal with the situation, and one of the most observed in recent years has been for them to go and fish in the fishing areas in the sub-region, outside Senegal's Exclusive Economic Zone (EEZ): Mauritania, Gambia, Guinea, Guinea Bissau and Sierra Leone. It is worth noting that the catches in these fishing areas in the sub-region are landed in Senegal and included officially in catches in Senegalese waters. This distorts the results of the indirect assessment of fishing activity, because the estimated potential of fish stocks is overstated. A data collection system was set up on March 1, 2012, with the support of CRODT, to assess the fishing effort and the landings captured outside Senegal's EEZ.

Preliminary findings suggest that the departure and landing sites of canoes that fish in foreign waters within the sub-region are St. Louis, Hann, Mbour, Joal, Ziguinchor and Elinkine. Data collection is done through the use of stratified random sampling. The collected data is routinely coded and recorded. Once it is processed, all the procedures for extrapolating from the statistics are then established. After this data is analyzed, tables and synthetic graphics can be produced and interpreted to help us understand the dynamics of fishing activity.

The major trends in this section are on the fishing effort by survey site, and were described in the previous quarterly report. When we were preparing this report, all the data collected on catches for a

period of six months was being processed. The first trends will be published in the next quarterly report.

Collection of socio-economic data from the shrimp fishery in the Sine Saloum

The project is pursuing its activities on shrimp fisheries to improve the biological and socio-economic knowledge needed to implement management plans. It is in this regard that a scoping study was done to identify stakeholders (fishermen, fishmongers and weighers), equipment and infrastructure in the targeted villages. The study made it possible to gain deeper insights to the social environment of fishermen and their level of equipment, as well as to their socio-economic profile, strategies for acquiring equipment and the importance of infrastructure related to shrimp fishing. After analyzing the data gathered, the project succeeded nearly a year ago to devise a strategy for collecting socio-economic and biological data on a monthly basis, and to identify early trends on harvesting, fishing effort and the number of shrimp per kilogram.

Catch: A decline is being observed in the overall level of catch and fishing effort. Across the area monitored, catches dropped from 75,462.5 kg in January to about 4462 kg in August, declining close to 94% against 70% in the month of May. The fishing effort also recorded a considerable drop concomitant with the decline in catches. This is due to the low yields. The trend is forcing some fishermen to stop harvesting shrimp and to go into other types of fishing (fish), or to diversify their activities.

Fishing effort: The monthly trends in fishing effort over the first eight months of the year showed significant disparities, depending on the area considered. With the exception of Betenti/Niodior and Fimela, all the other sites recorded a steady decline in fishing effort: 94% in Gandiaye, 94% in Gague/Kamatane, 74% in Foundiougne and 66% in Djirnda. In Betenti/Niodior, there was a remarkable change in fishing effort between January and March, with a 60% increase in fishing trips that climbed from 719 to 1993 due to the increase in fish yields.

Mussel: As concerns the number of individuals per kg, the average per month ranges between 152 and 215 individuals per kilogram. From January to April, the number of mussels in a kilogram is below 200 individuals, while from the month April it is over 200 individuals, depending on the fishing site. In the Betenti/Niodior area along the coastline, for example, there are less than 200 individuals per kg, while in the Gandiaye area, the average number of individuals per kilogram is over 200. The highest number of mussels recorded in this period was in Fimela in the month of March and in Djirnda and Foundiougne in July.

We note finally that data collection will continue until January 2013 to enable the project to have a full set of annual biological and socio-economic data (2012-2013). This data is then going to be processed and analyzed. The results will be used to update the previous Sine Saloum coastal shrimp management plan, developed with funding from USAID/IUCN. This newly revised collaborative management plan will be validated in 2014 by organizing workshops for the CLPAs in the five main areas concerned by this fishery: Niodior, Foundiougne Gandiaye, Kaolack, and Missirah

Photo 1: Dried shrimp

Photo 2: Fixed nets for the harvest of shrimp

Tackling Illegal, Unreported and Unregulated (IUU) fishing

The illegal, unreported and unregulated (IUU) fishing activities in Senegal are characterized mainly by transshipments at sea, the incursion of unauthorized vessels into the EEZ (foreign vessels), and fishing in prohibited areas (foreign and domestic vessels).

The number of regulatory offenses committed in recent years, and mostly by foreign vessels, has increased. In 2009, only one foreign vessel was identified in Senegalese waters, but this number rose to 6 in 2011. Surveys and observations show that the vessels in question are generally above 50 m in size, with CPUE of up to 250 tons per day, although the figures reported are generally below this CPUE. Some of these vessels target sardinella, the species most harvested by artisanal fishermen in Senegal. All available information suggests that the sardinella fisheries in Senegal's EEZ (IUU, Industrial and artisanal fisheries combined) harvest the same stock. This is why these studies on IUU fishing are important for the sustainable management of the stock.

The method to be used in estimating IUU catches is the one used by the SEA AROUND US project, the European Commission, and MRAG (Marine Resources Assessment Group).

The trends reported in the preliminary findings are as follows:

- The volume of IUU catches, harvested from Senegal's EEZ, and landed at foreign ports was estimated at 350,000 tons in 2009 - the last year for which data is available. This figure is comparable to the total volume of fish in DPM statistical records.
- The volume of IUU catches is so big that it could distort any evaluation that does not factor in IUU fishing.
- Sardinella landings from IUU fishing are estimated to be so high that they might even compete with the artisanal fishing figures on this species.
- The volume of IUU fish harvests is so big that Senegal needs to carefully consider the possibility of putting an end to this illicit fishing practice and supporting artisanal fishermen – by modernizing the fleet – to expand their fishing areas up to where the EEZ ends.

Managing fishing capacity in Senegal

In June and July 2012, several discussions were held during a workshop to find ways of managing fishing capacity in Senegal with the model FAO adopted in 1999. Several entities took part in those discussions, including: WWF, the Ministry of Fisheries (DPM), the Secretariat for Accelerated Growth (SCA) and USAID / COMFISH.

The participants agreed that it was necessary to have a working group develop an action plan for the management of fishing capacity in Senegal, using objective and quantitative criteria, to ensure consistency in the often conflicting goals of fleet capacity. The entities chosen to participate in this working group were: MPAM, via the DPM (3); CEP (2); SCA (1), ANAM (2); DPS P (1); CRODT (2); the university through IUPA (1); the representatives of stakeholders via GAIPES (1); NGOs and other WWF projects (2); FIT (1); GDRH (2); and the USAID/COMFISH project (3).

The workshop recommended that DPM should set up an ad hoc working group in 2013 to look into ways of devising a national action plan for the management of fishing capacity in Senegal. The WWF-USAID/COMFISH partnership will take up this activity in 2013.

Promoting participatory mapping of stocks and fishing areas in Local Conventions: Setting up a MIS-oriented scientific information base

Description: A participatory mapping exercise was held in focus groups with all CLPA resource persons. Semi-structured interviews were conducted, focusing primarily on fishing areas, target species, fishing practices and related techniques, the state of the resource, and the causes of its deterioration. These surveys showed that the main reasons for the drop in fishery resources are poor fishing practices, increases in the fleet leading to overfishing, loss of habitat, the presence of foreign vessels and the rise in sea level. During the discussions, the fishermen also described and demarcated fishing areas on a map of the area. Boat trips were organized with the fishermen to locate the fishing areas geographically.
In addition to the fishing areas, information on the demarcation lines of areas with a strong concentration of juvenile pelagics, shrimp, ***white grouper*** and octopus were represented on the map. This data came from the databases of entities such as WWF, DPM and SIAP/FAO.

Photos 3 & 4: Participatory mapping session in Joal and Cayar

<u>Mapping of CLPAs, fishing areas and priority stocks</u>

The Cayar CLPA: According to the fishermen we met, the Cayar CLPA's fishing area stretches from the Niari Rai Buoy (Latitude 15°08' N; Longitude 17°00'W) to the border with Cape Verde. It has diverse habitats with sandy-to-muddy features, rocky areas and very deep hollows. The most popular artisanal fishing areas are: *keurouss, Xerou Malatir, Xerou Mame Bounama, Tank, Dior ak Ndar, Seurap Singar, and Diokhor*. The most harvested species in these areas are sardinella, sea bream, octopus, white grouper and gag grouper. Most of the habitats on the Cayar site are made of sea grass (at bypasses) and rocks.

Mapping the sardinella stock was difficult because it is a migratory species whose movements vary from season to season. In all, 26 fishing areas are located on the Cayar CLPA site.

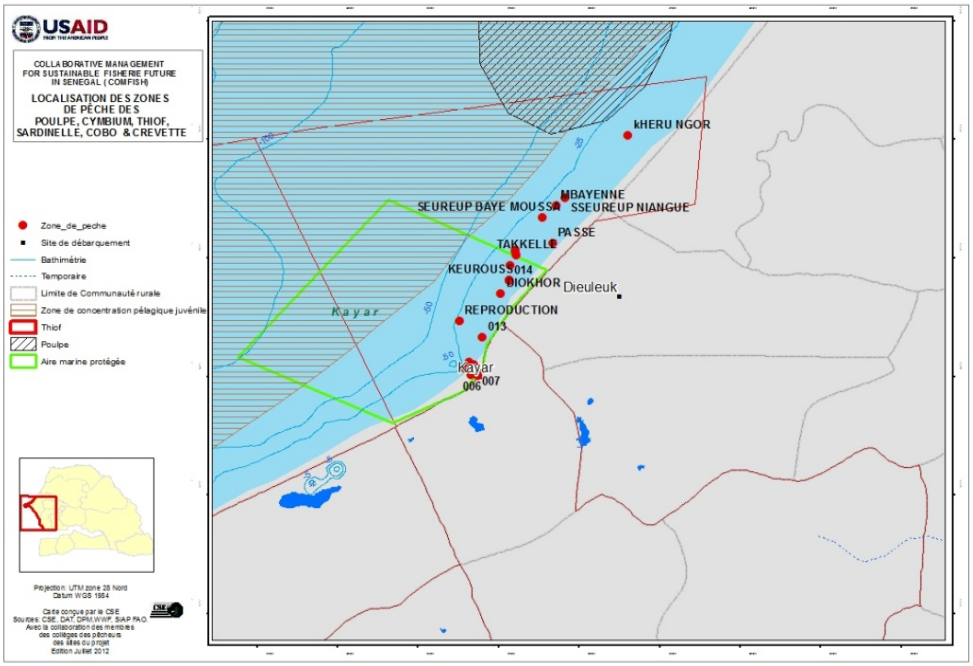


Fig.5: Fishing areas on the Cayar CLPA site

The Mbour and Sindia CLPAs: The most important fishing areas of the Mbour and Sindia CLPAs are: *Khaytine, Konkobi, Allemagne and Ngoto digueu, Khérou Tam, Yagoura, Khér ko, Mbalou Saly, Séroukay, Dial bou yatoubi*. According to the fishermen we met, the fishing area is located on a strip that is between 1 and 50 km wide. Our attempts to identify the fishing areas around Sindia were made easier when we examined the map of rocks that local stakeholders had produced to demarcate the community marine area. The harvesting of demersal species, such as white grouper, cymbium and octopus takes place from 12 km to 50 km off the coast. The fishing areas identified and geo-referenced for the two CLPAs were 44 in number.

Photo 5: Locating the Mbour CLPA's fishing area

Photo 6: Buoy 50

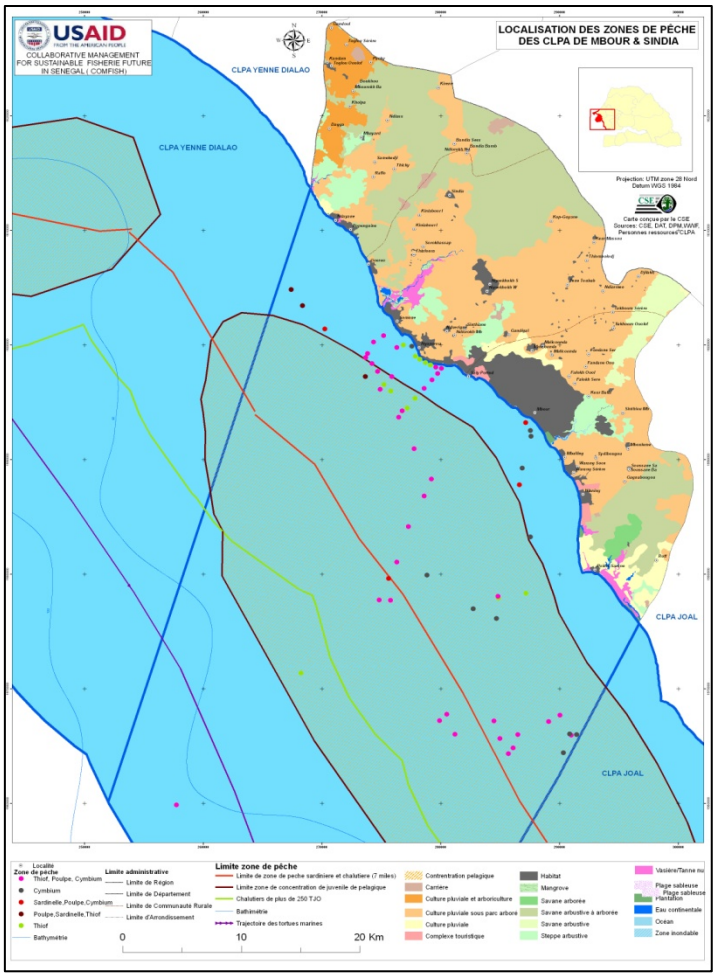


Fig.6: Fishing areas of the Mbour & Sindia CLPAs

***The Joal CLPA*:** The CLPA in Joal has a marine protected area (MPA) where fishing is allowed on one side and for a specific period. The fishermen we interviewed said that the sardinella fishing area begins just after the boundary of the MPA in Joal and covers an area that stretches over 70 miles off the coast. It is a stock shared between the CLPAs in Joal, Sindia and Mbour. The area stretches from Kellou Ngazobil right up to the Pointe de Sarène. According to the fishermen, the harvesting of such species as octopus and white grouper begins 25 km off the coast and stretches for up to 100 km into the sea. The stock of cymbium is found between 16 and 25 km. The most important fishing areas are: *Xerru Yaye, Allmagne, Kellou Ngazobil, Diggou Joal, Konkobi, Niakhanoryi and Bangou yeti brasse*. A dozen fishing areas were identified and located.

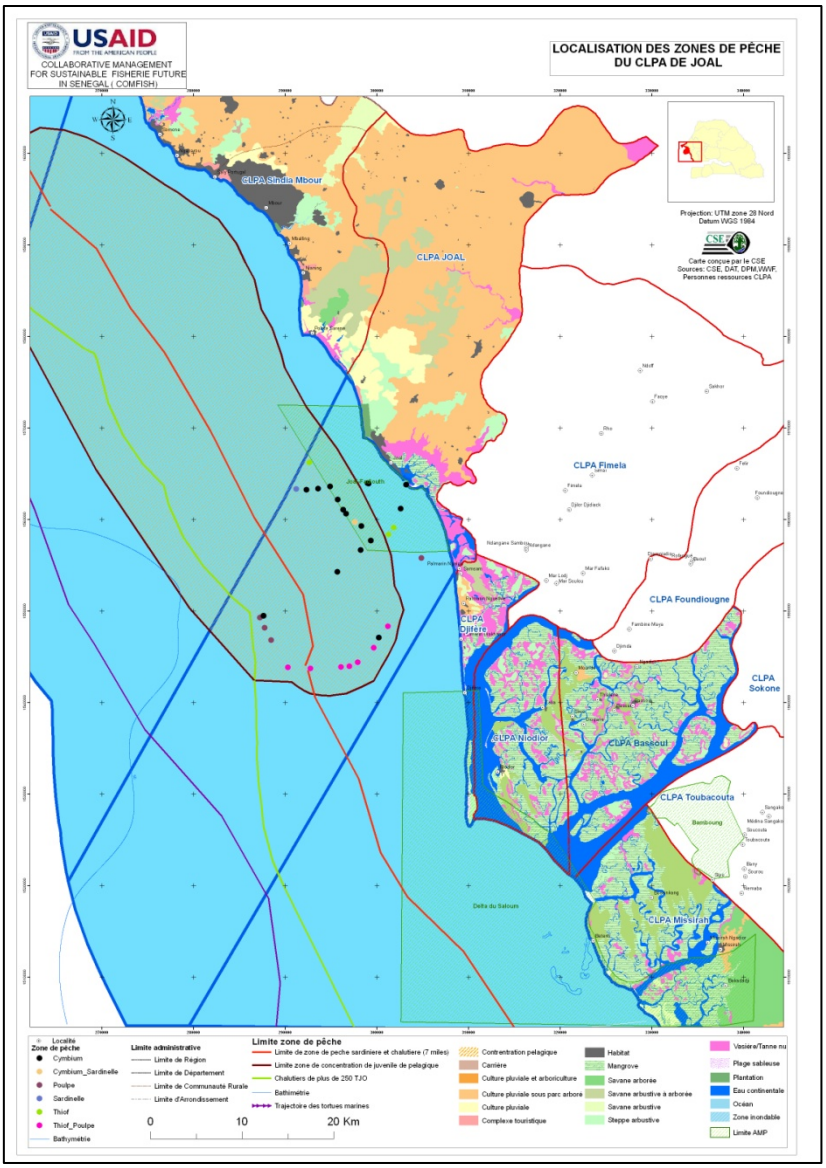


Fig.7: The Joal CLPA fishing area

The CLPAs in the Saloum Delta: These are the CLPAs in Fimela, Niodior, Foundiougne Missirah, Toubacouta and Bassoul. The efforts to locate the fishing areas on these sites focused more on shrimp and cobo fisheries. In all, 34 fishing areas were geo-referenced. The results of this work were used to complete the existing database on the fishing areas in Saloum, which was produced in the first phase.

The CLPAs in Rufisque-Bargny and Dakar: In these CLPAs, 57 fishing areas were identified and mapped from Sendou to Ouakam. The most important are *Kassaw, le Bassé, Dialaw, Khérou Sonou, Kérou Baye Motte, Amoule Yagall, Séling Baye Sy Ndoye, Mole bou Danoubi, Bountou Port, Thirou bou Ndaw, and Gouye Talli Botte.*

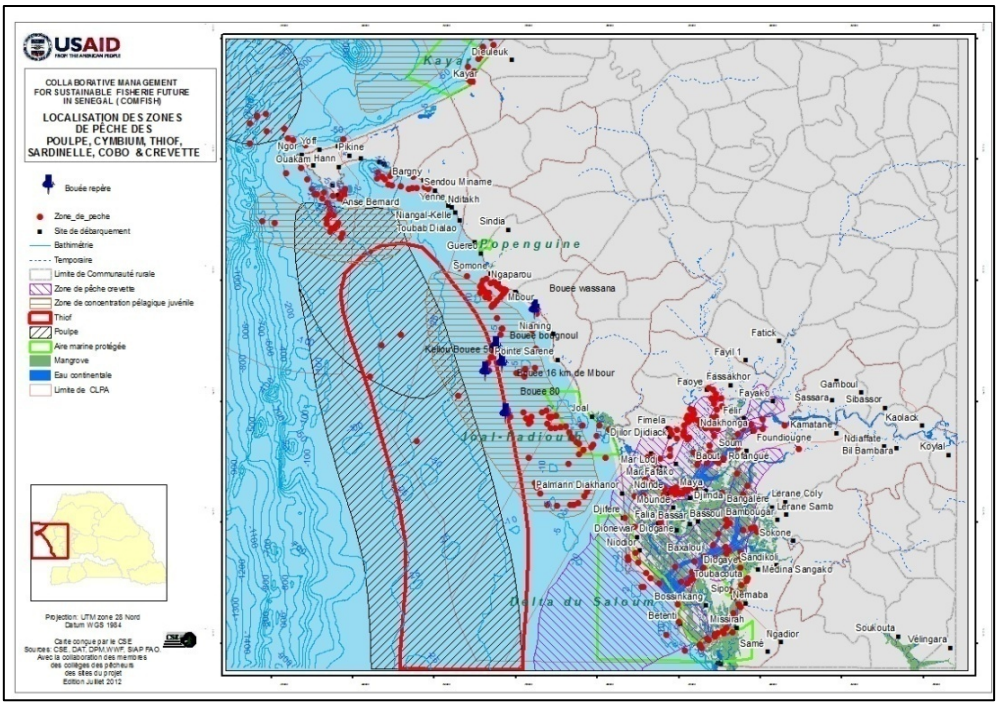


Fig.8: Octopus, cymbium, sardinella, shrimp and cobo fishing area

Mapping of marine habitats and location of underwater pits

To do a mapping of marine habitats, information was provided on the substrate, the herbarium, the mangrove area, the nursery area for pelagic fish, and the nesting area for turtles. The data on the substrate layer was from ORSTOM's 1977 map of the Senegambia continental shelf, represented on a scale of 1/200000. The mangrove layer was generated from a Landsat ETM + image of 2009. The layers of the herbarium, the nursery area for pelagic fish and the turtle nesting area were extracted from the WWF database.

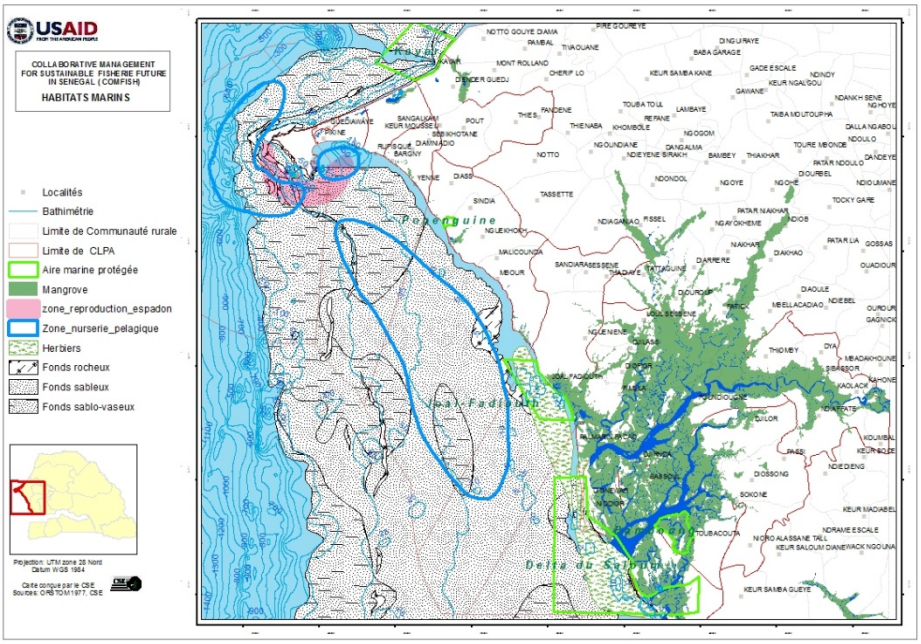


Fig.9: Marine habitat mapping

As concerns the location of underwater pits, we used probes produced in the PRCM to generate the digital terrain model of the area.

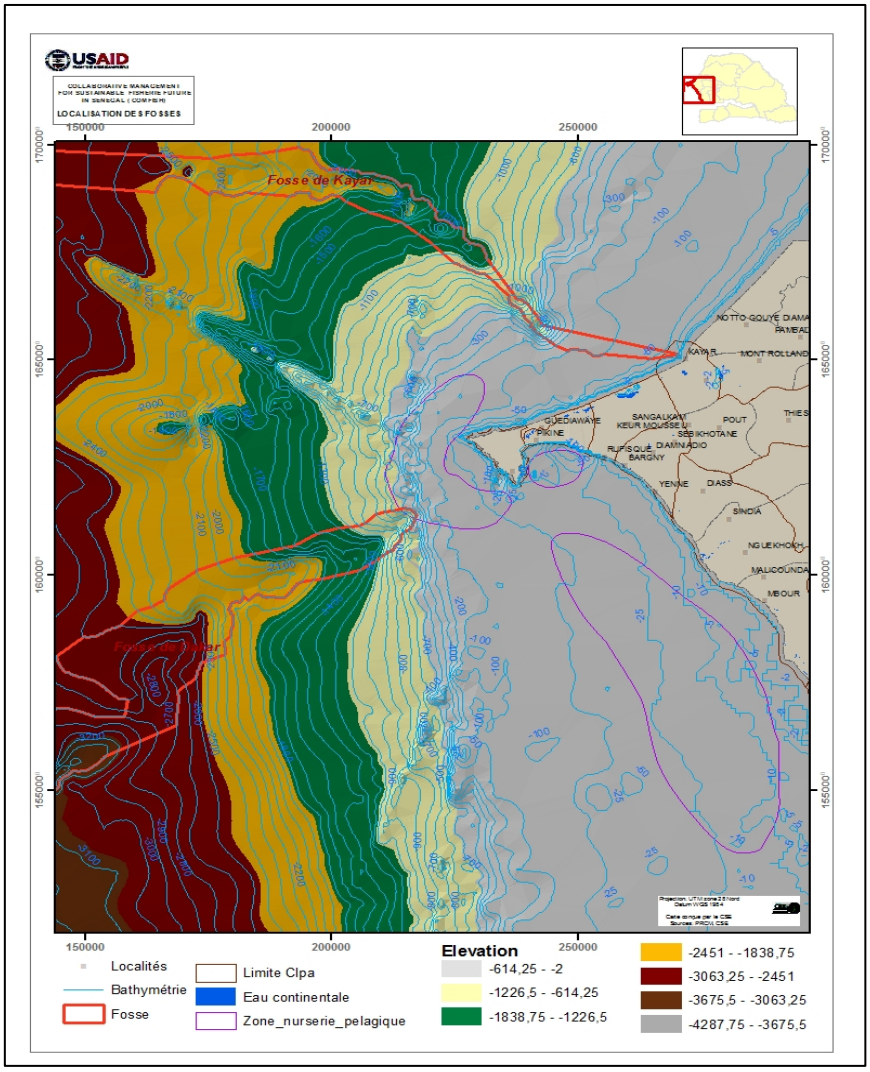


Fig. 10: Map on the location of underwater pits

<u>Study on the dynamics of land use and mangrove ecosystems</u>

This study on the dynamics of land use and mangrove ecosystems was conducted by the Ecological Monitoring Center. Given the direct correlation between these phenomena and climate change, the results of the study are presented in detail under section *3.3.1. (on climate change).*

3.2.2. Good management practices

Mainstreaming good management practices into management plan development: To help implement the management plans of fisheries targeted by the project, good fishing practices in local communities across the country were identified. After this, a national workshop was organized on June 6–7, 2012. At the end of this workshop, awards were handed to the actors of the fishing community in Ngaparou, Mbour division, for their initiatives on the ground, as well as to the economic interest groups (EIGs) in Gnasse Mane Dionewar and Falia, Foundiougne Division, for their work on the processing of wild foods such as arches, oysters and mussels. To promote these initiatives widely and ensure they become part of the SMU process, WWF and USAID/COMFISH organized a media field trip in July, and then an exchange visit and experience sharing trip on the Ngaparou initiative.

A report was produced in the form of a magazine. The 500 copies of this magazine contained interviews with key stakeholders. The magazine was distributed to key stakeholders, the authorities of the Ministry of Fisheries, including the Minister and the Director of Fisheries, the USAID/COMFISH project, USAID and the University of Rhode Island.

Photo 7: A packet of shellfish produced by the EIG that received the award

Photo 8: monitoring mission by the Ngaparou EIG

Working towards a legal and institutional framework for establishing SMUs: supporting the CLPAs in Joal, Mbour and Sindia to develop three local conventions for sustainable management of fishery resources: In the process of establishing Sustainable Management Units, the *USAID/COMFISH* project uses **Local Conventions** as the legal instrument for negotiating management rules in local communities and formalizing relations between CLPAs for the development and implementation of stock-based management plans.

A Local Convention (CL) can be defined as a formal agreement on the rules for natural resource management between the users of these resources in compliance with the laws and regulations in force.

In 2011-2012, the USAID/COMFISH program provided support to the three CLPAs in Sindia, Mbour and Joal to enable them to develop local conventions. This helped the stakeholders set rules for accessing and monitoring fishery resources to ensure sustainable management and create conditions for exploiting the resources without comprising their renewal. Several steps were taken in this process. Information sessions for administrative and local authorities were organized; protocols for collaboration between the USAID/COMFISH project and the respective CLPAs were prepared; a steering committee was set up under the responsibility of the CLPA; an action plan for elaborating the local convention was developed; community relay workers were chosen to develop the local convention; an inventory of fishery resources on the different sites was conducted; participatory mapping of fisheries was done; and rules for accessing the resource on the fishing sites were set.

With the inventory of the fisheries and participatory mapping of the resource, the CLPA had a situation of reference on the number of different fishing trades, the institutions involved in the sustainable management of fisheries resources, the equipment used, the canoe fleet, and maps locating the fishing areas in each CLPA.

The stakeholders and technical services on the ground acted in a truly dynamic manner throughout this process that led the actors and administrative authorities – Sub-divisional Officer of Sindia and the Divisional Officer of Mbour – to develop, validate and approve the first three local conventions on marine fisheries in Senegal. These local conventions will be implemented in year three.

Photo 9: Information and awareness meeting

Photo 10: training of relays

Photo 11: Relay selection meeting

Photo 12: Focus group meeting

Photo 13: Local convention validation meeting

3.2 .3. Biodiversity conservation and marine ecosystem management

Supporting ecotourism in Joal-Fadiouth: This activity is aimed at operationalizing the Joal-Fadiouth ecotourism interpretation center. The project purchased additional equipment to help this center become fully operational and promote ecotourism activities managed by local actors. Since August 2012, it has purchased office equipment and furniture for rooms at the tourist camp. A date for opening the center is soon going to be set together with the municipal authorities in Joal Fadiouth and the manager of this center, which is very important for the eco-guides in this locality - fishermen that willfully left their fishing activities in the MPA to become eco-guides.

***Two Senegalese experts attend the WIO-COMPAS assessment workshop for MPA professionals (East Africa)*:** The USAID/COMFISH project assisted two observers from West Africa to take part in the "Level 3" certification program offered by the Western Indian Ocean - Certification of Marine Protected Areas Professionals (WIO-COMPAS) initiative. The workshop took place in Johannesburg, South Africa, from May 21 to 25, 2012. This assessment of MPA professionals is designed to provide a consensus score for each criterion on the scoring grid. The assessment criteria are grouped into seven areas of competence relating to the management of MPAs.

There are opportunities for collaboration and partnership, with the West African sub-region taking part in the training and assessment exercises organized by WIOMSA for levels 1 and 2 of COMPAS; with experience sharing and exchanges between experts for mutual participation in meetings; and finally with the development and initiation of a process for the certification of professionals in West Africa, drawing on the experience and expertise of WIO COMPAS.

Photo 14: Examiners interview a candidate

Photo 15: Team of examiners and candidates

Monitoring buoys in Joal-Fadiouth: The first mission for the monitoring of buoys in the Marine Protected Area in Joal-Fadiouth made it possible to know the real state of the buoys, most of which were beginning to rust. Based on the findings and observations noted, proposals were made to improve the management of buoys by taking steps to increase their number, label them for easy identification, and put reflectors on the buoys for safe navigation at night. The lessons learned and recommendations on this activity will be taken into account in efforts to install marker buoys in the MPA in Cayar.

Photo 16: Locating and cleaning a buoy

Photo 17: A monitoring mission member in a diving operation near a buoy

Mapping the MPA in Cayar: The USAID/COMFISH project and WWF agreed, by virtue of their partnership, to co-finance the mapping of the MPA in Cayar. A call for tenders was published in June to select the contractor for tagging and demarcating the boundaries of the MPA. The

USAID/COMFISH Project will contribute to finance the costs of marking the MPA in Cayar. WWF will provide over 70% of the budget through its BMZ project that is funded by the German Cooperation Agency.

Workshop of the Technical Committee of the Department of Community Marine Protected Areas (DAMCP) on strategic planning for intervention in the MPAs in Senegal: The expert workshop on the strategic directions of the Department of Community Marine Protected Areas (DAMCP) took place in September 2012. The goal was to provide this new department with a tool for decision-making. The workshop brought together the staff of DAMCP and representatives of UCAD, DPN, WWF and the GIRMAC program. It reviewed the events that led to the creation of DAMCP, which is going to build on the work done by the Department of National Parks (DPN), the Department of Community Areas (DAC) and partners such as WWF. The participants also examined: i) the vision of DAMCP; ii) the need to expand the MPA network to the high seas; iii) the tasks assigned by the public authorities; iv) the remit of the DAMCP; v) the activity areas of the DAMCP; vi) a few successful models for community conservation; and finally vii) the organizational chart of DAMCP. The participants framed a vision for MPAs as follows: "*A network of Protected Areas, representing marine and coastal ecosystems, is established in a participatory manner for the sustainable management of biodiversity and well-being.*"

Working from this vision, the participants identified four strategic areas for DAMCP initiatives: resource conservation, development of MPAs, promotion of good MPA governance and the communication and monitoring of MPA assessments. Objectives and expected outcomes were designed in these areas. The most important results expected in line with fisheries management are: a) the description of all the characteristics of marine and coastal ecosystems; b) the establishment of a system for developing ecosystem management services; c) the institution of functional management organs; d) participatory development and implementation of management tools; e) participatory development and implementation of MPA development and management plans; f) effective delivery of training, communication and monitoring and evaluation plans.

3.3. Crosscutting areas

3.3.1. Climate change vulnerability assessment and adaptation planning

The activities in the climate change component cover "vulnerability assessment and capacity development of vulnerable coastal communities for resilience to climate change." The project initiated three main activities together with the Institute of Environmental Sciences: Strengthening the capacity of stakeholders on climate change, assessing coastal community vulnerability to climate change, and establishing a framework for consultation on the mainstreaming of climate change in Senegal's fisheries policies. All these activities are designed to build coastal community and marine ecosystem resilience to climate change through appropriate and effective strategies.

Alongside these survey initiatives, CSE studied the dynamics of land and mangrove use in the project area. The preliminary findings suggest that there is a correlation between these phenomena and climate change.

3.3.1.1. Developing stakeholders' capacities on climate change issues

A series of interactive training workshops were held to provide climate change training to stakeholders, including: USAID/COMFISH staff, implementing partners, women fish processors in Cayar, and ICC members from the 9 CLPAs based respectively in *Cayar, Rufisque/Bargny, Foundiougne, Mbour, Joal/Fadiouth, Yenne/Dialaw, Sindia, Hann and Dakar-ouest.* The project trained a total number of 394 participants in the reporting period. This series of training exercises is still going on. The actors on the three sites selected for vulnerability assessment also received training. This activity made it possible for project staff to share ideas and experience on climate change

phenomena with the respective stakeholders. It also enabled the actors, particularly the members of CLPA/ICCs to: gain a deeper understanding of USAID/COMFISH project initiatives as well as climate change, its key concepts, causes, signs and impacts on fishing communities, and to list out the local events, impacts and adaptation strategies implemented.

3.3.1.2. Assessing coastal communities' vulnerability to climate change: The activities for 2012 began slightly behind schedule due to the difficulties in executing the contract with ISE, the implementing partner, before it was finally signed in July 2012. Nevertheless, an exploratory visit was conducted to seven (7) project sites; vulnerability indicators were established using an evaluation guide produced by ENDA in year one; and information was collected during the exploratory visit. The project identified the three (3) most vulnerable sites, based on the information gathered and adjustments made to the indicators. It also conducted a target group sampling survey on each of the three (3) sites and developed data collection tools. Socio-economic data is now being gathered for vulnerability analysis.

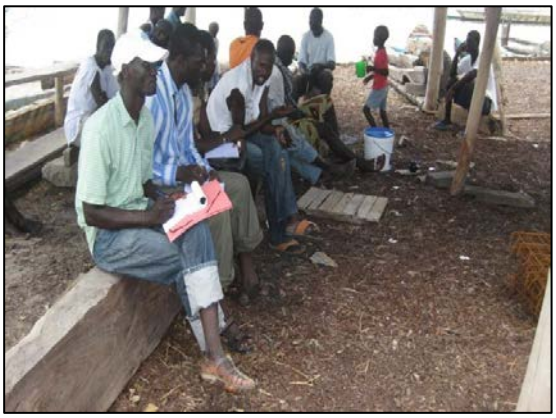


Photo 18: Discussing the impact of climate change

Photo 19: Coastal erosion caused by climate change

Alongside the activities on the ground, the ISE team is currently analyzing coastal area dynamics from 1954 to 2011/2012 and carrying out a spatial assessment of the environmental problems. The area of study has already been defined. On each site, the team will cover the shoreline and coastal area along a buffer zone between five and six kilometers. It has already collected the baseline data (high-resolution aerial photographs and satellite images covering the area in 1954, 1978, 2003 and 2011).

3.3.1.3. Studying the dynamics of land and mangrove ecosystem use: The dynamics of land use can be defined as the evolution of types of land use in time and in space, either towards a state of degradation or improvement, or to a state of equilibrium that is more or less stable. It gives a holistic account of space-time variability. Studying the dynamics of land use through satellite imagery is an important element in the management of natural resources and the monitoring of environmental changes. It enables us to describe and characterize changes in time and space on a given unit of land. This analysis of changes in land use within the USAID/COMFISH project area was done using satellite images on three different dates (2011, 1999, 1979).

Dynamics of land use between 1979 and 1999: Analyses on the dynamics of land use between 1979 and 1999 show that the study area is partially stable. The major changes observed in the period between 1979 and 1999 relate mostly to areas with natural vegetation, and specifically the savannah areas that have been turned into crop farms. Approximately 29,638.37 hectares of savannah land was converted into farms. This is a normal trend in Senegal, especially because rural communities have the tendency to clear natural vegetation in order to expand their farmland. We also find that during this period, over 3153.88 ha of agricultural land was converted into housing areas, owing to rapid

urbanization and the resulting expansion of settlements caused by population growth in the area. There was progress in the size of salt flats on farming areas. This expansion of salt flats on agricultural areas results from the degradation of vegetation cover, the drop in the level of rainfall in the area and some unsustainable agricultural practices. The salinization of farmland lowers crop yields for farmers in this area, and causes them to abandon their farmland, lay off workers or even decide to ply different trades such as fishing and small-scale entrepreneurship.

Dynamics of land use between 1979 and 2011: Between 1979 and 2011, the general trend in land use was one of escalating changes, especially in agricultural areas and natural vegetation areas.

Natural vegetation areas were transformed into farmland, which ate up over 37,766 ha of natural vegetation. The most decisive change in this area was observed in savannah areas, where over 16,214 ha were converted into farmland during the reporting period.

Significant fluctuations were seen also in farming areas during the period between 1979 and 2011. Owing to such changes, over 19,009 ha of farmland was used to establish artificial areas.

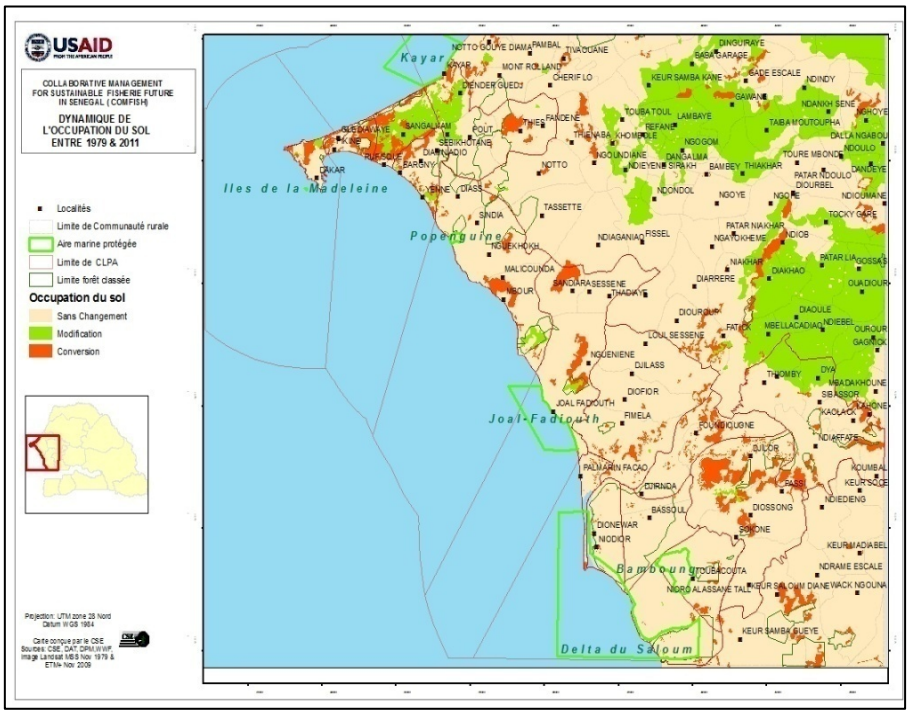


Fig.11: Dynamics of land use between 1979 and 2011

These artificial areas, made up mostly of human settlements, increased considerably between 1979 (2.21%) and 2011 (3.10%). This change is tied to the high population growth recorded in the period from 1979 to 2011 and the housing policies of the public authorities.

The progressive extension of salt flats observed on farming areas in the period between 1979 and 1999 increased even more between 1979 and 2011 with over 7197.31 of agricultural land that was replaced by salt flats.

Dynamics of land use between 1999 and 2011: The biggest changes in this period were seen in natural vegetation and farming areas. Farming areas still cover over half of the study area, even after an estimated 5862.98 ha was used from 1999 to 2011 to develop artificial areas. The decline in farming areas results from the increase in housing areas. Most farming areas have been replaced by homes, or are being developed for housing.

Between 1999 and 2011, mudflats as well as bare or grassy salt flats progressed significantly (12,490 ha). The progress on these bare surfaces was beneficial to farming areas and natural vegetation areas, especially mangrove areas, as a result of the mangrove restoration programs pursued in the 1990s.

To summarize, the major changes observed in land use across the USAID/COMFISH project area, from 1979 to 1999 and from 1999 to 2011, were mainly on farming areas, natural vegetation areas and areas of modified habitat (development). For the first two categories, the trend was a negative one because of the gradual modification of these areas, which resulted in a rapid and significant increase in modified/developed areas, used mostly as residential areas or tourist resorts. The habitat modification trend observed in this area led directly to an increase in population density, a direct consequence of which is increased pressure on fisheries resources.

Dynamics of mangrove ecosystems*:* The mangrove ecosystem concerned here is that of the Saloum Delta National Park. By virtue of the Park's economic importance for Senegal and the international community, UNESCO in 1981 put it on the World Network of Biosphere Reserves. This ecosystem, located between 13° 35' and 14° 10' latitude north and 16° 00' and 16° 47' longitude west, covers the Delta and the Saloum islands in Sine Saloum on a surface area of 58,000 hectares (IMAO.2007). Mangroves play a vital role in the life cycle of many species. They are spawning grounds and nurseries for many species of fish, including sardinella (*Sardinella aurita*), Bonga (*Ethmalosa fimbriata*), carp, barracuda (*Sphyraena sp*), captain fish and others. Shrimp (*Penaeus*) spend their juvenile stage there, while the West African manatee (Trichechus senegalensis), a marine mammal considered to be an endangered species today, lives there. Mangrove resource use contributes significantly to meeting the needs of people in the area. Mangroves also play a very important role in protecting and stabilizing the coast in this area. That was why the USAID/COMFISH project deemed it useful to commission the Ecological Monitoring Centre (CSE) to not only study the dynamics of land use, but to focus also on the mangrove area by mapping with satellite imagery the evolution of this area over three periods (1979/1999, 1979/2011 & 1999/2011).

Period from 1979 to 1999: After comparing the two maps on land use and interpreting Landsat images from 1979 and 1999, one sees there is a loss of 643 ha of mangrove areas, 610 ha of which has been converted into saltpans.

Most of the converted areas are located in the CLPAs in Fimela, Fatick and Foundiougne. This degradation results from the abusive harvesting of mangrove vegetation for firewood and also from the improper harvesting of oysters. Coupled with these, there are natural factors such as dwindling rainfall, tidal influence and increasing salinity. But, alongside the damage noted in the CLPAs mentioned above, improvements have been observed with the recovery of salt flats by mangroves. About 1,366 ha of salt flats have been converted into mangroves. This is a direct consequence of the mangrove conservation and restoration programs undertaken by local communities, government, NGOs and donors.

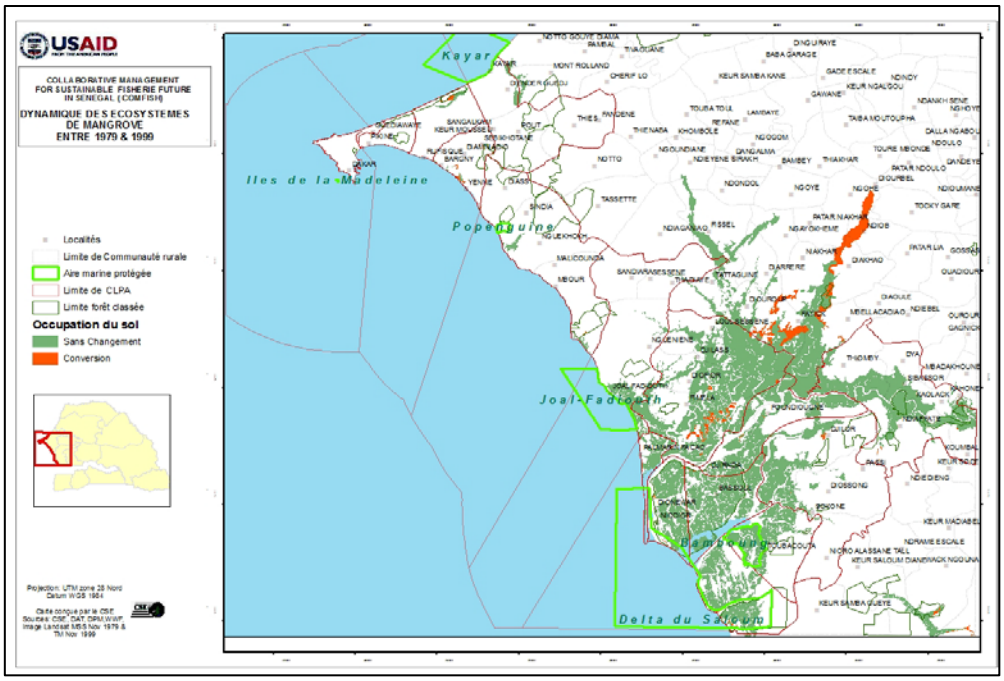


Figure 12: Dynamics of mangrove ecosystems between 1979 and 1999

Period from 1979 to 2011: The mangrove confirms the dynamics observed already between 1979 and 1999. Mangrove areas actually declined from 75,296 ha in 1979 to 69,730 ha in 2011. And, over 5726 ha of mangrove areas were converted into salt flats. The rural communities of Bassoul, Djirnda and Palmarin were the ones most affected by this degradation.

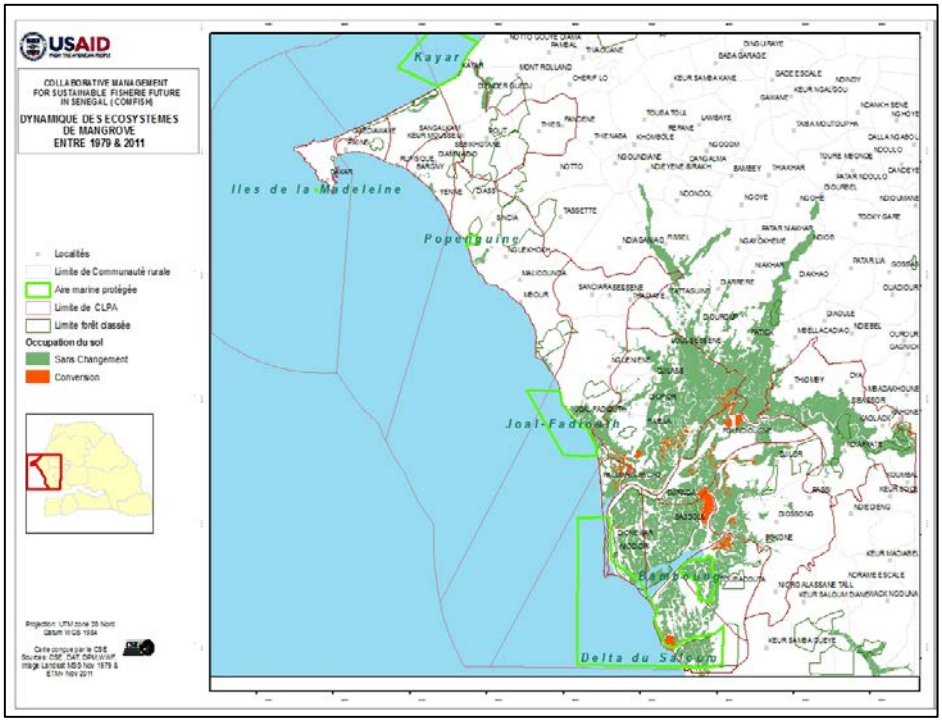


Fig.13: Dynamics of mangrove ecosystems from 1979 to 2011

As for salt flats, they expanded by about 12,489 ha between 1979 and 2011. The regression in mangrove areas and concomitant progress of salt flats result from the combined effects of climate change and unregulated use of mangrove resources by the local communities.

Period from 1999 to 2011: Looking at the results of land use in 1999 and 2011, they are slightly better than those in 1979/2011. Such an improvement is from the reforestation programs in the area. The south was relatively stable from 1999 to 2011, while the east (Djilor, Foundiougne) suffered degradation (conversion). The transition matrix shows that 58.13 ha of mangrove areas were converted into salt flats.

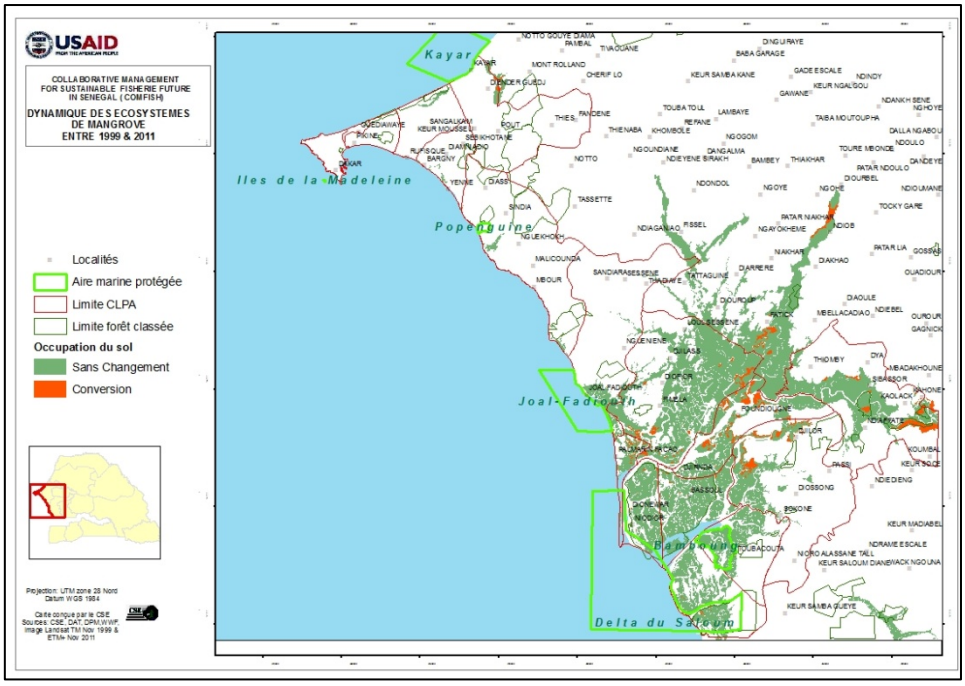


Fig.14: Dynamics of mangrove ecosystems from 1999 to 2011

3.3.1.4. Establishing a framework for consultation: To better address climate change issues in the government's sector policies, a framework for consultation is being put in place with the support of the *USAID/COMFISH* project. To that end, a first meeting took place on September 25, 2012 at Hotel Océan. The meeting brought together state departments (DPM, DEEC, Director of Emergency Preparedness, DAMCP, COMNACC, and HASSMAR), research institutes (CEP, IUPA, CSE, ISE/UCAD, IRD/IFAN, CRODT) and development partners (*USAID/COMFISH*, CONIPAS, IUCN, Océanium, SRSP Dakar – Thiès – Fatick, DITP, DPC, DPSP, FENAGIE Pêche, WWF, Green Sénégal, and GREP).

Photo 20 & 21: Participants at the workshop on the mainstreaming of climate change in the fisheries sector

One of the main outcomes of the workshop was that all the participants were willing and ready to get actively involved in the framework for consultation on climate change. However, a preliminary diagnosis had to be done beforehand to understand why previous consultation frameworks had failed.

This was how a new three-pronged body was formed to ensure better operationality. A small committee, made up of DPM, DEEC, the Director of Emergency Preparedness, COMNACC and USAID/COMFISH, was appointed to pursue thinking and hold its first meeting in November 2013.

3.3.2. Gender

The USAID/COMFISH project's strategy on gender issues consisted in developing the capacities of all the fishermen and associations, including women, to enable them to form a pressure group for the promotion of good practices in fisheries. For fisheries management to be effective, fishermen must be at the heart of reforms and be empowered to build a sense of ownership of the new management approaches. To do so, the stakeholders needed to recognize and share their experiences and needs, and to assume responsibilities in the management process and the results obtained. The project placed particular emphasis on empowering women in the fisheries sector. Although most communities undermine women's role in decision-making, they are the first link in fish processing. Nowadays, they assume great responsibility in child education and health, and in the family's social well-being.

Using the studies the project had conducted in year one on women's role and status in the fisheries sector, a strategy for the empowerment of women was developed in year two. This strategy built on the recommendations of the above studies "Assessing the role of women in fishing communities and CLPAs" and identified ways to strengthen their involvement in decision-making and increase their benefits from the fisheries sub-sector.

Support will be provided gradually to implement this strategy within the project cycle. Likewise, emphasis will be placed on improving the working conditions of women on processing sites by promoting techniques for processing and storing fishery products in line with sustainable fishery resource management practices and international standards.

To foster the goals of FTF, the project partnered with APTE in the first two years to improve fishery processing and storage techniques by equipping the GIE Mame Toulaye Guène's processing unit in Cayar with appropriate technology, improving processing practices, building women's skills and enhancing the label of products from the unit. Activities with a climate change adaptation component were initiated also in project activities. These activities will be one of the cornerstones of the project as it monitors the processing unit in due course.

This initiative seeks generally to add value to the products from the processing unit by improving hygiene, quality and labeling standards, so that women can earn more income and improve their standard of living. It aims also to promote the good fish processing practices that have been initiated in Cayar by women (about 400 women). These good practices, seen in the changes in collective behavior from women and awareness of their heritage (Sea), contribute in preserving the environment and fishery resources. To take this forward, the project will implement several activities consistent with the objectives of the USAID fishing program's Feed the Future (FTF) component. These activities will contribute to the objectives listed below:

- Reducing post-harvest losses;
- Promoting international trade through eco-labeling; and
- Involving the men and women in artisanal fisheries effectively in the value chain.

To help achieve the objectives of the *USAID/COMFISH* project, expected outcomes were set as follows:

- The processing unit of GIE "Mantoulaye Guène" is refurbished and equipped to the standard required
- The barriers to good fish processing practices are understood and better addressed
- Training on hygiene and quality, literacy education and leadership are organized

An audit of processing infrastructure in Cayar: It was necessary to know the state of affairs on the processing site before any improvement. The surveys conducted in Cayar before this project was developed actually showed that there were many shortcomings in the use of the infrastructure, even though the facilities in place were modern. The reasons were that women had been left out, although those women were the ones mostly involved in developing and implementing projects. Hence, the processing equipment installed was not the right type and obviously did not meet production needs.

Initiating efforts to refurbish the processing unit of GIE "Mantoulaye Guène": Compliance with technical and administrative procedures is a sine qua non for achieving project objectives (labeling, compliance, hygiene standards, authorization, etc.). That was why APTE insisted on these procedures before beginning the construction closely together with relevant government agencies (the municipal council, Department of Environmental Affairs, DITP). Similarly, a senior building technician was recruited to develop the unit's site plan, in close collaboration with the fish technologist, monitor the unit's work and ensure compliance with the construction requirements in Senegal throughout the unit construction phase.

APTE also mobilized its key partners to deliver this project, including ITA that was in charge of development and monitoring, consultants from the University of Dakar involved in the infrastructure audit exercise, the fisheries service in the supervision phase and DITP in charge of certification and normalization. The objective was to set up a modern unit, built to the required standards. But before establishing the unit, a participatory diagnosis of the existing infrastructure on the Cayar processing site was done. This exercise brought out the weaknesses in design and gathered women's views on the type of equipment that would eventually meet their needs.

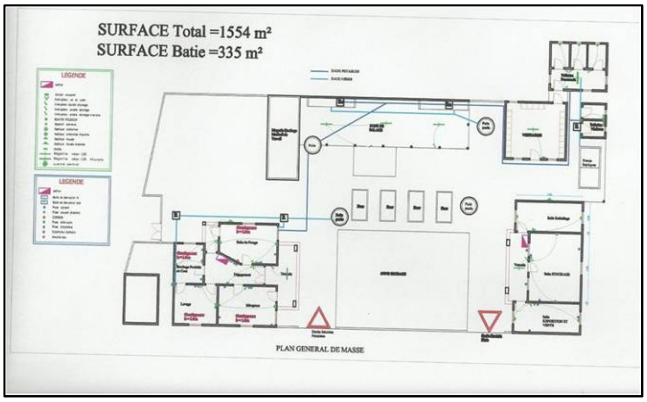


Fig. 15: The unit's site plan

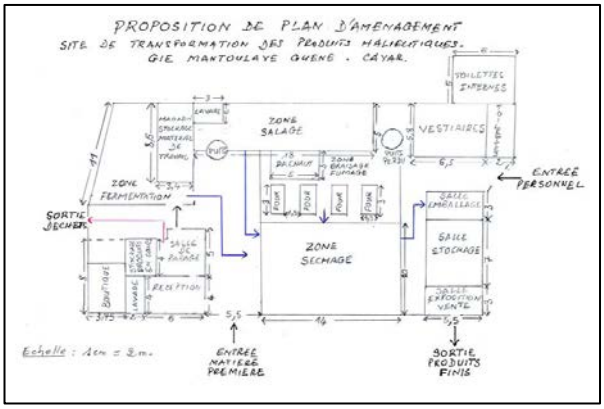


Fig.16: the unit's development plan

Photo 22: ITA consultant taking measurements on site

Raising awareness and overcoming the barriers to good processing practices: to achieve this result, the activities pursued were:

- To conduct microbiological analyses on processed products (**keccax)**
- Standardizing processing methods and monitoring their application

Ensuring that processed products are safe is a prerequisite for promoting the products of the unit. To do this, processing practices had to be understood and then improved. It is in this respect that microbiological analyses were done to truly test the quality of processed products and establish a baseline. The findings and recommendations will be used to correct the deficiencies identified in the processing phases. After that, the methods will be standardized. To monitor their implementation, a code of conduct will be established and the labeling process launched.

Photo 23: Collecting samples

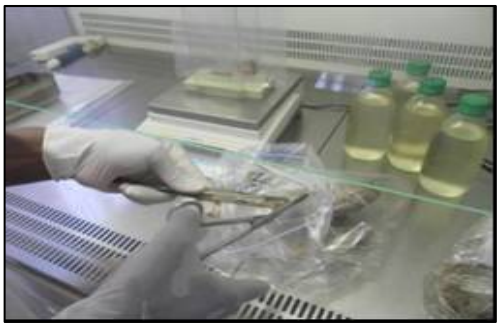


Photo 24: Doing tests in the HIDAOA laboratory

Photo 24: Samples of roasted fish put in freezer bags

Photo 25: Sampling seawater

Organizing training on climate change, hygiene and quality, literacy education and leadership

To support the process of establishing the fish processing unit, a program for developing the skills of women fish processors was initiated. The training courses delivered this year were on:

- climate change
- hygiene and quality
- leadership
- literacy skills

Activities for developing women's capacities are important for implementing this project in Cayar. Women are often illiterate and therefore have trouble assimilating knowledge acquired through training. This is why literacy constitutes the basis for developing women's capacities. It will be delivered during the entire project. Women must also affirm their leadership in the fisheries sector so that their concerns are taken into account in the fisheries policies or management plans in Senegal. Thus the project plans to empower and monitor them so they are more influential in the fisheries sector and also benefit fully from their activities.

Photo 26: training in Hygiene and quality

Photo 27: Training in leadership

Photo 28 & 29: Literacy education training

The climate change adaptation component is important for implementing this project. Several activities will be conducted to address this global scourge that could jeopardize the future of many subsistence activities, including fishing and related activities. Training has been organized for women to raise their awareness of the problem and the impacts it may have on their activities.

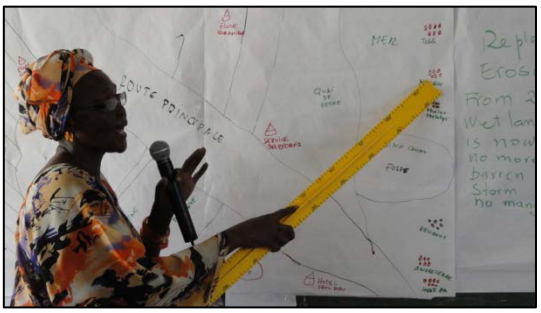


Photo 30 & 31: Training on climate change

Training on environmental monitoring has been added to the training provided already on climate change. The goal of this training is to articulate the changes that the participants have seen in their region and the adaptation strategies developed by communities, to understand the effects of climate change and their potential implications on their daily lives and economic conditions, and propose strategies to reduce their current and future needs related to climate. This time, the training will enable women to become familiar with the concept of environmental monitoring and its importance to the development of their activities so that they can consider possible changes, their probability and appropriate responses.

Finally, training was provided this year on standardization. This training, like the others, is also important for the development of the unit. Women should be made aware of the relevant departments of standardization in Senegal and the relations they should have with them. This capacity development

will enable them to overcome the passivity that often characterizes them when they have to fulfill certain administrative formalities for the project that only the contractors do.

Photo 32: Introducing women to practical exercises during training on Standardization

In addition to these activities, a cost-benefit analysis was conducted by USAID in Washington, DC on the USAID/COMFISH project activity aimed at improving the quality of processed sardinella (Keccax). This analysis showed that the assistance from USAID's Feed the Future Initiative (FTF) would yield impressive returns on investment. However, the model is still under study and will be reviewed and updated especially on the relationship between different variables. This result is based on assumptions about the price of fish and future trends in landings, etc. Some of the assumptions are still being reviewed and crosschecked.

All the activities conducted in the process of establishing management plans (local conventions, socio-economic studies) and future activities, converge towards improving and increasing the profits that stakeholders can make from sustainable and rational fishing practices.

3.3.3. Communication, Awareness and Dissemination

In 2011-2012, the major communication activities were around the launch of the project, the development and implementation of the project's communication strategy, the project's outreach activities for visibility, the creation of a database with photos on the project, and the updating of the project's branding strategy.

Project launch: The USAID/COMFISH project was launched officially in the first quarter of year two, and precisely on October 19, 2011. The event was an opportunity to formally present the project to key stakeholders in Senegal's fisheries sector and eventually find possible areas of synergy. The launching ceremony brought together over 120 participants representing the Ministry of Fisheries and Maritime Affairs (Ministry of Maritime Economy at the time), professional organizations in the sector and fishing communities, NGOs and donors, as well as representatives of the projects and programs working in fisheries. It was an opportunity also to publicize the name of the project in the local language (PENCOO GEJ) and reward the winner of the contest that was organized to find a local

name for the project. The event received wide media coverage[14], and this gave USAID/COMFISH even greater recognition among the CLPAs[15].

Developing and implementing the project's communication strategy: After the project was launched officially, a communication strategy – addressing both internal and external needs - was developed for the project on 24 January 24, and then on February 15 and 16, 2012 in consistency with the USAID/COMFISH project's 2012 annual work plan. The objective of this strategy was firstly to improve internal communication within the project team. This had to do with communication between the project team, the donor (USAID) and the main beneficiary of the project (MPAM/DPM). Secondly, the strategy sought to support and profile the implementation of major project activities. The communication strategy made it possible for the project to identify the key target groups that it needed to influence on climate change, poor fishing practices and good governance of fisheries. It also helped identify communication approaches/activities and tools to use in managing the people/target groups identified, as well as the mechanisms for monitoring and evaluating these activities.

The communication strategy identified fishing communities as one of the main target groups and identified a set of communication tools to communicate with these communities. These include relay workers and community radio stations, cultural events (Nguel, Gumbe, forum theater...), film screenings, demonstration sessions and testimonies.

Communication relay workers: They were chosen by the communities themselves to play an interface role between the project and the communities through the CLPAs. These relay workers were six in number in the six CLPAs active in the project areas, and served as a resource for communicating with the community. In 2012, the project involved them in the information and awareness campaigns on the project and the issues it was working on (poor fishing practices, climate change adaptation, development of local conventions, etc.)

Community radios: Community radios, in the same vein as the relay workers, play a very important role in the project's community-oriented communication activities. To reach a large segment of the communities living or working in the project areas, the project team has identified a community radio station in each of the coverage areas and is working to develop a partnership agreement with these radios, so that they host weekly programs in various formats (roundtables, call-in shows, interactive street shows, feature magazines, etc.) and on the project's key issues with community leaders/opinion leaders. Communication via community radio will start before the end of the first quarter of fiscal 2013.

Cultural events: To mobilize the largest possible number of actors during its information and awareness campaigns, the project will also use cultural events, such as the Nguel, the Gumbe (song and dance) and Forum Theater. Each cultural activity will be organized according to the socio-cultural realities of each locality (e.g. the Nguel in Joal, the Gumbe in Rufisque/Bargny). These cultural events are also an opportunity for the project to conduct demonstration sessions (e.g. good fishing and fish processing practices) and listen to testimonies and/or anecdotes on key project issues.

A cultural event was organized at the launch of the project, and it contributed significantly to make the ceremony a success.

In addition to the above tools, ***film and/or video projections*** will be used also as tools for communicating with the communities. The screenings will be held at peak hours on topics/issues

[14] The team leader was welcomed by those who had seen him on TV, and who commended COMFISH

[15] During a public meeting attended by all 22 CLPAs with > 100 people to discuss strategies for developing the CLPAs, a CLPA representative underlined the fact that COMFISH usually paid visits to consult with them before proposing any new ideas to the CLPA. His remark was greeted with warm applause.

specific to the project coverage areas. These screenings will be followed by open discussion sessions. These projections will also be used during the project's information and awareness campaigns in years three and four of project activities. To develop this strategy, the project brought together its key partners (representatives of CLPAs, FENAGIE, DPM, WWF, CSE, FIT, Enda Energy, community radios, etc.).

Project outreach activities: To raise the profile of project activities among key stakeholders and partners in the fisheries sector, the project uses a range of different communication mediums and tools:

Media coverage: The project's key activities (workshops, coffee talks, and press trips) have been covered widely by the local and national media (print, radio, TV, online news, etc.).

It is in this regard that the following meetings were reported in the national press: i) Workshop on Strengthening the Role of Women in Artisanal Fisheries Management in Senegal; ii) National Workshop on identification of strategies for CLPAs and establishment of SMUs; iii) Coffee Chat on the roles and responsibilities of the CLPA, CLP and SMU in local governance of fisheries in Senegal; Workshop on good fishing practices; and iv) Workshop on the mainstreaming of climate change in fisheries management.

Photo 33: Meeting on national authorization to export Fishery products to Europe

Photo 34: Meeting on Fisheries and Martine Protected Areas

In collaboration with the WWF that was in charge of implementing these activities, communication plans were developed for these three meetings. For the project, the communication plans were an opportunity to produce banners and radio spots on these events that enjoyed extensive media coverage (4 TVs, 4 newspapers, 6 radio stations). A short report on the first two events was produced in DVD format and entered into a photo database on the three meetings.

N.B.: Annex 5 presents a set of URLs to the various media outlets that covered the above activities online.

Promoting the project's visibility at the USA Week: The visibility of the project was enhanced during the USA Week that took place from 23 to 26 May 2012 at the King Fahd Hotel in Dakar. Along with other FtF projects, the USAID/COMFISH project took place in a 3-day exhibition during the week. It used the event as an opportunity to raise its profile by distributing flyers about its work during exchanges with the nearly 600 visitors to the exhibition stand. The USAID/COMFISH project's communication officer seized the opportunity also to strengthen his working relationship with the other communication officers of FTF projects. They all took turns in hosting the visitors to the stand.

Photo 35: The USAID/COMFISH project at the USA Week

Bi-weeklies: To share progress reports with USAID on major project activities, several updates were sent to the USAID/Senegal newsletter between October 2011 and September 2012. Below are some examples of the activities or events covered in the bi-weekly updates:

- Fishermen choose priority stocks in an atmosphere of progress and dialogue (October 2011);
- The USAID/COLFISH Project launched (November 2011);
- Seven CLPA workshops train CLPA members on modalities for developing intra-CLPA Local Conventions;
- Workshop on strengthening the role of women in the fisheries sector – April 2012

Success stories: The project achieved significant milestones in year two and some of these accomplishments were reported as success stories:

- Results of the meeting (vision, strategies and the declaration of women in the fisheries sector) on strengthening women's role in management;
- The innovative approach designed by the USAID/COMFISH project to improve communication between community actors and the authorities. This approach includes the use of certain local languages and customs (dance, song, storytelling...), the allocation of time for men and women to express themselves, and the arrangement of seats during meetings in ways that facilitate free expression and greater participation of women during those meetings.

Press trip to Ngaparou and Dionewar Falia: To contribute in eradicating unsustainable fishing practices, the project organized a press trip to Ngaparou and Dionewar Falia in partnership with WWF and GREP (Group of Journalists and Environmental Experts). The purpose of this press trip was to show the good fishing practices and transformations taking place on both locations, and thanks to which the actors on the ground had received awards from the USAID/COMFISH project and its partners. At the end of this press trip, a magazine was published and shared with key stakeholders and partners in the fisheries sector.

Harmonizing the project's "branding" strategy and adopting reporting formats: To secure greater ownership of the USAID/COMFISH project by the Ministry of Fisheries and Maritime Affairs, the Ministry's logo was added to the project's graphic chart. The chart used to have only the logos of USAID and the University of Rhode Island. The Ministry's logo will henceforth be opposed on the project's major publications and other materials.

In accordance with the project's 'branding' strategy, activity and mission report formats were developed this year. These reporting formats will preserve the visual identity of the project (standard use of logos and the project name), as well as save time by using the report to provide information that is important and useful.

Establishing and updating a photo database and PowerPoint presentation on the project: To add value to the quality of the project's visuals, a photographic database has been developed and is now available to the entire project team and to partners who request access thereto. This database is organized by year (e.g. 2011, 2012, etc.) and covers the project's flagship activities, such as meetings, field visits, briefings, the project launching ceremony, etc. It will be improved during the third year.

To improve communication on the project and align PowerPoint presentations on it, a generic PowerPoint presentation in French and English was developed. This presentation was updated in 2011-2012. It will also be shared with some local partners who provide information and build awareness of the project in local communities.

3.3.4. Governance/Decentralization/Policy reform/support to the sectoral policy letter

The project this year pursued its activities to help foster sector reform in terms of sustainable management and enhanced governance in the fisheries sector, so as to support the Sectoral Policy Letter (LPS). The strategic objectives of the LPS assigned to the sector in the Poverty Reduction Strategy Paper (PRSP II) are:

- Ensure sustainable management and restoration of fisheries resources;
- Meet domestic demand for fishery products;
- Develop fisheries resources and modernize artisanal fishing;
- Encourage the transformation, professionalization and training of actors in the fisheries sector;
- Improve the system for financing fisheries and aquaculture activities;
- Reinforce regional and sub-regional cooperation on fisheries.

The Accelerated Growth Strategy (AGS), which is an integral part of the PRSP II, has considerably strengthened the role and status of fishing and aquaculture by placing this sector among the group of five (5) high growth potential clusters able to trigger growth in the other economic sectors. In the fisheries sub-sector, the main challenge of the sector policy (as defined by the AGS) is to regenerate the rent from fisheries and increase the added value of activities on land.

The USAID/COMFISH project approach to LPS delivery is to help entrench the prerequisites of enhanced fisheries governance in Senegal. In the year under review, the project's support in that regard consisted:

1. At the strategic level, in (i) organizing a series of brainstorming exercises (via workshops, discussions and studies) on the best strategies for fisheries governance and mechanisms for involving stakeholders effectively in decision-making. This approach made it possible to reach a consensus on the methodology and process of implementing reforms for the establishment and operationalization of Sustainable Management Units (SMUs) on priority stocks; (ii) supporting the AGS to ignite in-depth thinking with key stakeholders on issues related to fishing capacity and the prerequisites for establishing SMUs.

2. At the level of grassroots actors, CLPA and gender strategies were developed and some initiatives put forward to introduce new reforms, particularly in the local organs for fisheries governance. This new approach aims to:

- Use the local conventions signed within and between CLPAs as the main tool for stock-based fisheries management (at the legal level and in terms of communication);
- Review some of the legal instruments in CLPAs to establish effective strategies that facilitate and improve the establishment of SMUs;
- Formalize the relations within and between CLPAs with a view to developing and implementing stock-based management plans;
- Establish sustainable frameworks for consultation between CLPA actors and industrial fishing actors to develop stock-based management plans;
- Increase the number of women in the ICCs of target CLPAs;

3. Take steps at the national level (DPM) to develop the capacities of the National Advisory Council for Marine Fisheries (CNCPM);

- Set up a scientific committee to support CLPAs and the CNCPM;
- Work with IUPA to develop a model of partnership for establishing effective SMUs;
- Mainstream IUU fishing in fisheries management programs.

On climate change, the USAID/COMFISH project assists the Government of Senegal in identifying the effects of climate change on the productivity of priority stocks, and in designing strategies to simultaneously address fishing capacity, overfishing and climate change in the management of fisheries resources. This year, the project:

- Developed the capacity of stakeholders to increase their resilience to climate change;
- Began efforts to establish a framework for cooperation between the various actors in the area, so that they can more effectively address climate change issues and include them in sector policies;
- Built partnerships between CSE and USAID/COMFISH for participatory mapping of changes in the migration of priority stocks and land use in the CLPAs in Sindia, Mbour and Joal-Fadiouth. These efforts will make it possible to integrate these results into sector policies and establish sustainable fisheries management mechanisms that are responsive to climate change.

3.3.5. Science and technology

Establishing a participatory system for collecting biological data (growth, size, etc.)

In the partnership between USAID/COMFISH, IUPA and IRD/IFAN, efforts were made to collect biological data on sardinella, Bonga, white grouper, shrimp and octopus as a way of providing assistance to operationalize the management plans on these species. Sampling began in March 2012 and was done on a monthly basis. The stocks gathered for sampling came from the commercial artisanal fishing sites in Mbour, Joal, Cayar Foundiougne and Betenti.

Each month, at least 400 individuals were measured from each species to collect data on the following: fork length, standard length, total length, carapace length for shrimp, and total body weight. Of the 400 individuals measured, a sample of 100 individuals was dissected and data collected on: sex and stage of maturity, gonad weight, eviscerated weight of the body, and number of mature oocytes.

Apart from biological variables, other data related to fishing activity was recorded. This included the type of boat, engine power, fishing gear, fishing area, number of fishers on board, duration of the voyage and the quantity of fish caught.

Photo 36: sardinella catch

Photo 37: Shrimp catch

As for IRD/IFAN, they undertook three (3) missions for sampling to two landing sites (Mbour and Joal) from July to September 2012. The objective was: to estimate the distribution of sizes landed and to under sample some of the individuals and use them to take biological samples in the laboratory for four target species: the white grouper, round sardine, flat sardine and bonga. Each month and on each site, 150 fish species were randomly measured by species (total length) and 30 fish under-sampled by species and per site among the 150 fish measured. The under-sampled fish was stored in ice and returned to the laboratory for measurements and biological samples. In the laboratory, some individual parameters were measured: total length, fork length, total weight, eviscerated weight and gonad weight. Sex and stage of sexual maturity were determined for each individual, then the mature gonads were extracted and stored to estimate fertility later. Otoliths (calcified inner ear growth recording parts) were removed, washed in water, dried and stored in dry referenced tubes.

Finally, one notes the importance of this data. When it is processed on an annual basis, it provides key evidence on the age of the stock population, stages of sexual maturity, estimates on mortality, otolith growth, etc. which are important inputs to determine the exploitation potential of sardinella stocks.

3.4. Project management

3.4 .1. Office equipment and recruiting additional staff

The premises of the USAID/COMFISH project coordination unit are now functional and additional staff has been hired (monitoring and evaluation officer; junior expert in climate change). Relay workers identified by the CLPAs are ready to pursue the activities required to finalize the three Local Conventions. Likewise, interns have been brought in to support the monitoring and evaluation officer in collecting field data and establishing baselines. The diagram below shows an updated version of the organizational chart.

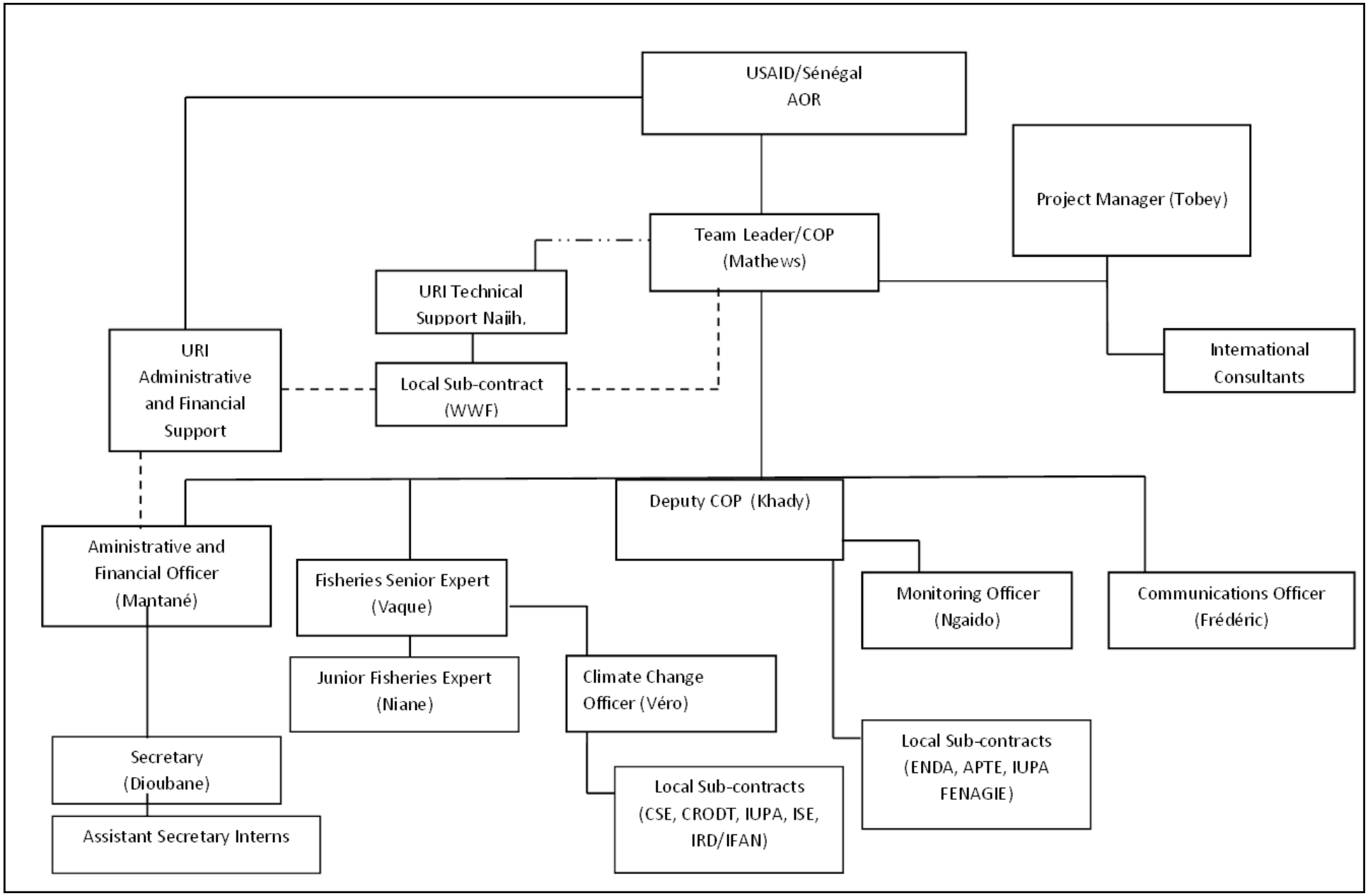


Figure 17. Organizational chart

3.4.2. Strategies/Mechanisms/Partnership

Meetings held with:

- The Ministry of Fisheries (DPM, DPSP) on activities for establishing: i) local conventions for Sindia, Mbour and Joal; ii) IUU fishing; iii) DITP to discuss issues on the standardization of products (norms and standards for product quality and hygiene products);
- The Ministry of Environment (DEEC) to conduct activities on climate change, environmental monitoring, etc.
- In terms of synergy and partnership, the USAID/COMFISH project conducted scientific research to help develop the priority stock management plans initiated by the other partners (PRAO, COGEPAS etc.). In this respect, it began to develop a scientific database (biological and socioeconomic surveys, participatory mapping) for establishing Sustainable Management Units on octopus, white grouper, coastal shrimp, cobo and sardinella. The project participated also in managing the biological rest period for octopus, an initiative put on course this year across Mbour division by COGEPAS and the Ministry of Fisheries. It did so by contributing to buy octopus pots upon request from the CLPAs concerned.
- The only way to ensure long-term success and sustainability of fishery reforms in Senegal is to make sure that national institutions and their local branch offices acquire the capacity at the end of the project to sustain the commitment and support (political, technical and financial) for implementing the reforms made and new approaches used throughout the project cycle. To do so, the USAID/COMFISH project strengthened these institutions through a learning-by-doing approach. In the same vein, the project worked with civil society and the private sector that also constitute a key link for sustainability. This is why the project is working closely together with the "Alliance for Sustainable Fisheries", which served as a framework for dialogue, to organize coffee chats on themes and concepts developed by the project this year (functional CLPAs, SMUs, authorization, MPAs, etc.). Other local, regional and national organizations will also play a key role in finding partners to implement project activities. The project's main implementing partners and their roles were described in the work plans submitted to USAID/Senegal. Most of these institutions also are beneficiaries of the project and thus receive funds to perform a number of activities mentioned in the work plan.
- Monthly coordination meetings are organized with all partners each month at the USAID/COMFISH project office. This is to enable implementing partners to communicate and discuss the results, achievements and constraints on the performance of their activities on the ground, as well as to develop synergies in interventions so as to pool efforts and funds. They also share the activities planned for the coming month.

3.4.3. Lessons learned

1) There was a severe lack of communication between the central authority (who is well educated in French but has a rather linear, analytical approach and is based in Dakar) and grassroots actors who are illiterate and speak Wolof. A new tool has been designed to simplify and enter technical information to the database.

2) A mechanism for monitoring the project's six implementing partners and other potential partners every month, has been set up to ensure quality control and better reporting.

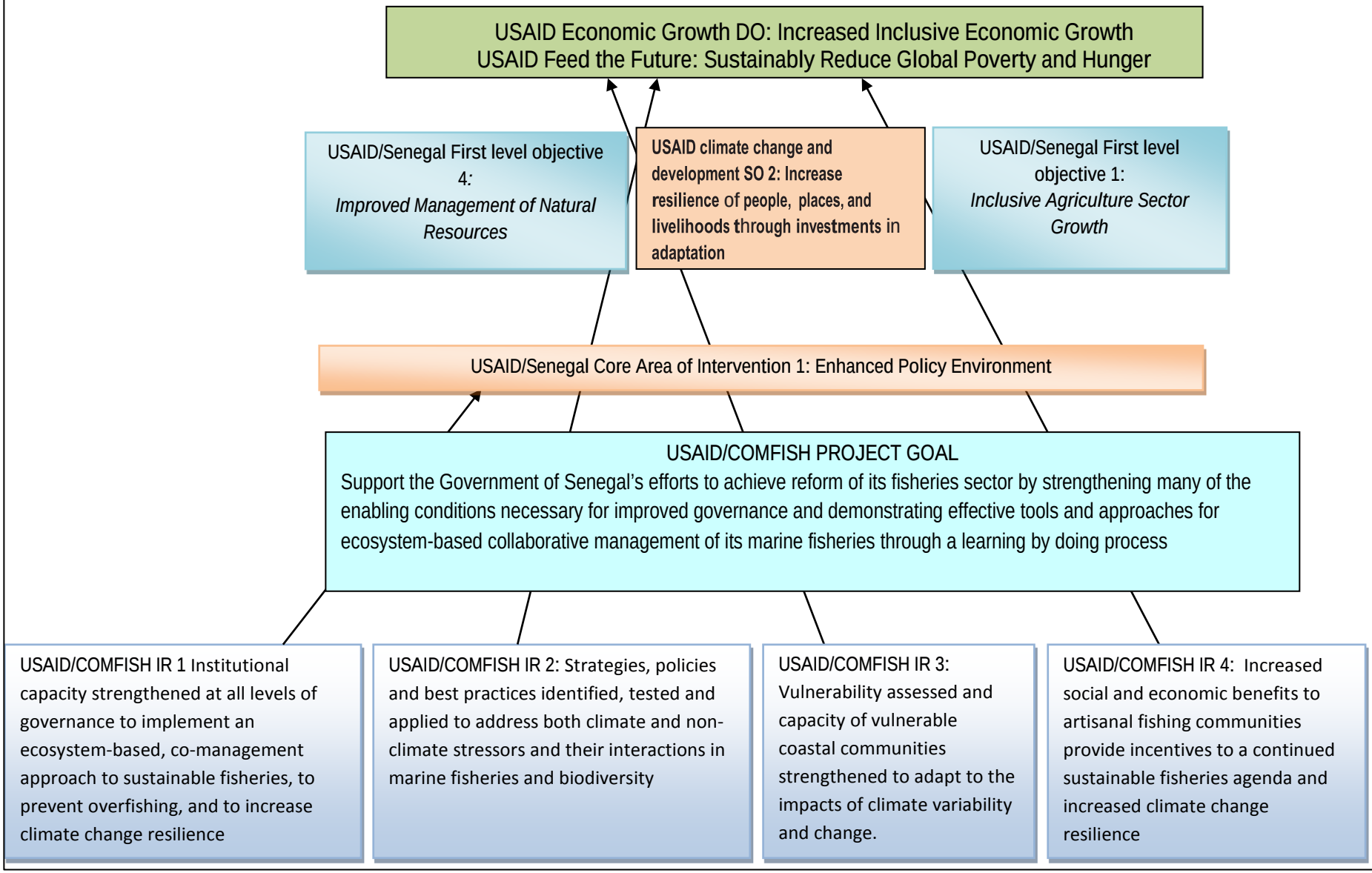
3) Signing contracts with partners proved more difficult (from an administrative point of view) than expected. The project continues to learn from this experience.

4) Building the skills of community relay workers (CLPA members) for them to join in establishing local conventions, was a remarkable contribution to the approval process.

ANNEXES

A1: USAID/COMFISH RESULTS FRAMEWORK
A2: FINANCIAL SITUATION
A3: MITIGATION AND ENVIRONMENTAL MONITORING PLAN 2012
A4: PROCEDURE FOR OBTAINING AUTHORIZATION FROM THE MINISTRY OF ENVIRONMENT AND THE DEPARTMENT OF FISH PROCESSING INDUSTRIES (DITP)
A5: URL LINKS ON MEDIA COVERAGE OF USAID/COMFISH PROJECT ACTIVITIES
A6: LIST OF TECHNICAL REPORTS FOR 2012
A7: LIST OF ACTIVITIES IN FISCAL 2012

A1. USAID/COMFISH Results Framework



Indicators	Life of project targets	Year one results	Year 2 targets	Year 2 results	Year 3 targets	Year 4 targets	Observations
Result 1: *The capacity of institutions and stakeholders are strengthened at all levels of governance to increase their resilience to climate change and facilitate implementation of co-management as part of Sustainable Governance Units:*							
1. 75% increase of the composite index score for CLPAs management effectiveness in USAID/COMFISH Project sites by 2016	75% increase in terms of index score (0.07)	NA	Baseline	Baseline (0.04 out of a range of -1 and +1)	20% increase in terms of composite index score (0.05)	20% increase in terms of composite index score (0.06)	
2. Number of individuals who have received USG supported short-term food security and productivity training	4 790	45	700	986	2090	800	The target is revised upwards because 2 800 trainees initially set will be exceeded in 2013
3. Number of print media and audio-visual products designed for strengthening the capacity of co-management institutions and that of fisheries stakeholders	15	NA	NA	2	9	2	2012 results : 1 magazine on winners of best practices distributed to seven targets CLPAs 1 baseline report on management of CLPAs
4. Ratio of women who have received short term training on food security (in relation to the total number of people trained)	55%	NA	NA	40%	50%	50%	This is the number of women trained divided by the total number of people trained
5. Number of research and training institutions, of governmental departments, consultation frameworks and NGOs whose capacity was strengthened as a result of USAID/COMFISH Project	20	NA	NA	15	17	18	

Result 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*							
6. Number of action plans and/or projects developed to support fisheries management process	11	NA	NA	2	7	2	
7. Number of technical studies contributing to the management plans of UGDs	13	NA	NA	2	11	0	
8. Number of synergies created in the development of sustainable management units	9	NA	NA	1	4	2	Contribution to the purchase of octopus pots with COGEPAS
9. Number of policies/regulations/ administrative procedures analyzed	43	13	11	10	13	7	The target is revised upwards because the analyzed texts have reached 23 (initial target)
10. Number of policies/regulations/ administrative procedures drafted and presented for public/stakeholder consultation	17	0	3	3	6	6	3 local conventions and 3 adaptation plans to climate change
11. Number of policies/regulations/ administrative procedures presented for legislation/decree	12	1	3	3	6	3	7 local conventions and 3 adaptation plans to climate change+2 management plans
12.Number of policies/regulations/ administrative procedures prepared as a result of USG assistance passed/approved	14	0	3	2	5	5	4 local conventions et 1 MPA strategy (on 2013)
13. Number of policies/regulations/ administrative procedures passed for which implementation has begun	15	0	1	0	4	5	3 local conventions et 1 MPA strategy (on 2013)

14. Number of new technologies for fisheries resources management developed	3	NA	NA	4	1	1	1 best practice process
15. Number of stakeholders who have put in place new regulations for the collaborative management of fisheries resources	40 000	NA	NA	20 940	15 000	4 060	20 940 actors of Mbour, Joal and Sindia CLPAs
16. Number of producers and the likes who have applied new technologies or management practices as a result of USG support (indicator 4.5.2-5 of FTF)	40 000	0	0	0	20 940	15000	
17. Number of hectares of biological significance and/or of natural resources under improved management as a result of USG assistance	844 655 ha	0	17 100 ha	0	327 104 ha	170 451 ha	Fishing zones of Joal, Mbour and Sindia CLPAs (on 2013)
18. Number of hectares in biologically important areas under improved management as a result of USG assistance	364 500 ha	0	17 100 ha	0	34 500 ha	330 000 ha	MPA of Cayar, Joal and the RBDS
Result 3: Vulnerability of coastal communities assessed and their capacity to adapt to the impacts of climate change strengthened							
19 Number of people receiving training in global climate change as a result of USG assistance	2 400	0	650	394	950	300	
20. Number of climate vulnerability assessments conducted as a result of USG assistance	4	0	3	0	3	1	
21. Number of laws, policies, agreements, or regulations addressing climate change proposed, adopted, or implemented as a result of USG	11	NA	NA	NA	3 (proposed)	6 (3 adopted & 3 implemented)	3 climate change adaptation plans on 2013

assistance							
22. Number of people with increased capacity to adapt to the impacts of climate variability and change as a result of USG assistance	4 790	700	700	986	2 090	800	
Result 4: Sustainable fisheries management provide increased resilience to climate change and increased social and economic benefits to artisanal fishing communities							
23. Number of food security private and for profit enterprises, producer associations, water users association, women's associations, businessmen and businesswomen's associations and CBOs receiving assistance from USG	53	0	21	20	12	12	
24. Number of rural households benefiting directly from USG interventions (FTE indicator 4.5.2-13)	10 331	0		Baseline 10 331	5 449 Households of Mbour, Joal and Sindia CLPAs	9 131	
25. Fishery sector stakeholders in project sites perceive that their welfare is better off due to USG assistance	NA	NA		Baseline completed	NA	NA	Welfare includes dimensions related to the quality of life, level of empowerment of fishermen in resource management, decision making, the degree of control and access to the resource and perceived change in the state of the resource. A baseline study of fisheries stakeholders will be

							conducted ; at mid-term and at the end of the project, the same study will be repeated

PROJECT PERFORMANCE MANAGEMENT

According to the USAID's ADS 203 Guide, the project Results Framework and Performance Monitoring Plan (PMP) should be appended to the annual work plan. The objective of the performance monitoring plan is to assess and measure how effectively the activities identified are likely to contribute to the achievement of expected results. The PMP is the basis for continuous project performance assessment, adaptive management and implementation for generalized learning on ecosystem management and the reporting of results to USAID.

To ensure closer monitoring and better evaluation of project performance, a monitoring and evaluation officer, working under the direct supervision of the project's Deputy Director, has been recruited. A monitoring and evaluation system is now in place. It is based on records and files/folders that show the results achieved and the performance indicators met. To monitor the degree of achievement of certain project indicators, such as the effectiveness of tools for capacity building of CLPAs and increased socio-economic benefits for the communities supported by the project, baselines were established from the beginning of the second year of activity.

The PMP objectives for the entire project cycle have been revised and two new indicators on biodiversity added (indicators 17 and 18). The indicator on the effectiveness of CLPAs was finalized with DPM in year two, and will be implemented as from year 3. In addition to FTF indicators, a number of project indicators (7 in total) have been developed to enable the project to measure its performance on the ground (these are indicators 3, 4, 5, 6, 7, 14 and 15). Similarly, the baseline study on the well-being of communities has been conducted (Indicator 15).

The details of the project's performance during the second year are described in the monitoring and evaluation report on year two, which was prepared for this purpose and sent separately to the Mission. Appendix A1 provides a summary of the project's performance during the year.

A2. FINANCIAL SITUATION

The USAID/COMFISH project experienced no major difficulties in financial implementation. In FY2012, the project expended $ 2,409,108.

A3. ENVIRONMENTAL MONITORING AND COMPLIANCE

Most USAID/COMFISH project initiatives are based on developing and implementing effective strategies and tools to help establish Sustainable Management Units for targeted fisheries. The majority of the activities undertaken so far required no environmental impact reviews or implementation of mitigation measures. The only activities that may have an impact on the environment are those performed to refurbish the keccax processing unit in Cayar. A specific procedure (described under Annex 2) for obtaining authorization to establish a processing unit from the Ministry of Environment and the Department of Fisheries Processing Industries (DITP) was followed by the implementation partner for this activity (APTE).

Meanwhile, the project's environmental monitoring plan was approved by the Commission in 2012. The mitigation plan and environmental monitoring report for 2012 is described below:

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.	Education, technical assistance and training activities that fundamentally affect the environment include discussions on prevention and mitigation of potential adverse environmental effects (training of relays, actors and partners in the process of implementation of UGD)	Deputy Project Manager	Education, technical assistance, training and other materials and reports	Review of implementation plans of local conventions: Implementation document (local convention) and trained personel (relays, facilitators and ICC)	Quarterly
2. Reduce post harvest losses and improve product quality	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 Increased harvests and threat to overfishing due to increased demand from improved quality Potential impacts of water supply & 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	Actions were carried out in order to increase the resilience of actors and to implement mitigation measure -Recruitment of a relay to monitor the implementation of recommendations from different trainings and the redevelopment process of the processing unit of Cayar -Capacity building of women in leadership, literacy, standardization, environmental monitoring, hygiene and quality to support the redevelopment process	Deputy Project Manager	-Construction plans, drawings and photographs of all facilities built -Training materials -Action plan from training -Code of conduct being developed for the monitoring of training on hygiene and quality	Monitoring of : -Training materials -Action plan from trainings -Monitoring the activities of women through literacy training (two sessions per week) and the relay - Code of conduct being developed for the monitoring of training on hygiene and quality	Quarterly

	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 shallow groundwater water quality adversely affecting both human and ecosystem health	-Obtaining a license from the Environment Directorate (DEEC) and approval of the department of Industrial Transformation Fisheries (DITP) -An audit of infrastructures (development of an action plan) -Microbiological analysis of the inputs used and the final product: keccax (development of a code of conduct in progress)				
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	Deputy Project Manager	None	None	Quarterly
4. Improve fishing community resilience to climate change	Alteration of nearshore sediment patterns resulting in displaced or accelerated erosion of beachfronts from inappropriate construction 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 To be determined through environmental screening processes	-Development of a vulnerability assessment guide to climate change -Capacity building of stakeholders on climate change, sustainable management of fisheries, small-scale processing, good fishing practices.	Project Manager	-Assessment report of vulnerability to climate change -Training reports -Action plans for adaptation to climate change (to follow)	-Using the guide of vulnerability assessment of actors -Implementation of three local conventions (ongoing) -Action plan for the integration of best practices (on going)	Quarterly

A4. PROCEDURE TO OBTAIN AUTHORIZATION TO ESTABLISH FROM THE MINISTRY OF ENVIRONMENT AND THE DEPARTMENT OF FISH PROCESSING INDUSTRIES (DITP)

"Improving techniques for processing and storage of Cayar fishery products"

October 2012

INTRODUCTION

The refurbishing of GIE Mantoulaye Guène's processing unit is the project's biggest activity on "Improving techniques for processing and storage of Cayar fishery products," which is funded by USAID/COMFISH. Compliance with technical and administrative procedures is a sine qua non for achieving the project's objectives (labeling, compliance and hygiene standards, authorization, etc.). This was the reason why APTE insisted on fulfilling these procedures before beginning to do the construction work together with the relevant government agencies (Department of Environment and transportation infrastructure).

Obtaining authorization from the Ministry of Environment and Sustainable Development

The "Improving techniques for processing and storage of Cayar fishery products" project has a component on refurbishing a modern artisanal fish processing unit. This requires the project to establish production facilities on the site concerned. To address the environmental concerns that USAID/COMFISH nurtures on projects that involve the building of facilities, and at the same time comply with Senegal's environmental code, APTE took the initiative to request authorization from the Ministry of Environment's Department of Environment and Classified Establishments in Dakar. This entity has the competence to classify the proposed activity and the nature of the environmental assessment, if necessary, before any installation that may cause damage to the environment is done. The APTE's request included a file with a project proposal (nature and volume of activities performed, manufacturing processes, power facilities, a site plan).

After that step, a presentation on the project was given at the Department of Environment with the APTE technical team. This was followed by a discussion on the project, its objectives, its location, and the length of time the GIE had been occupying the project site.

Following this presentation, the application was examined by the relevant authorities in Dakar, who concluded that the project did not require an environmental assessment, but needed to obtain clearance from the Ministry of Environment. It was recommended that the clearance be issued at the Regional Division of Environmental Affairs in Thies.

In light of the above, the project established contact with the Regional Division for Environmental Affairs in Thies to submit the documents required for the clearance. In a first mission in Thies, the project team met with the Director of the Division and told him about the Caya project and its objectives. The team used this occasion to collect information on the documents the project was required to provide for the document known as the Classified Establishment Document.

The complete list of documents was submitted to DREEC in Thies. This included the site plan, the location map, the management plan, the project description and the business license. After this was done, an inspection mission was organized with the Director of DREEC in Thies. This mission visited the site and verified whether it met the required standards for compliance. The mission also met with the project beneficiaries and those who were going to manage the project and monitor environmental procedures.

It was after this visit that authorization was granted finally. To obtain the clearance, the project needed to pay taxes, calculated on the basis of a lump sum of 10,000 CFA francs. The other taxes, payable only once, had to do with charges for building on a developed site, at a rate of 150 FCFA*$m^{2,}$ and on undeveloped land for 75 FFCA* m^2. These charges were settled in Thies.

Site visit by Director, DREEC-Thies. Photo Credit, APTE, 2012

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Site inspection tour by Director, DREEC-Thies. Photo Credit, APTE, 2012

Meeting with women fish processors and project beneficiaries. Photo Credit, APTE 2012

Prior authorization to process fish for export

The Department of Fish Processing Industries (DITP) in Senegal is the public authority responsible for issuing prior authorization for fish exports. It must always grant approval before the industrial fish processing facilities in any planned project are installed. On artisanal fish processing, there is no reference guide on prior authorization for fish exports. However, DITP uses the decree passed on industrial processing units or fresh fish exports to deliver export licenses. Because of this, processed fish products are hardly exported to foreign countries through normal channels. The way fish is processed in the artisanal sector can differ considerably from the processes in industrial facilities.

Furthermore, women fish processors often do not have all the information and means to follow the necessary procedures for authorization and compliance with the rules for exporting processed fish to foreign countries. Generally, project sponsors or groups of women fish processors come to DITP after

they have established their facilities. This often causes problems because DITP has to first validate development plans before construction work begins. Owing to this, Senegal now has no processing site with an export license, because prior requirements are not always met. This seems to be from a lack of information on the part of project promoters, as well as on the part of women fish processors.

This was why APTE contacted DITP from the onset of project activities. For better collaboration, the structure should be involved from inception in designing management plans, because production facilities are required to meet certain operational standards. Several meetings were held with the Director of said structure to discuss opportunities for collaborating with and supporting DITP to establish the unit. It was after these meetings full of good advice and recommendations that the request was submitted in a formal manner. The reason put forward was to validate the site plan that the fish technologist had designed using the project plan. Let us not forget that these plans are validated only after the relevant departments at the Ministry of Environment issue authorization to establish and correct the plans they get from the contractor if need be.

After the plans are approved, a team of inspectors will visit the site in Cayar to verify compliance between the work being done and the site plan. It is only after this inspection stage that the license is delivered. This license, obtained upon payment of a lump sum equivalent to the related taxes, is renewed every year.

The plans are presently under review at DITP. The project coordinator has had two working sessions on the plans with DITP officials. Construction work on the Cayar site will begin once the plans are validated.

While APTE works together with DITP in the pre-construction phase, it attempts also to bring this structure closer to the women fish processors on the Cayar site. In addition to issuing export licenses, DITP coordinates efforts for fisheries stakeholders to take part in various national and international fairs. This gives women the opportunity to know the different opportunities open to them if their processing units are up to standard. In this regard, the project organized training with DITP to share all this information with women and build their capacities on standards and on the advertising and marketing of fisheries products.

A5. URL LINKS TO MEDIA COVERAGE OF USAID/COMIFSH PROJECT ACTIVITIES

Links to media coverage of meetings on the CLPAs

http://www.lesoleil.sn/index.php?option=com_content&view=article&id=13809:cogestion-des-pecheries-lever-les-contraintes-au-fonctionnement-des-structures-locales&catid=51:economy&Itemid=63

http://www.lequotidien.sn/index.php/economie/item/9656-comites-locaux-de-gestion--pour-la-preservation-des-pecheries

http://www.aps.sn/aps.php?page=articles&id_article=93116

URL links to meetings on national authorization to commercialize fishery products, April 30, 2012

http://www.lesoleil.sn/index.php?option=com_content&view=article&id=14759:exportation-vers-lunion-europeenne-les-acteurs-de-la-peche-se-penchent-sur-les-defis-de-lagrement-national&catid=51:economy&Itemid=63

http://africnaone.com/?p=3824

http://apanews.net/news/fr/article-fas.php?id=173572

http://carrapide.com/news/lecture/article/focus-causerie-sur-l-agrement-national-lundi--20734

URL links to the meeting on MPAs and fishing, June 19, 2012

http://www.sudonline.sn/les-roles-des-aires-marines-protegees-en-debat_a_8958.html

http://www.walf-groupe.com/actualites/economie/6086-peche-gestion-des-aires-marines-protegees--des-acteurs-souhaitent-avoir-un-financement-durable.html

http://www.aps.sn/articles.php?id_article=97846

http://www.cncr.org/spip.php?article741

http://carrapide.com/news/lecture/article/societe-conservation-des-ressources-halieutiques-au-senegal-les-roles-des-aires-marines-protegees-en-debat--27557

http://carrapide.com/news/lecture/article/societe-causerie-sur-les-fonctions-et-roles-des-aires-marines-protegees-mardi--27173

URL links to media coverage of the workshop on mainstreaming climate change in fisheries management, September 2012

http://www.sudonline.sn/la-necessite-de-s-adapter_a_10499.html

http://www.walf-groupe.com/actualites/economie/7824-changement-climatique--menace-sur-la-peche-et-la-securite-alimentaire.html

http://www.journalbic.com/societe/environnement/1446-senegal-environnement-peche.html

http://www.sudonline.sn/la-necessite-de-s-adapter_a_10499.html

http://www.enqueteplus.com/content/changement-climatique-une-menace-pour-la-p%C3%AAche-et-la-s%C3%A9curit%C3%A9-alimentaire-au-s%C3%A9n%C3%A9gal

A6. LIST OF TECHNICAL REPORTS FOR FISCAL 2012

Date	Author	Title
September 2012	USAID/COMFISH	Rapport de l'atelier relatif à la relance des discussions dans un cadre de concertation sur la prise en compte de la problématique du changement climatique
September 2012	WWF	Stratégie de renforcement des capacités et du pouvoir social et économique des femmes actives dans la pêche
September 2012	Pape Jean Ndiaye (intern USAID/COMFISH)	Rapport sur le recensement des Organisations professionnelles Du secteur de la pêche dans les CLPA de : Joal-Fadiouth, Mbour, Sindia, Foundiougne, Cayar, Rufisque-Bargny, Yenne-Dialaw
September 2012	Djiga THIAO Hamet D. DIADHIOU Moustapha DEME	Evaluation de l'effort et des captures réalisés hors de la ZEE sénégalaise Rapport d'activité du deuxième trimestre : Juin- Juillet-Août
August 2012	Adama Mbaye	Situation de référence sur la perception des acteurs de l'état de leur bien-être social au niveau des sites d'intervention du programme COMFISH
July 2012	WWF	Stratégie de renforcement des capacités des CLPA dans le cadre de la mise en œuvre des unîtes de gestion durable des ressources halieutiques
July 2012	Ousmane Baldé, Saloum Cissokho	Rapport de l'atelier de formation en leadership du 4 au 6 juillet 2012 à Foundiougne
July 2012	Mamadou Diop, Véronique Faye	RAPPORT: Formation interactive sur la problématique du changement climatique avec les CLPA
July 2012	CSE	Dynamique de l'occupation des sols, cartographie des CLPA, des zones de pêche et mise en place d'un système d'information géographique
July 2012	CAREX/ISE/UCAD*	Rapport de missions de prospection sur la vulnérabilité des zones côtières en relation avec les activités de pêche (Mbour Mballing Pointe Sarène Ngaparou Saly Somone Ndayane Poponguine Guéréo Kayar Rufisque Yenn Sindou et Foundiougne)
June 2012	IUPA	Rapport mensuel d'activités de collecte de données pour les pêcheries de sardinelles, E*thmalose, thiof*, crevettes et poulpe Rapport technique mai 2012
June 2012	Amadou Mactar Niane	Rapport de mission de suivi de la crevette
May 2012	FORACTION	Stratégie de renforcement des capacités des CLPA dans la zone d'intervention du programme USAID/COMFISH
May 2012	Amadou Mactar Niane	Mission de sensibilisation préparatoire au focus group et de définition de chartes avec les acteurs
May 2012	Niane, Ndiaye, Mathews	Recensement de la Pêche Crevettière dans la Zone du Sine Saloum
May 2012	FENAGIE	Rapport technique de la mission d'information publique des acteurs du département de Mbour
May 2012	IUPA	Mise en place d'un système de collecte de données pour les pêcheries de sardinelles, ethmalose, thiof, crevettes et poulpe : échantillonnage du mois d'avril 2012

May 2012	Mamadou Faye and Ibrahima Niamadio	Rapport de Mission à l'atelier d'évaluation du niveau 3 des professionnels des AMP par WIO-COMPAS Johannesburg, 21 au 26 Mai 2012
May 2012	Vaque Ndiaye	Rapport de Voyage : *Mission à Mbour, Joal et Pointe Saréne*
April 2012	Claude Séne	Construction d'indicateurs pour le suivi-évaluation de la performance des Conseils Locaux de Pêche Artisanale au Sénégal 36 p
March 2012	Djiga THIAO, Hamet D. DIADHIOU, Moustapha DEME	Description des séries statistiques sur l'effort, les captures et l'environnement hydroclimatique au niveau des sites de Cayar, Mbour et Joal (rapport provisoire)
March 2012	Madeleine Hall-Arbor	Role of Women in Fishing Communities of Dakar, the Petite Cote and Sine Saloum
March 2012	Madeleine Hall-Arbor	Snapshots of Women's Roles in Senegal's Fishing Industry: Then and Now, Powerpoint (English) Snapshots of Women's Roles in Senegal's Fishing Industry: Then and Now, Powerpoint (French)
March 2012	Ibrahima Niamadio, Khady Sané Diouf and Aminata Mbengue	Atelier National d'Identification et d'Elaboration d'une Stratégie de Renforcement du Rôle des Femmes dans la gestion des Pêcheries Artisanales, Dakar, 20-22 Mars
February 2012	Minata DIA Aminata MBENGUE Khady Sané Diouf	Atelier préparatoire : Genre et CLPA pour la gestion durable des stocks, 23 février 2012
February 2012	Saloum Cissokho	Rapport de mission : Renforcement des capacités des relais dans l'élaboration et la mise en œuvre de la convention locale pour une gestion durable des ressources halieutiques
November 2011	Saloum Cissokho	Rapport de synthèse des Rencontres d'information et de partage sur le processus d'élaboration des conventions locales de pêche