

# Report of the multi-stakeholder meeting: Incentivising fishers to sustainably manage Mozambique's shallow- water shrimp fishery

20 November 2014, Maputo, Mozambique



Organised by:

Instituto Nacional de Investigação Pesqueira (IIP)

WWF Coastal East Africa Initiative

International Institute for Environment and Development



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## 1. Background

The shallow-water shrimp fishery is the most important fishery in Mozambique, contributing more than \$120 million in export earnings annually and employing thousands of artisanal fishers. Mismanagement of the fishery is increasingly threatening the Endangered Green (*Chelonia mydas*) and Critically Endangered Hawksbill (*Eretmochelys imbricata*) turtles through bycatch. This, coupled with continued catch declines, has prompted the government to produce the shallow water shrimp management plan, which includes regulations to limit vessel number and size; ban the use of harmful fishing gears such as mosquito nets, and the introduction of closed seasons. However, inadequate enforcement has hampered the effectiveness of these measures.

One way to change behaviour towards better ecological and livelihoods outcomes is through direct economic incentives such as Payments for Ecosystem Services (PES). This approach is in its infancy in fisheries, but evidence from terrestrial ecosystems suggest PES has the potential to improve both conservation and livelihoods outcomes if well designed.

## 2. Objectives

The main objectives of the multi-stakeholder meeting were to:

- enhance understanding of both the ecology and socioeconomics of shallow-water shrimp fishery in Mozambique
- map existing enabling and disabling environments that promote or hinder sustainable management of shallow-water shrimp fishery, and most importantly to
- explore the plausibility of introducing 'incentive-based' mechanisms to complement existing regulatory regimes.

## 3. Participants

The participants included representatives from the Ministry of Fisheries including the National Fisheries Administration (ADNAP) and the Development of Small-scale Fisheries (IDPPE), fishers' representatives, and members from civil society and the private sector. A list of participants is attached as Appendix I. Fittingly the meeting was held during the national week of the fishers, and celebrations had been taking place all week in Mozambique, culminating in World Fisheries Day.

## 4. Methodology

Presentations were delivered on specific topics by members of the multi-stakeholder group for an open discussion on the agenda items and members interacted in plenary sessions. The meeting was held in Portuguese and English with simultaneous translation provided. The agenda for the meeting is attached as Appendix II. Key elements included:

- The current status of fisheries in Mozambique, including biology and ecology of shallow water shrimp fishery; socio-economics of shallow-water shrimp fishery
- Occurrence of marine turtle bycatch and associated policy interventions to mitigate bycatch
- Mapping existing regulatory regimes to manage shallow-water shrimp fishery, and enabling and disabling conditions that promote or hinder sustainable management of the shrimp fishery
- Identifying the interconnectedness of artisanal (shallow-water) and industrial (deep water) shrimp fishery, and the potential role of the private sector in financing an economic incentive mechanism.

## 5. The current status of the shallow-water shrimp fishery

### 5.1 Biology and ecology of the shallow-water shrimp fishery

The Fisheries Research Institute (IIP) gave a presentation on the situation of the shallow-water shrimp fishery in Sofala Bank (see Appendix III). The area encompasses the coastal area from Angoche District in the north and extends south as far as the Save River. There are three types of shrimp fishery – industrial, semi-industrial and artisanal. The IPP carries out a research and monitoring programme. For the industrial shrimp fishery, both catch and input (effort) data are collected, and fishing companies are required to send in their logbook data. For the artisanal fishery the data on species is collected at district level from landing sites.

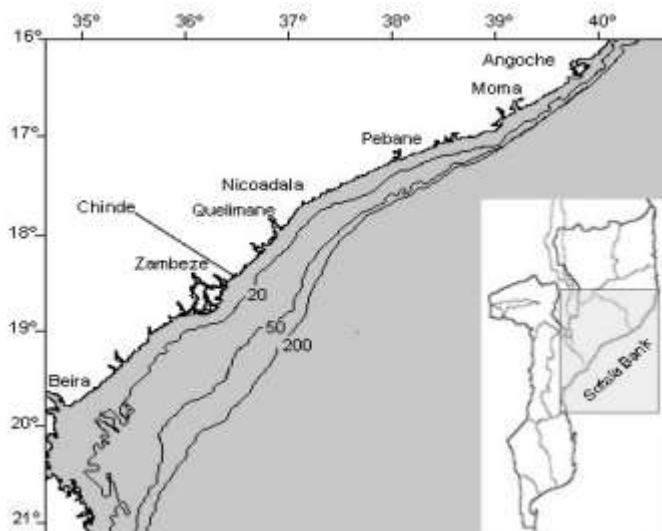


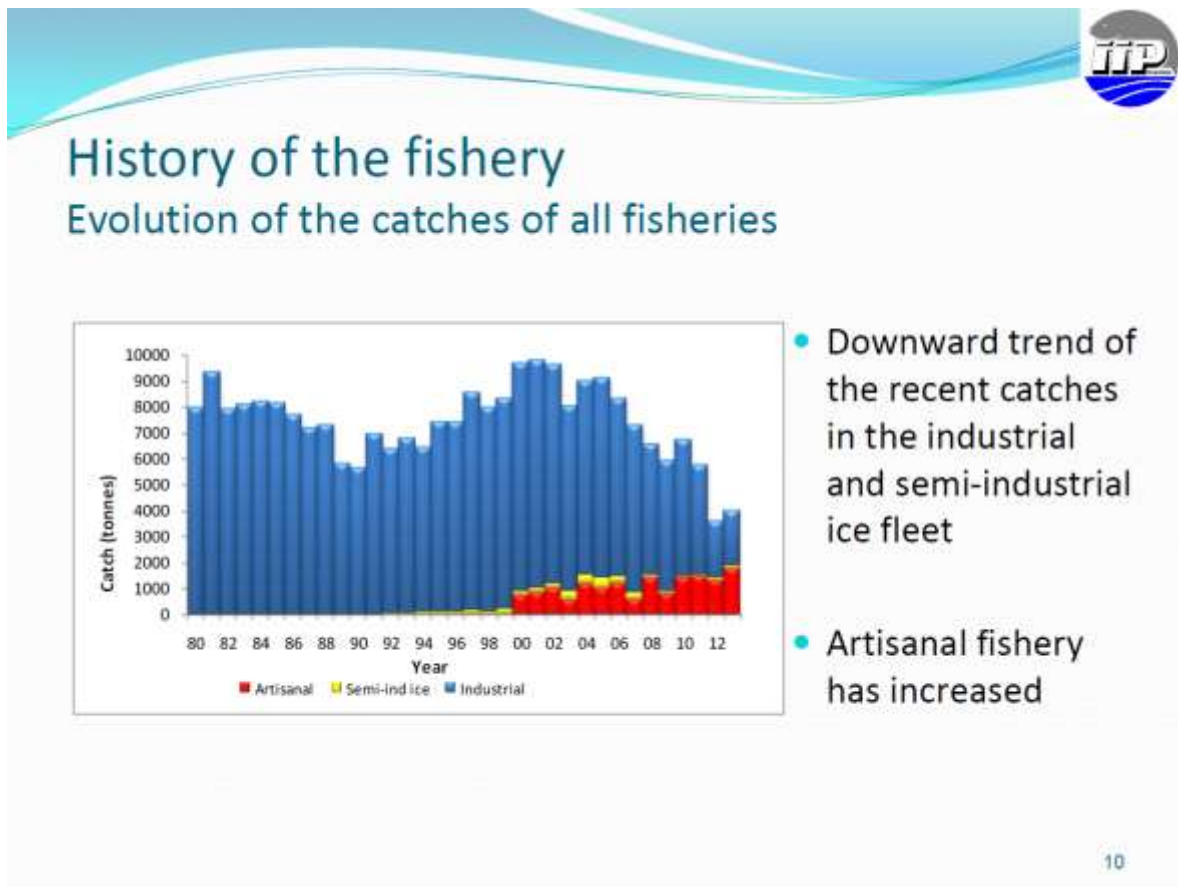
Figure 1 Sofala Bank

The type of biological data collected for the industrial fishery includes weight, length, maturity or fecundity, and gonad weight. A fisheries officer boards the vessel to inspect for incidence of bycatch. Random samples of shrimp specimens are taken to the laboratory and further analysed. The laboratory analysis includes species identification. It was noted that a new species had been identified, and that further research was needed to find out what impact this is having on native species.

The presentation provided an overview of the history and the state of exploitation of shrimp fisheries. In recent years there has been a downward trend in industrial and semi-industrial catches, whereas artisanal catches have increased (see Figure 2). The latter is mainly due to a significant increase in fishing effort – many people have switched to fishing as their main income generating activity in recent years. It was noted that the numbers of Indian White shrimp (*P. indicus*) in catches has been declining over the last few years. But there has been an increase in catches in artisanal fishing, including the Indian White shrimp, although it was not clear if it could be due to the arrival of a new species, whose identification can be confused with the Indian White shrimp.

The fishery risk assessment revealed that the situation for *P. indicus* is classified as 'high risk', i.e. it is intensively exploited. To overcome the problems of over-exploitation, the IIP made recommendations to monitor in real time the catches for August and September, and suggested a closed season (*veda*) for 1 month for the artisanal fishery in Sofala Bank. However, the enforcement of the closed season remains a challenge.

Figure 2 graph showing history of catches for industrial, semi-industrial and artisanal fisheries



## 5.2 Socio-economics of shallow-water shrimp fishery

The Institute for Development of Small-scale Fisheries (IDPPE) of the Ministry of Fisheries works to promote small-scale fisheries and to define development pathways, and also to assess shrimp exploitation and associated challenges. They have a presence in all provinces (both inland and coastal) and work with a wide network of local level 'delegations'. The number of fishers involved in small-scale fisheries is 352,252, and this includes traders, processors, fishers, and (boat) mechanics. The presentation (attached as Appendix IV) provided an overview of the work to support small-scale fisheries through training and research, the types of fishing gear used in artisanal fish production, and some of the challenges faced. Approximately 39,000 vessels and '*jangadas*' (traditional fishing boat), are used, and some are motorised boats. The main fishing techniques include the use of beach seine nets and gillnets.

More than two-thirds of fish landed by artisanal fishers is caught using beach seine nets, the most common type of fishing in the Sofala Bank area. Results from studies show that catches of shrimp per day amount to 2-3 Kgs per fishing trip but they have the potential to reach 25 kg per day.

Even though there are clear regulatory regimes that clearly define input control (e.g. mesh-size for nets) there are still problems of enforcement and compliance. According to the IDPPE, limits to the implementation include: (1) the lack of capacity to police the vast expanse of water, and (2) the fact that fishers breach the regulations chiefly to maintain their livelihoods and have limited alternatives to meet their daily dietary and income needs.

For fishers beach seine nets are cheaper and more profitable, despite the need to withdraw nets with small mesh size for shrimp fishing. Mosquito nets are increasingly being used by coastal fishers, especially in areas where there are few alternatives. It is estimated that 70 per cent of fishers who use

mosquito net for shrimp fishing are women. It was proposed that it would be helpful to identify the number of people involved in using mosquito nets and explore how fishing gear bans can be enforced. A study was done in 2010-11 to understand how and why fishers use mosquito nets but more up-to-date information is needed. For example, the study found that a community in Nampula were not using mosquito nets and this appeared to be where there was strong community leadership; through community fishing councils, locally known as the CCPs (Conselhos Comunitários de Pesca). Participants agreed that it would be useful to further explore this issue.

Another point raised was whether artisanal shrimp fishers catch shrimp for subsistence or commercial purposes. For artisanal fishers shrimp fishing does not bring much profit, and it is likely to be for subsistence. However, there are reports that small-scale artisanal shrimp fishers are joining the supply chain of the commercial shrimp fishery through 'middlemen' who buy the catch and transport it to the capital. It was noted that the links between these presentations could be made, and there was discussion on whether fishers could become involved in a different type of fishery.

### **5.3 Mapping existing regulatory regimes to manage shallow-water shrimp fishery in Sofala Bank.**

The presentation (see Appendix V) by the National Fisheries Administration (ADNAP) described the history of fisheries management. Closed fishing was implemented in 2001, and the results are showing. The management plan incorporated the ecosystem approach from 2012, and the plan was adopted in 2013 to manage shrimp by fishing effort rather than quota. The types of monitoring for boats includes reviewing logbooks, registration, inspections and export reports. The number of vessels are monitored and measures for quotas for each vessel are established each year and then approved. Freight contracts are also analysed.

Recent findings show that shrimp fishing is 'intensely exploited' despite having many measures in place. The problems involve fishing effort; the numbers of boats licensed in 2014 is above the recommended limit. There is rarely any control in artisanal fishing, for the same reasons discussed above, and issues include the use of harmful fishing gear and ecological problems such as overfishing and habitat destruction.

Suggested steps for improvement include:

- Trying to restore the biological balance in Sofala bank, with benefits for society;
- Improve the management of fisheries through legal instruments established by the Ministry of Fisheries.

#### ***Towards an integrated approach***

Participants discussed the need for a holistic and integrated approach to overcome overfishing and habitat destruction. It was suggested that there is a need to understand how the closed season should be managed for the three types of fishing – industrial, semi- industrial and artisanal, and to be aware of the specifics of artisanal fishing.

It was noted that artisanal fishing is mainly for subsistence and therefore a different approach is needed. It was recognised that, rather than criminalise artisanal fishers, there is a need to understand their resource use behaviour. During the closed season, socio-economic factors that may affect fishers need to be carefully assessed. The suggested approach to management is to take into account community habits and customs, use a participatory approach to educate fishers about the issues, develop the management plan in a bottom up and participatory approach, and potentially introduce an incentive mechanism to bring about a desirable behavioural change and align both ecological and socio-economic outcomes. Regulation measures such as closing licensing concessions in problematic areas were proposed as another option to explore.

The closed season for artisanal fishers has an impact because for some communities it is their only means of livelihood. So identifying the right alternative for fishers during the closed season is important and participants acknowledged that socio-economic and cultural factors need to be better understood.

#### 5.4 Shallow-water shrimp fishery and the potential threat to biodiversity

A study had been carried out in 2009-10 to assess the incidental catch of sea turtles in Sofala Bank. It showed that on average 1,235 turtles were caught in nets accidentally per fishing season. Different questions were asked about the numbers of dead sea turtles, where the incident took place, and what happened to the sea turtle. An issue for the interviewers was that fishers might be afraid of reprisals because turtles are a protected species in Mozambique. However interviewees were assured that they would not be reported so the study received a good response. The impacts of bycatch are not totally understood. The study was carried out based on an assessment of fishers' perceptions of marine turtle bycatch. To mitigate marine turtle bycatch turtle excluder devices (TEDs) had been introduced. However, the intervention met with limited success. This is mainly considered due to the lack of knowledge and understanding on how to use the devices.

The presentation (see Appendix VI) provided data on incidental catches and mortality of marine turtles in Sofala Bank, in 2010 and 2011, and compared data with other studies carried out in other parts of the world where turtle species are affected. The two species of turtle affected in Sofala Bank are the loggerhead turtle *Caretta caretta* (25.8%) and the green turtle *Chelonia mydas* (48.4%). An example of the incidence rate of turtle catch is for every 30 trawls, one sea turtle is hauled.

Participants discussed whether there was a distinction between industrial and artisanal fishing regarding turtle bycatch. It was noted that there is an impact from the use of both trawling and beach seine nets in Sofala Bank. It was suggested that there is a need to do more studies to (1) estimate the rate of occurrence of marine turtle bycatch in artisanal fishery, and (2) validate the estimates done based on the assessment of perceptions.

Another unanswered question is whether artisanal fishers target marine turtles. For example in some fishing communities, there is a belief that turtles have aphrodisiac properties. Other research gaps for turtles include unknown details about their migration since studies show that they migrate long distances, ranging from areas such as Reunion, and the Comoros islands.

Participants discussed other types of information that would be useful. For example, turtles have long life cycles and studies may be too close together; log books in shrimp fishery could include a column for information on turtle species. The discussion highlighted the lack of information on artisanal fishing and turtle ecology; the efficacy of TEDs, and the impact upon other species should be reviewed.

#### 5.5 Main challenges for artisanal fisheries compliance

The presentation by the National Directorate for Fisheries Surveillance (DNFP) is attached as Appendix VII. Mozambique has a long coastline, approximately 2470km in length. The work involves inspection and ensuring the compliance of artisanal fishers and the private sector. The surveillance programme has been set up to inspect and ensure compliance of fishing activities according to the regulations in place. The main challenges facing the DNFP is managing the use of illegal or destructive fishing gear; and a question is how to work with fishing communities and educate them about harmful fishing practice.

Resources are limited and include surveillance vehicles and patrol boats to assist in monitoring. Capacity-building is needed to train people to use the boats. The use of beach seine and mosquito nets are a serious concern.

Main challenges to compliance in artisanal fishery are:

- How to use the CCPs (community-based organisations) to help prevent the use of destructive fishing gear
- How to encourage the private sector to become aware of non-compliance
- How to educate the fishing communities and raise awareness.
- How to train the officials to better approach the artisanal fisheries compliance
- How to create the supplementary livelihoods to reduce the pressure on fishing.

Comments from the group included suggestion to have more coordination with different ministries, for example, the Ministry of Health regarding use of mosquito nets as fishing gear. How are the areas for surveillance defined? There has been an attempt to train CCPs locally but the programme is costly.

### 5.6 The use of economic incentives for fisheries management: prospect and challenges

A presentation (see Appendix VIII) based on knowledge gathered from Bangladesh, through a research project funded from the Darwin Initiative, was shared. The concept of the use of economic incentives for fisheries management was explained. Following the presentation it was noted that marine and coastal fisheries are under stress due to overfishing, climate change, pollution and habitat destruction. If healthy and resilient marine fisheries can be created the benefits to a country are immense. But the approach to fisheries management needs to be modified; rather than criminalising fishers, there is a need to understand their behaviour and try to rationalise their thinking.

The presentation showed how economic incentive mechanisms could complement existing regulatory schemes. This can be done by rewarding communities or households by, for example, the restoration of coastal areas, or compensate them for loss in earnings dues to no-take seasons and zones.

The main lessons that were shared from the Bangladesh experience include:

- recognition of the significance of cultural value of fishing in fishing communities, for example the hilsa fish
- the gap between preferences and the types of compensation packages provided (which often seem to diverge)
- integration of the scheme with existing programmes (such as the vulnerable food programme in Bangladesh)
- need for a scientific impact evaluation study on the effectiveness of no-take zones or other regulatory interventions
- innovative financing mechanisms could be explored, for example, the establishment of trust funds, and
- the role of the media in communicating messages to communities.

Participants also identified some key lessons that are applicable to Mozambique's shallow-water shrimp fishery. These include:

- empowering fishers to monitor and enforce compliance
- assessment of preferences
- understanding the complex socio-economic and ecological systems.
- further understanding about type of compensation
- innovative (sustainable) financing
- promoting regional cooperation.

Participants agreed that the economic incentives approach was very interesting for both small-scale and large-scale fisheries. It was worth exploring what could be applied in the Mozambique context concerning alternative income-generating schemes. Factors to consider include coordination with the legislative bodies such as the coast guard and the naval military; the negative impacts of compensation schemes that can distort local markets, and the need to work closely with the Ministry of Finance to formulate a financing mechanism for the scheme.

## 6. Enabling and disabling conditions that promote or hinder sustainable management of shrimp fishery [legal and institutional frameworks]

Within artisanal fisheries there are priority areas that need to be tackled: the use of mosquito nets and non-compliance of closed seasons. A socio-economic study of fishing communities should be undertaken to understand the artisanal shrimp fishery, and it was recognised that the Bangladesh study



dealt with one species, whereas shrimp fishers take other species when they fish for shrimp. It would be important to make fishers aware of the issues in the multi-specific fishery.

One of the key questions extensively discussed was about the difference between incentives and alternatives and what it means in the Mozambican context. The challenge is around a lack of alternatives or incentives, and poverty. A working definition of 'economic incentives' which includes cash payments, alternative livelihoods, 'in kind' contributions, such as training, and access to micro-credit etc was adopted. The Bangladesh example was able to use resources from the government supported vulnerable group feeding programme, so it is important to look at the existing enabling environment and specific legislation. It was acknowledged that any approach to adapt the management should consider the socio-economic priorities and needs of the affected communities.

Some enabling conditions include the presence of well-established and organised CCPs in every coastal village; a national database system where relevant data on catch levels has been developed, and established relationship between the Ministry of Fisheries and fishing communities through the IDPPE.

Given the length of Mozambique's coastline it was noted that the closed season was difficult to enforce but that a local management plan should be involved, and a 'bottom-up' approach to find out what would work. It was also recognised that the lack of clearly defined property or access and use rights remains an unresolved issue. The participants indicated that the introduction of an economic incentive mechanism may catalyse the process for defining and allocating the use and access rights for fisher communities, including migrant fishers.

At the national level collaboration and coordination between the sectors is crucial. It was recognised that it is very important to work closely with the Ministry of Fisheries, the Ministry of Trade and Industry and other relevant stakeholders. It was noted that continuing regional cooperation will encourage engagement and dialogue through the Southwest Indian Ocean Fisheries Commission (SIOFC), and address the challenges of the shallow-water shrimp fishery at the regional level through cooperation and knowledge sharing.

## 7. Lessons Learned and the way forward

Participants agreed that it was important to share knowledge on artisanal shallow-water shrimp fishery management, and document the experience so that it could be a reference for other parts of the world, to achieve a model of sustainable fisheries management. Participants expressed their willingness and openness to collaborate further and get a better understanding of the economic incentives concept. It was agreed to continue to work together and to maintain contact through an informal working group. Depending on resources, further collaboration on the following areas was identified: to improve understanding about fishers' livelihoods, economic incentives and the closed season; the impact of harmful fishing gear; the issue of bycatch and threat to endangered species (turtles), and how the legislative framework and compliance with regulations could enhance sustainable fisheries management.

# Appendices

## I List of participants

| <b>Name</b>           | <b>Organisation</b>        |
|-----------------------|----------------------------|
| Laura Jenks           | IIED                       |
| Essam Yassin Mohammed | IIED                       |
| Domingos Gove         | WWF Coastal East Africa    |
| Maria Joao Rodrigues  | WWF Mozambique             |
| Silvia Abdula         | IIP                        |
| Mustafa Amisse        | Gambeira (fishing company) |
| Manuel Tafe           | IIP                        |
| Lucinda Mondre        | ADNAP                      |
| Nazma Soares          | Maputo                     |
| Jorge R Faike         | IDPPE                      |
| Lazaro Come           | DNFP                       |
| Domingos Chivule      | DNFP                       |
| Paula S Afonso        | IIP                        |
| Barbara P Sousa       | IIP                        |
| Lizette P Sousa       | IIP                        |
| Claudia Tomas         | ADNAP                      |
| Alice Inacio          | Sofala                     |
| Atanasio Brito        | IIP                        |
| Isabel Chavica        | IIP                        |
| Joao Zitha            | IDPPE                      |
| Angelo Tembo          | Alvada                     |
| Cristiano dos Santos  | Interpreter                |
| Zeferino Fanequico    | Interpreter                |

## II Agenda

### MULTISTAKEHOLDER MEETING: INCENTIVISING FISHERS TO SUSTAINABLY MANAGE SHALLOW-WATER SHRIMP FISHERY IN MOZAMBIQUE

20 November 2014

Maputo, Mozambique

#### Background

The shallow-water shrimp fishery is the most important fishery in Mozambique, contributing more than \$120 million in export earnings annually and employing more than 400,000 artisanal fishers.

Mismanagement of the fishery is increasingly threatening Endangered Green (*Chelonias mydas*) and Critically Endangered Hawksbill (*Eretmochelys imbricata*) turtles through bycatch. This, coupled with continued catch declines, has prompted the government to introduce regulations including: limiting vessel number and size, banning the use of harmful fishing gears such as mosquito nets, and no-take seasons and zones. However, inadequate enforcement has hampered effectiveness.

One way to change behaviour towards better ecological and livelihoods outcomes is through direct economic incentives such as Payments for Ecosystem Services (PES). This approach is in its infancy in fisheries, but evidence from terrestrial ecosystems suggest PES has the potential to improve both conservation and livelihoods outcomes if well designed. The research will concentrate on the Sofala Bank, which is a long stretch of land running 950 km along the Indian Ocean covering the poorest provinces in the country namely: Nampula, Zambezia and Sofala.

The main objectives of this multistakeholder meeting are:

- 1- To enhance our understanding of both the ecology and socioeconomics of shallow-water shrimp fishery in Mozambique
- 2- Mapping existing enabling and disabling environments that promote or hinder sustainable management of shallow-water shrimp fishery
- 3- Explore the plausibility of introducing 'incentive-based' mechanisms to complement existing regulatory regimes

| <b>Time</b>   | <b>Activity/topic</b>   | <b>Speakers/facilitators</b> |
|---------------|---|------------------------------|
| 8:30 – 9:00   | Registration and coffee   | WWF Secretariat              |
| 9:00 – 9:30   | Opening remarks and introduction <ul style="list-style-type: none"> <li>- Paula S Afonso, Director of IIP</li> <li>- Domingos Gove, Head WWF Coastal East Africa Initiative</li> <li>- Someone from M.o.Fisheries</li> <li>- Essam Yassin Mohammed, IIED</li> </ul> | Domingos Gove                |
| 9:30 – 10:00  | The current status of fisheries in Mozambique   |                              |
| 10:00 – 10:30 | Biology and ecology of shallow-water shrimp fishery   | IIP                          |

|               |   |                            |
|---------------|---|----------------------------|
| 10:30 – 10:50 | Coffee break  |                            |
| 10:50 – 11:20 | Socioeconomics of shallow-water shrimp fishery [employment, source of food, marketing, etc.]  | IDPPE                      |
| 11:20 – 12:00 | Mapping and discussing existing regulatory regimes to manage shallow-water shrimp fishery   | ADNAP                      |
| 12:00 – 12:30 | Shallow-water shrimp fishery and potential threat to biodiversity (bycatch of sea turtles)  | IIP                        |
| 12:30 – 13:30 | Lunch   |                            |
| 13:30 – 14:00 | The use of economic incentives for fisheries management: prospect and challenges  | Essam Yassin Mohammed      |
| 14:00 – 15:00 | Breakout groups: enabling and disabling conditions that promote or hinder sustainable management of shrimp fishery [legal and institutional frameworks] | Working Groups             |
| 15:00 – 15:30 | Identifying beneficiaries and affected communities [including those who may benefit from the use of economic incentives]                                | Facilitated session        |
| 15:30 – 16:30 | Coffee/tea break  |                            |
| 16:30 – 18:00 | Feedback from participants and concluding remarks   | Domingos, Paula or Lizette |
| 18:30 – 21:00 | Dinner [to be hosted by IIED]   |                            |
|               |   |                            |



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