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SOUTH WEST INDIAN OCEAN FISHERIES COMMISSION

Report of the

SECOND WORKING PARTY ON FISHERIES DATA AND STATISTICS

Mombasa, Kenya, 28–30 April 2008

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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PREPARATION OF THIS DOCUMENT

This is the final version of the report of the second Working Party on Fisheries Data and Statistics held in collaboration with the Kenya Marine Fisheries Research Institute in Mombasa, Kenya, from 28 to 30 April 2008.

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ABSTRACT

The second Working Party on Fisheries Data and Statistics was attended by participants from Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, South Africa, the United Republic of Tanzania, Yemen, the Indian Ocean Tuna Commission (IOTC), the Regional Programme for the Sustainable Management of the Coastal Zones of the Indian Ocean (ReCoMap) and the South West Indian Ocean Fisheries Project (SWIOFP).

The Working Party received updates of the status of monitoring of the fishery catches by the member countries of the South West Indian Ocean Fisheries Commission. Some countries were upgrading their systems, others continued with existing systems that operated satisfactorily. Comoros and Somalia had no systems in place.

The Working Party discussed minimum data requirements for effective fisheries management in three artisanal fishery types: tuna, shark and small pelagic fisheries. Each country provided the existing availability of data for these requirements. As requested, the Working Party also examined the standardization and synchronization of frame surveys from a technical presentation on frame survey design as well as from information provided by the countries at the meeting. Due to the large variety of artisanal vessels in the region a more detailed analyses would be required in order to provide recommendations to the Scientific Committee. The Working Party commented on Statbase metadatabase descriptions made by countries and clarified some of the terms and definitions. In the process it was recognized that closer comparision of the datasets in respective countries was necessary. Other metadatabases discussed included WioFish and Transmap. The statistics of fishery catches in each country was examined and recommendations made for their improvement. The catch statistics held by IOTC for tuna fisheries and their bycatch, the SWIOFP data management plan and the activities supported by ReCoMap, were presented.

The Working Party made recommendations on improving the situation of fisheries data and statistics for the consideration of the Scientific Committee of the SWIOFC.

CONTENTS

Page

APPENDIXES

OPENING

1. The second Working Party on Fisheries Data and Statistics (WPFS) was held at the Nyali Beach Hotel Mombasa from 28 to 30 April 2008 and organized by the Kenya Marine Fisheries Research Institute (KMFRI).

2. The Working Party was attended by 32 participants from Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, South Africa, the United Republic of Tanzania, Yemen and the Indian Ocean Tuna Commission. The list of participants is given in Appendix B.

3. Mrs Martha Mukira, the Deputy Director of Fisheries who is responsible foe the Kenya coastal region opened the WPFS. The full statement of Mrs Mukira is attached as Appendix D to this report.

4. Mrs Mukira noted the challenges facing the regional countries with regard to the availability of resources for capturing fisheries statistics. She pointed out the need to have a common approach in solving regional issues. She also advised that even after gathering statistics, it is necessary to do a comprehensive analysis of the data to bring out the true picture of the state of the fisheries. She concluded by advising the member countries to strengthen their statistics and data systems so as to help fisheries managers in the region understand the resources under their care

5. Dr Renison Ruwa representing the Director of KMFRI, Dr Johnson Kazungu, the Secretary of the South West Indian Ocean Fisheries Commission, Mr Aubrey Harris, the recently-appointed Executive Secretary of the South West Indian Ocean Fisheries Project, Mr Kaitira Katonda, also made introductory remarks and welcomed the participants. They recalled the background to the Working Party and welcomed the collaboration between SWIOFC and SWIOFP.

ADOPTION OF THE AGENDA

6. Dr Renison Ruwa chaired the Working Party on behalf of KMFRI. A time-table for the WPFS was presented and discussed. The Working Party agreed to keep the timing flexible to allow all participants to contribute in all the proposed items of the Agenda. The Agenda of the Working Party is given in Appendix A.

STATUS OF THE COLLECTION OF FISHERIES LANDINGS (CATCH AND EFFORT) AND OF FISHERIES DATA MANAGEMENT

7. The participants updated the status of collection of fisheries landings and of fisheries data management in their respective countries.

Comoros

8. Comoros reported on its fisheries and catch providing information similar to that presented at last years WPFS. It was not possible for the Ministry of Fisheries to set up the monitoring system for the national catch that had been envisaged last year. Licensed foreign fishing vessels consist of 40 purse seiners from the European Union, and 17 longliners. The estimated catches of foreign vessels have varied between 5 000-7 000 tonnes per year over the last 5 years.

9. Discussions raised the possibility of getting rough estimates of catch through a rapid census of the fleet and examination of the catches of some landing sites and markets.

France

10. The monitoring system described in last year's Working Party on Fisheries Data and Statistics continued to acquire detailed catch information for Reunion. In the national vessel register at 31/12/2006, there were 288 vessels and 441 fishers in the Reunion fishing fleet. This consisted of a coastal component of some 250 vessels, and a longline component of 39 vessels. The coastal component caught over 900 tonnes (of which 85 tonnes were of demersal fish). The longline component of the fleet caught 2 781 tonnes which was 20 percent less than the catch in 2005. Data from Mayotte was not yet available.

Kenya

11. During the WPFS I meeting most of the District Fisheries Officers (DFOs) offices did not have computers for data processing but now all of them have computers and data is now being captured in computers at district level.

12. A database has been developed for sports fisheries with the help of Overseas Fisheries Cooperation Foundation (OFCF) and Indian Ocean Tuna Commission (IOTC). Data from 1978 up-to-date has been captured in the database. Development of the artisanal fisheries database is also in process and is expected to be complete by end of July 2008.

13. The biennial artisanal frame survey will be conducted in May 2008 and it will be possible to monitor changes in fishing effort since the other surveys done in 2004 and 2006.

14. Better facilities are expected following the elevation of the fisheries department within a Ministry of Fisheries Development. Main constrain in fisheries data collection have been the lack of training of sufficient data collectors, and funding.

15. The working party noted the developments and commended the improvements in data capture effort.

Madagascar

16. Since last year, there had been a national workshop on setting up of a harmonized system for collecting data on fisheries statistics. There was also the implementation of a schedule of transport of product to the interior of the country.

17. A register of artisanal fishing gear was being prepared for three zones: Bay Ambaro in the northwest; Bay Antongil in the northeast; and Menabe region in the southwest. Supplementary activities such as marking of the fishing gear and distribution of fisher cards by the regional fisheries service are being undertaken to complete the register in these three areas. The exercise includes

18. In the industrial and semi-industrial fishing sectors, a permanent register of fishing rights has been set up by the Directorate of Fisheries after publication in an official Gazette. These will later be provided to the National Program for Shrimp Research Activity (PNRC), the "Centre de surveillance des pêches" (CSP) and the Economic Unit for information and follow up. There is also an annual register of fisheries activity which records the following information:

- Owner
- Alternative contact
- Prawn fishery licence no and type
- Fishing gear allowed for the vessel
- Fishing gear not used in cases where appropriate
- Length of headrope

Operators with fishing rights in the industrial and semi-industrial fishery are required to submit completed official logbooks of daily catch and fishing effort. Trawlers and their support/transshipment vessels are required to have functional satellite transponders so that their positions can be monitored.

Mauritius

19. Data collection continued without major modification since the last working party. Artisanal fishery data were collected monthly at 25 selected fish landing stations so as to provide catch and effort by species and gear within and off lagoon, monthly and for the entire year.

20. In the banks and semi-industrial chilled fish fishery the catch was monitored through the logbooks received on the arrival of fishing vessels from the different fishing grounds and by sampling of fish at the unloading sites. This provides fisher days, bad weather days, fishing days, catch and catch per fisher day. The average catch per fisher day on the two major banks of Saya de Malha and Nazareth was compared with the longer-term trend. In the chilled fish fishery the catch by species and fishing area was calculated in addition to catch, effort and catch per fisher day.

21. The swordfish fishery consisted of five fishing vessels that made 116 trips and landed 247 tonnes of fish.

22. Tuna fisheries were monitored by collecting, processing and analysing fishing and biological data obtained from local and foreign licensed vessels.

23. The meeting noted the progress made and encouraged the country to implement information systems that may help in analysing and storing these sets of information regionally within the SWIOFP.

Mozambique

24. The data collection systems and fisheries data management remained same for all the fisheries as reported in the first working party. However, technical arrangements were made in the artisanal fisheries data collection system based in ecological characteristics of the fishing areas so as to extrapolate the catch estimates to areas no currently covered. The monitoring of bycatch from the industrial fleet which is collected by artisanal fishers has been started.

25. Efforts were made to describe the meta data for artisanal fisheries as recommended from the first working Party.

26. Other pertinent activities conducted in 2007 include:

- a second artisanal fisheries frame survey for coastal and inland waters by the Instituto Nacional de Desenvolvimento de Pesca de Pequena Escala (IDPPE);
- a frame survey on recreational fisheries in southern Mozambique by the Instituto Nacional de Investigação Pesqueira (National Institute of Fishing Investigation [IIP]);
- a research cruise of the entire Mozambican coast with the DR. FRIDTJOF NANSEN research vessel.

27. Mozambican summary statistics for total catch reporting from 2005 to 2008 (Appendix H).

28. The participants noted that there was still need for a Mozambican fisheries statistics Bulletin which bring together all the relevant statistics data of the country.

29. The WPFS noted good catch information is available for particular areas and encouraged further improvement on other areas that may help in consolidating the various data sets, within a statistics bulletin.

Seychelles

30. The Seychelles national systems for monitoring fisheries comprised of three main monitoring systems. The catch assessment survey (CAS) which is a catch, effort and species composition sampling system that is stratified geographically and by boat/gear type is used for the major artisanal fisheries. A wide range of trap, line, net, and foot fisheries are monitored using four boat survey types within the CAS and Foxpro based databases are used for processing these data. The lobster and sea cucumber monitoring programmes are logbook systems and the data processing is done in MS Access. Problems with the sampling strategy have been identified, and the data management approaches and software require revision and modernization to provide better utilization of data for management.

31. In October 2007, the Seychelles Fishing Authority (SFA) sought assistance from French Institute of Research for the Exploitation of the Sea (IFREMER) to assess the current state of artisanal fisheries monitoring. This mission identified three processes for improvements to the system. Firstly, a new fisheries monitoring system should be based on an inclusive vessel registration system, whereby all boats landing fish are identified and monitored. Secondly, the sampling methodology should be redesigned and be integrated, as much as possible, across existing fisheries and vessel-gear combinations, and be flexible in order to allow new fisheries or gear combinations to be effectively assimilated. Thirdly, data management and analysis for artisanal fisheries monitoring data should be integrated with the Fisheries Information and Statistical System (FINSS). A number of support mechanisms have been identified to support these processes. The first process will largely be undertaken as an in-house exercise with technical advice from IFREMER. For the second part of the process, redesigning and integrating the sampling methodology, SFA will be assisted by ReCoMap. As for the last stage of the process, which involves writing the modules for data management and analysis in FINSS, SFA will secure the services of a programmer.

32. SFA is also planning to undertake a total boat frame survey by August/September 2008 The last one was carried out in 2004. Approximately 98 percent of all local fishing vessels in Seychelles were registered at SFA in 2007.

33. In the discussion that followed, the member countries noted the progress that is being made in improving the sampling systems as well developing of computer based data analysis systems.

South Africa

34. Since the previous working party there have been no changes to the system of routinely collected data. The South African system is well established and was described in detail in the national report presented at the first working party. Data is stored in Oracle and Sybase databases that are located in Cape Town. The data are in ASCII format but can be extracted in Excel, text or MS Access format. These databases are the responsibility of Marine and Coastal Management under the Department of Environmental Affairs and Tourism.

35. As expressed during the first working party, Marine and Coastal Management collects the data specified as the minimum requirement for management of the fisheries that will be included in the SWIOFP.

36. Frame surveys are not undertaken in South Africa as each fishery is managed on an individual basis. There would be no objection to extending the Mozambique frame survey into KwaZulu-Natal, South Africa but this will not form part of the routine data collection performed by Marine and Coastal Management.

37. All vessels are required by law to register with the South African Maritime Safety Authority and fishing permits are issued only to applicants that provide proof of vessel registration.

38. In the discussion that followed, member countries took note of the data management systems earlier described in the first working party.

United Republic of Tanzania

39. Since April 2007, several changes have taken place with regard to fisheries statistics. First, all issues related to fisheries have been moved from the former Ministry of Natural Resources and Tourism to the new Ministry of Livestock Development and Fisheries. A frame survey was carried out in October 2007 and for the very first time jointly with Zanzibar. Arrangements have also started to improve the fisheries statistics through training of data enumerators and their supervisors in collaboration with FAO and UNU – Fisheries Training Program, expected to commence after August 2008. It is also very likely that, the shrimp trawl fishery (industrial) will be closed for the 2008 season. However, the artisanal shrimp fishery will not be affected. This is due to the fact that, the shrimp resources have drastically declined during recent years and this has been confirmed through dwindling of catches and through research findings. The CAS database has remained the same since 2007, but improvements are being made to simplify data analysis and make it user friendly.

40. In the discussion that followed, the member countries took note of the improvements being undertaken to strengthen the collection of various statistics, and urged the member country to continue with the effort.

Yemen

41. Since the previous working party there have been improvements in the establishment of different research and information authorities such as Fisheries Information Centre based in Sana'a MFW headquarter and Marine Research Authority in Aden among others.

42. In the discussion that followed, more information was sought especially with regard to the fisheries of the island of Socotra.

DATA GAPS ANALYSES (IDENTIFICATION OF PARAMETERS)

Artisanal tuna fisheries

43. Artisanal tuna fisheries, with hook and line, trolling or gillnetting are seasonally important in the Comoros, Reunion, Mauritius, Seychelles and to some extend in Somalia and Yemen they are of less importance in Kenya, Tanzania and Mozambique where the catch of tuna is less then 5 percent of total marine catch and where tuna are taken as the bycatch of other multispecies fisheries (beach seines).

44. For data requirements, similar procedures as the first working party (2007) were used and adapted artisanal tuna fisheries. The requirements and the status of data for artisanal tuna fisheries for each of the countries are presented in Appendix E.

45. The following observations were made:

- of the countries where artisanal tuna fisheries are relatively important (Reunion/France, Comoros, Somalia, Mauritius and Yemen) it seems that only Reunion and Yemen can provide reliable information on the total catch of tuna caught by artisanal fisheries. In Mauritius basic data on fishing effort is not available and in the Comoros and Somalia no monitoring is presently carried out.

- of the countries where the contribution of artisanal tuna fisheries to the total catch is relatively low, the reliability of data on artisanal tuna catch is linked to the overall functioning of artisanal fisheries monitoring and it seems that only Kenya can provide reasonable information.

Artisanal shark fisheries

46. In most countries shark fishing is a bycatch of artisanal tuna fisheries (Reunion, Comoros, Mauritius) or multispecies fisheries (Kenya, Tanzania, Mozambique) and catches are relatively low (1-3 percent). Only in Somalia and Yemen are there specific shark fisheries. The requirements and the status of data for artisanal shark fisheries for each of the countries are presented in appendix E.

47. From the information provided it can be concluded that none of the SWIOFC countries can provide reliable estimates of the total catch of the artisanal shark fisheries and basic structural as well as catch and effort data are lacking.

Artisanal small pelagic fisheries

48. Artisanal small pelagic fisheries are important over the entire region[1] with catches accounting for 10-30 percent of the total marine catch. Major gears used are surrounding nets, beach seines, gillnets and hook and line. The requirements and the status of data for small pelagic fisheries for each of the countries are presented in Appendix E.

[1] Except Mauritius

49. Overall the situation of monitoring artisanal small pelagic fisheries seems better were compared to tuna and shark fisheries. Except for Madagascar, Somalia and the Comoros there seems to be reasonable information available on the structural data and catch, the major gap seems to be reliable data on daily fishing effort

METADATA REPORTING

50. Firstly the working party identified and commented on the descriptions made by countries, that had either filled the metadata forms (South Africa [2 datasets], Seychelles [6 datasets], Mozambique [1 dataset], Tanzania [4 datasets], Kenya [8 datasets]) or data descriptions (Mauritius [10 datasets]). Secondly the working party clarified some of the different terms, definition and understanding

51. The countries then updated their different files which were presented and discussed (see summary in Appendix F).

52. Most of the datasets entered were considered as consistent, but some of the elements were still not well understood and were often not filled, such as the nomenclature and the bibliography.

53. It was agreed that closer examination and comparison of these dataset in respective countries is still necessary to be more precise on some points and obtain a better separation of data into more homogenous units. It was also agreed that participation in the FAO-FIRMS working group will be beneficial and that the regional coordinator attend the training programs whenever possible.

Other metadatabases

54. The metadatabase presented was that compiled for the TRANSMAP project that looked at the establishment of a network of transboundary marine protected areas for southern Tanzania and northern Mozambique and southern Mozambique and northern KwaZulu-Natal, South Africa. The metadatabase is available online at www.transmap-metadatabase.org.za. It was funded by the European Union and is available in the public domain. This metadatabase incorporates the 15 standard elements of the Dublin Core Metadata Initiative that have been formally endorsed in the following standards:

- ISO Standard 15836-2003 of February 2003
- NISO Standard Z39.85-2007 of May 2007
- IETF RFC 5013 of August 2007

The metadatabase was expanded to incorporate other required fields for the project. The governance and biophysical entries were briefly explored online.

55. Following this brief overview of the TRANSMAP metadatabase, a presentation was given on the background and development of the WIOFish database. Five countries collaborated in the development of WIOFish. These were Kenya, Mozambique, Seychelles, South Africa and Tanzania. The presentation also included the development of a template for data collection and the process of identification of fisheries. The results found after the first round of data collection were presented. The conversion of the database from MS Access to an online database was described. A new funding agency also came onboard and allowed updates of the database to take place this year. The changes in the fisheries will be investigated and an annual report will be produced within the next couple of months and

made available on the website. A brief overview was provided in how the scoring system can be used to show changes in the status and management of a fishery.

56. A complete data entry on WIOFish was presented to the working group to provide participants with an idea of the comprehensive nature of the data collected and required for WIOFish.

57. During the discussions that followed, member countries expressed support for the initiative noting that already a number of countries are taking part in this project. The project coordinator welcomed members who wish to participate in WioFish to get in touch with the project secretariat.

FRAME SURVEY

Sample based monitoring

58. Mr G.J. de Graaf (FAO, Rome) presented background information on the essential need of structural data for sample based surveys in artisanal fisheries. There are two strategies in fisheries monitoring: full enumeration (full coverage, high precision, expensive) and sample based monitoring (samples, less accurate, cheap). Considering the large number of vessels involved in artisanal fisheries, sample based monitoring is often the best option to monitor artisanal fisheries. However monitoring of artisanal fisheries is always a combination of sample-based monitoring and full enumeration (Figure 1).

- *Catch*, *fishing days* and *no of active vessels* are obtained through stratified sampling at the landing sites.
- The *total number* of artisanal vessels is obtained through vessel registration and/or frame surveys.

All four parameters are essential to estimate the total catch of the artisanal sector, if one of the parameter is unreliable as a consequence the whole system becomes unreliable and total catch cannot be estimated.

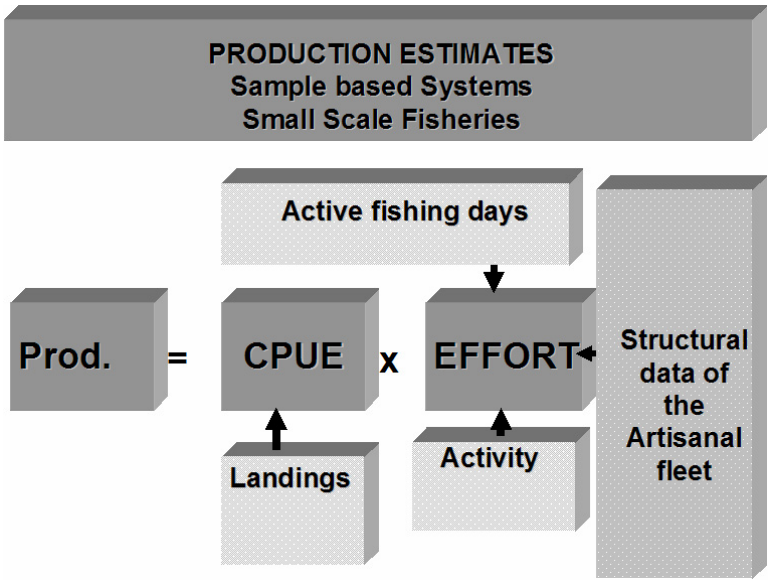

Figure 1

59. Experiences of the FAO FishCode STF project, which provides support to the improvement of fisheries monitoring in developing countries, indicated that a major constraint in artisanal fisheries monitoring is the lack of structural data of the artisanal fleet.

Obtaining structural data of the artisanal fleet

60. Structural data is essential for:

- designing the sampling scheme and stratification
- estimation of total catch

Structural information is usually obtained from fishing vessel registration and fishing licences/permissions. However, registration can be problematic as: i) vessel registration becomes easily out-dated; ii) owners are not always the operators; iii) operational patterns can be complicated (one vessel uses different fishing gears for different season); iv) a legal frame work is required and vi) there should be compliance/implementation/control.

A separate frame survey that enumerates each fishing vessel is an alternative to produce reliable information on fleet structure and used in a number of countries in East Africa.

Frame surveys as well as registers/Licensing systems should encompass the following information:

- Identifiers
  - Vessel name
  - Vessel registration number
  - Fishing license or permit number
  - Captain's name
  - Home port

- Characteristics of vessel
  - Type of vessel
  - Length overall (LOA
  - Engine fitting (inboard/outboard)
  - Power
  - Storage capacity

- Ownership
  - Type of ownership (individual/company/shared)
  - Name/address of the owner/co-owner
  - Duration of the ownership
  - Operator (when the vessel is managed and operated by others)

- Fishing operation
  - Type of fishing gear
  - Size (specification) of the gear
  - No of fishing gear units
  - Area of operation
  - Port of operation/landing
  - Average number of fishing trip/year

As frame surveys are expensive and have to be implemented at regular interval it is could be discussed how far the above information can be collected through cheaper

registration/licensing systems and what are the major constraints for artisanal vessel registration and licensing systems in the SWIOFC member countries.

Harmonization of frame surveys

Frame surveys

61. The SC requested to WFPS to look at synchronization and standardization of frame surveys and to provide an indication of how many vessels are registered in each country and how the registration is maintained. These issues were discussed in working group no 2 of the meeting which consisted of a participant of each country[2] and IOTC.

After an initial general discussion the working group decided to make a preliminary inventory of frame surveys and registration/license systems in each country. For this a small questionnaire was prepared which was subsequently filled by the participants of the countries.

The results of the questionnaire are presented in Table 1.

Table 1: Inventory of frame surveys and register/licensing systems on artisanal fisheries in SWIOFC countries.

	COM	KEN	MAD	MAU	MOZ	REU	SEY	SOM	TAN	YEM
FRAME SURVEY										
No of marine fisheries frame surveys carried out last 10 years	0	2	0	0	2	2	1	0	4	3
Last full marine frame survey carried out		2006	1989	1976	2007	2006	2004		2007	2004
Vessel Identifiers		no				yes	yes		yes	yes
Ownership		no		yes	yes	yes	yes		yes	
Vessel characteristics		yes		yes	yes	yes	yes		yes	yes
Fishing operations		yes		yes	yes	yes	yes		no	yes
Socio economic data		no			yes	no	no		no	no
Economic data		no			yes	no	no		no	yes
Other data		no			fishing centres,gears, fish processing		no		Landing facilities	
No of inland fisheries frame surveys carried out last 10 years	N/A	5	0	N/A	2	N/A	N/A	0	5	N/A
Last full inland frame survey		2008	1989		2007				2008-LV only	
ARTISANAL REGISTER										
Legal frame work for artisanal vessel register exist	no	yes	yes	yes	yes	yes	yes	no	yes	yes
Artisanal vessels obliged to register		yes	yes	yes	yes	yes	no		yes	yes
If yes, since when		1991	2007	1970's					1970	2000
Length of vessels to be registered		All			All	yes	All		All	

[2] As there is almost no artisanal fisheries in South Africa, SA was not included in the analyses

	COM	KEN	MAD	MAU	MOZ	REU	SEY	SOM	TAN	YEM
Artisanal vessel register reliable		no		yes	yes	yes	yes		no	yes
ARTISANAL LICENCE										
Legal frame work for artisanal vessel licensing exist	no	yes			yes	yes	yes	no	yes	yes
Artisanal fisheries obliged to license		yes	no		yes	yes	no		yes	yes
If yes, since when		1991							1970	2006
License register liable		no	yes		yes	yes	yes		no	yes
OTHERS										
Marine fisher data available in Population/Household/ Agriculture census	no	no		no			yes		Landing sites	Central Statistical Org
Inland fisher data available in Population/Household/ Agriculture census		no		N/A		N/A	N/A		Landing sites	N/A

62. The results indicate that frame surveys are carried out every 3-4 year, but have not been carried out over the last -20 years in Mauritius, Madagascar, Somalia and the Comoros. Mauritius however has replaced the need for frame surveys with a reliable artisanal vessel register. Vessel characteristics are obtained in all frame surveys but not all countries collect information on fishing operations, vessel identifiers and ownership.

63. In almost all countries the artisanal fleet is obliged to register and obtain a fishing licence. But the actual implementation of the legal frame work is mixed and only 40-50 percent .of the countries have reliable vessel and license registers.

Description artisanal fleet

64. An inventory of the types of artisanal vessels operated in the countries was made in working group No. 2 and the results are presented in Appendix G.

65. The preliminary results indicated a large variety of artisanal vessels ranging from 3 to 23 metres. The working group considered the exercise very useful and essential for harmonization of data collection and exchange of data. But more detailed description/ analyses will be needed in order to provide recommendations on harmonization of frame surveys.

FISHERY CATCH STATISTICS IN SWIOFC

66. The small working group set up during this working party to examine fishery catch statistics in SWIOFC mostly concentrated on the quality and consistency of the data officially submitted to FAO and on some discrepancies that had been noted with the information made available at the latest SWIOFC Scientific Committee (SC) as presented in Appendix I.

67. The absence of a data collection system for **Comoros** was remarked by the national participant. However, it was suggested that until a basic system to collect data is in place, general information from operating fishing vessels, markets, domestic consumption and other indicators could be considered to validate current guess estimates. It was noted that the FAO

database includes a data series for shrimp catches “Natantian decapods nei” which instead very probably is referring to lobster catches as there is no shrimp fishing in Comoros.

68. No major inconsistency throughout the data series were noted for catch statistics reported by **Kenya**. However, it was noted a discrepancy between the data for cephalopods (octopus plus squids) in FISHSTAT+ and those presented to the SC. The national participant verified the data and informed that the data reported to the SC was wrong.

69. Catch statistics reported by **Madagascar** are grouped by principal species groups (i.e. fishes, crabs, shrimps, lobsters, cephalopods) which makes it impossible to extract trend information about single species or higher taxonomic level. Although it would be highly desirable that catches be reported at a better breakdown, it does not seem probable that will occur in the next years unless the data collection system is substantially improved. The decrease of shrimp catches in recent years was confirmed. The national participants informed the meeting that there were plans for a frame survey in two regions and for a national census of artisanal fisheries.

70. Besides an overall decrease of total catches, data reported to FAO by **Mauritius** for 2006 included data for less species than the previous years and the quantity reported as “Marine fishes nei” increased significantly. The datum for “Lutjanidae-Snappers” reported to the SC was much more on line with the quantities reported in previous years and it was decided to use this datum to revise the 2006 catches for Lutjanidae presently in the FAO database.

71. The discrepancies between the 2006 total catch statistics for **Mozambique** reported to FAO and those provided by the Ministry of Fisheries to the Fishing Industry Handbook (published by I&J) were pointed out as total catches in the FAO database are about half of those available from the other source. The national participant informed the meeting that the correct data are those included in the “Relatório do Balanço PES” published by the “Direcção Nacional de Economia Pesqueira” of the Minister of Fisheries. It was recommended that the national participants report back to the relevant institutions the problems encountered with the data previously submitted to FAO and that they provide the correct data also for previous years to avoid as much as possible disruption in the series. The Ministry of Fisheries should also examine if the paper “National conflict and fisheries: reconstructing marine fisheries catches for Mozambique, 1950–2004” by Jacquet and Zeller (UBC Working Paper Series, 2007-02) may provide complementary information to the revision of historical catch series.

72. No major problems were underlined for the catch statistics submitted by **Reunion**. Catch statistics for Mayotte and the French Southern Territories, which are recorded separately in the FAO database, were also shown (Appendix I).

73. The data reported by the **Seychelles** looked reliable and with a good species breakdown. Particularly, it was noted that the latest data submitted included also statistics for five sea cucumber species covering the 2001-2006 period.

74. Official data for **Somalia** are not available since 1985. The national participant informed the meeting that no provision of fishery data may be expected for the next years. Excluding a few scattered data extracted from project reports and country profiles, all other data included in the FAO database since 1985 are estimates. Total catches for recent years

were derived from the table on fishery data included in the Statistical Yearbook of the Arab Organization for Agricultural Development (AOAD).

75. Total catches by **South Africa** in area 51 (Western Indian Ocean) are very limited (around 1000 tonnes per year in the latest three years) as most of the South African waters fall under area 47-Southeast Atlantic and all of its major fisheries are operating in this latter area.

76. For **Tanzania**, particular attention was given to reported catch statistics for shrimp and tuna. For both groups of species, the 2006 data did not look very reliable. The shrimp datum (1 800 tonnes) in the FAO database was repeated and it was clarified that the quantity (312 tonnes) reported to the SC was referring only to trawl catches. For tunas, it was found out that statistics submitted so far to FAO included also industrial catches by foreign fleets (e.g. Japan). As catch data should be reported by flag State and not by exclusive economic zone, it was agreed with the national participant that the submission of 2007 Tanzanian catch statistics to FAO will include also a revision of the tuna data series excluding catches by foreign fleets. It was also noted that a study by UBC on reconstructing historical marine catches is also available for Tanzania. It was suggested that the same approach followed for the similar paper on Mozambique will be followed.

77. **Yemen** had not submitted any 2006 data to FAO and for 2004-05 only the total catches had been provided. Catches by species items had been estimated by FAO according to percentages on total catches of previous years. However, data for missing years were included into the national report presented at the meeting and made available to the FAO Statistician during this working party in a version translated into English. As data on yearly catches is regularly collated by the Ministry of Fish Wealth, it is recommended that these data are regularly submitted to FAO. IOTC noted that the system currently used in Yemen to estimate tuna catches might need to be revised.

IOTC

78. The IOTC Data Coordinator presented the status of the statistics held by the IOTC Secretariat concerning IOTC species and other species bycatch of tuna fisheries. IOTC compiles various types of information including data on total catches, catch and effort and size frequency data. Overall, 80 percent of the catches of IOTC species are reported by the flag states, the remaining 20 percent coming from other sources, including estimates from the Secretariat based on information collected in the countries from which statistics are not available.

79. It was noted that while the catches available from industrial fisheries are fairly complete, those from artisanal fisheries are considered incomplete, the latter accounting for the majority of the catches by SWIO countries. The following problems were identified concerning the artisanal fisheries in the SWIO region:

- Data collection is either insufficient or not done at all.
- Statistics are highly aggregated by gear or species.
- Statistics are aggregated for domestic vessels and foreign vessels operating within the EEZ's of SWIO countries.
- There is a paucity of data on the lengths of IOTC species from artisanal and industrial fisheries in the SWIO.

- Data are collected by various institutions but not put together.
- There is insufficient/incorrect data processing due to a lack of appropriate hardware/software.
- Data is sometimes available but not reported to the IOTC.

80. The IOTC presented the activities of the IOTC-OFCF Project, whose main objective is to build capacity in countries of the IOTC region in the area of fisheries statistics. It was noted that some countries in the SWIO area have benefited from such activities, including Kenya, Mozambique, Tanzania and Yemen.

81. The IOTC indicated that it will continue assisting countries in the region in the area of data collection and processing, including cooperation with the SWIOFC/P in the area of artisanal fisheries for IOTC species.

SWIOFP DATA MANAGEMENT PLAN

82. The Working party was informed that the objective of the SWIOFP information and data management component is to develop an overall plan that ensures efficient data capture, processing and dissemination

83. In broad terms the information and data needs for SWIOFP include identification of fish stocks, basic information, biology, behaviour, fishery, bio-economics, and environment links.

84. Data collection will be characterized by a review of all existing data, including historic and present records, not only from SWIOFP members but also from distant fishing nations that have had access to the region's resources; and the collection of new information through extensive field sampling based on the *Science Plan.*

85. Data gap analysis will be undertaken prior to the field sampling program. This will be based on extensive collation of data from diverse sources as which includes but is not limited to peer reviewed literature and other publications, past surveys, data held by international programs and other agencies including research institutions in and outside SWIOFP region. All this data would be processed to produce a data atlas for the gap analysis.

86. The overall action plan for data management is the review of data requirements to be carried out in conjunction with the respective SWIOFP components. Procedures and protocols for data capture and reporting would be developed building wherever possible on existing established procedures of protocols. These will cover basic statistics and graphics, data and information exchange, web based communication platforms; and evaluation of data management capacity in respective countries.

87. An appropriate data management system for fisheries statistics, biophysical information, and data manipulation should be available when SWIOFP is initiated. This will include a module to transform raw catch-related data from the various cruises into format readily usable by scientists and managers. In regard to this the STATBASE software has been made available by France.

88. Data handling is likely to include the following:-

- Data collected by scientists on each cruise would be entered on laptops as soon as possible after the collection;
- Upon arrival in port, the scientists would “dump” their raw data into a regional database;
- Associated analytical fisheries programs will render raw data into usable form (catch curves, catch/unit effort, fecundity, environmental parameters etc)
- The raw data and its statistical interpretation would be made available on a Regional Project Website (password protected until the data is verified and cleared for general release) so that it is available to all project participants.
- Data will be reviewed periodically to see if sampling schedules need to be altered.
- It is expected that the necessary quality control procedures for data collection will be adopted through appropriate sampling plans, manuals, methods and protocols, standards and reference materials, intercalibration, etc.

The following are the anticipated datasets:

Stock separation
- Tagging data
- Genetics data
- Migratory patterns

Catch assessment data
- Biomass estimate by species
- Yield data
- Stock density

Baseline monitoring
- Use of several good indicators/bycatch like birds, dugongs or whales
- Stock density
- Number of licence applications
- Fish sizes
- CPUE by species

Fish biology and behaviour
- Maximum size
- Sex ratio
- Size of maturity
- Size frequency

Recruitment
- Egg and larval surveys
- Mortality rates
- Population structure
- Annual estimates of recruitment

Sports fishery and artisanal fishers
- Species lists
- Numbers caught
- Weights caught
- Tagging data
- Licence monitoring

OTHER MATTERS

89. The representative from the Regional Programme for Sustainable Management of the Coastal Zones of the Indian Ocean Countries (ReCoMaP) informed the Working Party that this is a five-year programme of the Indian Ocean Commission (IOC) financed by the European Union (EU) to enhance sustainable management of coastal and marine natural resources The beneficiary countries are Comoros, Kenya, Madagascar, Mauritius, Seychelles, Tanzania and Somalia.

90. A number of activities are being supported by ReCoMap:

Improving coastal fisheries statistics in Madagascar:

- a desk study of fisheries monitoring systems in Madagascar;
- interviews with key informants (government, development partners, NGOs, and the private sector);
- a fisheries information flow analysis;
- a SWOT analysis and recommendations for improved fisheries information systems; and,
- a presentation to key stakeholders.

Support to the Seychelles Fishing Authority (SFA) on:

- An improved, integrated and adaptable sampling design and methodologies for artisanal fisheries monitoring;
- Data management, processing and analysis routines for accurate and precise estimation of fisheries data;
- A comprehensive species identification guide for use by fishers completing logbooks and sampling teams conducting catch surveys; and,
- Production of an operational manual on the logistical aspects of the revised monitoring system.

Strengthening artisanal fisheries statistics in Tanzania by:

- improving the system of artisanal fisheries data collection and processing in order to have reliable, accurate and up to-date fisheries statistics;
- providing artisanal fish catches (production data) in all coastal districts and disseminate to various stakeholders;
- providing data for use in the estimation of fisheries stocks available in the territorial waters for improved management.

RECOMMENDATIONS OF THE WORKING PARTY

91. The working party recommended the following:

- The WP noted that some countries (e.g. Comoros and Somalia) have no data collection system in place or that data are collected only by principal species groups (e.g. Madagascar). These countries are recommended to establish or improve their national data collection system seeking the assistance of relevant regional projects or international agencies. In the meantime, it was suggested that these countries use general information from operating fishing vessels, markets, domestic consumption and other indicators to validate current estimates.

- The WP recognized that the historical catch data series for some countries (e.g. Mozambique and Tanzania) would need revision due to some periods in the past when there was no monitoring, submission of incomplete national data or to the inclusion of catches by foreign fleets. The WP recommended that national official statistics are revised and provided to FAO. The countries involved may seek assistance of FAO-FIES if or as required.

- The WP reminded the national reporting Offices that the flag of the vessel performing the essential part of the fishing operation should be considered the paramount indication of the nationality assigned to the catches. The flag State is responsible for the provision of the relevant data.

- Several countries reported that annual bulletin of fishery statistics have been compiled. It was recommended that, once published, an electronic version of the bulletin is made available to both the SWIOFC Secretariat and FAO-Fisheries and Aquaculture.Information and Statistics Service. The SWIOFC Secretariat was invited to consider establishing a repository of these annual bulletins, possibly accessible through the FAO Fisheries Department web site.

- The WP recommended that the SWIOFP regional working group on data adopt metadata standards in harmony with standards developed by FAO-Fisheries Aquaculture Management and Conservation Service, and international fisheries organizations such as IOTC; and encourage participation in their working groups;

- The WP recommends that member countries continue to describe their data holdings in the format used during the workshop (Statbase meta data format); and that they submit their respective metadata sets to the regional coordinator not later than the 1st planning meeting for component 1 of SWIOFP (June 2008); IRD will continue to offer technical expertise to ensure that the description of data conforms to the homogeneity of a dataset, to avoid excessive generalization;

- The WP recommends that member countries contribute relevant information to the WioFish database; to be done through respective national focal points. Countries who wish to join the WioFish network are welcome to do so by consulting the WioFish coordination secretariat in RSA;

- The WP recognizing that the activities of the first and second WPFS highly contributed to the goals of SWIOFP component 1, recommend that as much as possible, all the SWIOFC countries take part in the SWIOFP regional working group on data, that country participants remain the same for continuity, and that FAO, IOTC and other relevant organizations be encouraged to attend.

- The WP recommends each country to prepare an extensive description of different types of fishing crafts and gears, and request the Secretariat to prepare terms of Reference for the country descriptions. The country documents could be the basis for discussion on harmonization of frame surveys in the next meeting of the WP.

- The WP recommends member states improve data collection in artisanal fisheries at national level, special point of attention would be improvement of data collection on fishing effort (including complete structural data of the artisanal fleet) Actions to

improve the data collection systems for artisanal fisheries could include: capacity building and the development and implementation of cost effective and sustainable systems covering the specifics characteristics of the different countries.

CLOSING OF THE WORKING PARTY

92. The closing remarks were delivered by Mr Kaitira Katonda, Executive Secretary, SWIOFP. In his remarks he recognized the contribution that the WP has made towards fisheries statistics and data management as seen in the deliberations and the set of recommendations. He thanked the participants for dedicating their time in attending and for KMFRI in organizing the WP meeting. Noting that the activities of the WP and SWIOFP Data + information Management Component are complementary, he said that the WP meeting was timely as the SWIOFP was to begin in another three months after signing of the major documents with the World Bank, the MoU and the PAD. Finally he thanked all those who have contributed in one way or other to make the WP meeting a success (see full text, Appendix E).

APPENDIX A

Agenda

1. Opening
2. Adoption of the Agenda
3. Status of the collection of fisheries landings (catch and effort) and of fisheries data
4. Data gaps analyses (identification of parameters)
5. Metadata reporting
6. Frame survey
7. Fisheries statistics
8. SWIOFP data management plan
9. Other matters
10. Recommendations of the Working Party
11. Closing of the Working Party

APPENDIX B

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APPENDIX C

Speech by Mrs Martha Mukira – Deputy Director Fisheries Department (Marine Sector)

Director, Kenya Marine and Fisheries Research Institute;
Country Representative;
South West Indian Ocean Fisheries Commission;
Representatives from FAO;
IOTC Representative;

Dear participants I take this opportunity to welcome all of you to this auspicious occasion of the second meeting of the working party on fisheries data and statistics of the South Western Indian Ocean Fisheries Commission (SWIOFC). For those of you coming from outside Kenya, I would like to welcome you to this beautiful country and specifically the city of Mombasa. Please feel at home and enjoy the relaxing atmosphere and coastal cuisine. We call in Mombasa RAHA and for that matter, you are welcome. Karibuni Sana.

This meeting is being held in accordance with the resolution of SWIOFC which set up the working party with the mandate to advise the commission on issues pertaining to fisheries data and statistics. As a continuation of the first meeting, the main objective of this meeting is to continue to review matters relating to fisheries data and statistics from the respective SWIOFC member states. It is hoped that these technical consultations will finally lead the commission into coming up with a regional strategy on the management of fisheries data and statistics. This therefore shows the importance of this meeting.

I salute the South Western Indian Ocean Fisheries Commission for the effort to come about with a regional strategy for data and statistics. Many of the species found in this area are similar thus require a joint management strategy. Collection of accurate data, timely analysis and reporting are important tools for decision making. However, it is known that data collection is a costly exercise and sometimes poses logistical nightmare while undertaking. It is for this reason that Kenya has established the Beach Management Units (BMUs), whose mandate includes the collection of fisheries catch data. Member countries of the SWIOFC face common problems in availability of financial resources to undertake effective data collection and management. As such allocation of resources towards data collection is overlooked by the managers, yet it plays an important role in assisting them during decision making. Information assists a lot in development and proper utilization of the fisheries resources, taking into account the Code of Conduct for Responsible Fisheries.

As a country, Kenya recently undertook a significant step by creating a Ministry specifically responsible for the management and development of fisheries resources, known as the Ministry of Fisheries Development. Following this development, the fisheries department is currently undergoing restructuring in order to be able to discharge its duties as a Ministry and meet the challenges coming with the new responsibility.

Finally, I would like to take this opportunity to wish all participants in the working party lively group discussions in their endeavour to exchange collate and analyses information. This is an onerous task that will need a lot of patience, diligence and concentration. Remember “data can hide a lot, but if thoroughly tortured, can confess to anything”. With

these brief remarks, it is my pleasure to declare the second meeting of the working party on fisheries data and statistics of SWIOFC officially opened.

Thank you and may the almighty bless you all.

APPENDIX D

Closing remarks by Mr Kaitira Ibrahim Katonda, Interim Regional Manager of the South West Indian Ocean Fisheries Project (SWIOFP)

Honourable Chairman,
The Secretary of the South West Indian Ocean Fisheries Commission (SWIOFC),
The Regional Component Coordinator of SWIOFP Component No.1,
Representatives of International and Regional Organizations (FAO, IOTC, WIOFish & RecoMap)
Distinguished Delegates,
Invited Guests,
Ladies and Gentlemen.

I feel greatly honoured by the Second Working Party Organizing Committee to be given this opportunity to officiate the closing of the Second Working Party on Fisheries Data and Statistics.

Honourable Chairman, the First Working Party discussed various issues including the status of the collection of fisheries landings and fisheries data management; identification of minimum parameters for effective fisheries management; and various databases and their requirements on implementing the database systems. A number of recommendations were drawn and presented to the second SWIOFC Scientific Committee held in Quatre Borne, Mauritius from 9 to10 August 2007, and eventually adopted by the Third SWIOFC Plenary Session held in Mahe, Seychelles, from 17 to 20 December 2007 for implementation. The Third SWIOFC Plenary Session gave comments on some of the recommendations for follow-up by the Working Party which led to the convening of this Second Working Party Meeting.

In this Second Working Party, a number of issues have been discussed including an update on new developments on the status of the collection of fisheries landings (catch & effort) and of fisheries data; identification of minimum parameters for effective fisheries management on artisanal fisheries for tuna, small pelagic coastal fisheries and shark fisheries; metadata reporting; fisheries catch statistics in the SWIOFC countries; regional frame survey; and SWIOFP data management plan. I am glad to note that the Second Working Party had fruitful deliberations on the above issues and came up with a set of recommendations to be presented to the Third SWIOFC Scientific Committee Meeting and the Fourth SWIOFC Plenary Session, and later be effected by SWIOFP through Component 1 (data gap analysis, data archiving and information technology).

Honourable Chairman, the importance of this meeting cannot be overstated. You have met at a time of worldwide recognition that almost all fisheries are being exploited near to or above their allowable limits. This concern is already apparent for various stocks of major interest in the South West Indian Ocean region. In order for our Fisheries Managers to take good decisions regarding the sustainability of our stocks, they need proper data. Fisheries statistics and/or data collection, on the other hand, has been a major concern in most of the SWIOFC countries. Without proper data, however, it is not easy for the Fisheries Managers to assess the status of our stocks and this may result in poor decision making regarding the management of our fisheries. It is gratifying to note that the Second Working Party meeting

has come up with recommendations, which, when implemented, shall assist the SWIOFC countries to collect proper data, which in turn, shall be used for management decisions.

Honourable Chairman, Distinguished Participants, Ladies and Gentlemen, allow me, first, to extend my appreciation to the FAO for providing the financial and technical assistance to the meeting. I would also like to thank the Swedish International Development Agency (Sida) for their financial support through the FAO/Sida project known as "*Facilitating a regional fisheries arrangement for the management of sustainable non-tuna fisheries in the South West Indian Ocean*". Secondly, I would like to thank our hosts, the Kenya Marine and Fisheries Research Institute (KMFRI), for ably organising the meeting; thirdly, you the Participants for finding time in your busy schedules to attend this Second Working Party for without you this session could not have been held; fourthly, the Organising Committee and its Secretariat for a job well done; and last but not least, the Nyali Beach Hotel Management for their excellent facilities and good services.

Honourable Chairman, without taking anymore of your time as you have already spent three days of discussions, please let me end by wishing you all *bon voyage*.

It is now my pleasure to declare the Second Working Party on Fisheries Data and Statistics closed.

Thank you for your attention.

APPENDIX E

Data gaps analyses (identification of parameters)[1]

Available data in SWIOFC countries, (0= no data, 1 = very little, 2 = medium, 3 = excellent)

		COM	KEN	MAD	MAU	MOZ	REU	SEY	SOM	TAN	YEM	AV.
ARTISANAL TUNA FISHERIES	Effort – accurate Vessel Registration (including type of vessel, length, HP, no crew, landing site, fishing area)	0	2	1	1	0	3	2	1	1	2	1.3
	Effort – actual number vessels operational.	0	3	0	1	0	3	2	2	1	3	1.5
	Effort – defined, such as number of days, no of fishing trips, No of hooks, /nets/no of lines, depending on the gear	0	1	1	1	1	3	1	2	0	1	1.1
	Effort – seasonal distribution	0	1	1	1	0	2	2	3	0	2	1.2
	Catch – total weight	0	2	1	2	3	3	2	0	2	2	1.7
	Catch – composition of major species and gear if multigear use	0	2	1	2	3	3	2	0	1	2	1.6
	Catch – weight of bycatch by major groups/species.	0	2	1	1	3	3	0	0	0	0	1.0
	Fish aggregation devices used	0	2	1	2	0	3	0	0	0	2	1.0
	Day/night fishing details if light fishing is used	0	2	0		0	1	0	0	0	2	0.6
	Frame survey for structural information	0	2	1	0	0	3	3	2	3	2	1.6
ARTISANAL SHARKS FISHERIES	Effort – accurate Vessel Registration (including type of vessel, length, HP, no crew, landing site, fishing area)	0	2	1	0	0	0	2	1	1	2	0.9
	Effort – actual number vessels operational.	0	1	0	0	0	0	2	2	1	1	0.7
	Effort – defined, such as number of days, no of fishing trips, No of hooks, /nets/no of lines, depending on the gear	0	2	0	0	1	0	1	2	0	2	0.8
	Effort – seasonal distribution	0	1	0	0	1	0	2	3	0	2	0.9
	Catch – total weight	0	2	0	0	3	0	2	0	2	1	1.0
	Catch – composition of major species and gear if multigear use	0	1	0	0	3	0	1	0	0	1	0.6
	Catch – weight of bycatch by major groups/species.	0	1	0	0	3	0	1	0	0	0	0.5
	Frame survey for structural information	0	2	1	0	0	0	3	2	3	1	1.2
ARTISANAL SMALL PELAGIC FISHERIES	Effort – accurate Vessel Registration (including type of vessel, length, HP, no crew, landing site, fishing area)	0	2	1	na	3	3	2	1	2	2	1.8
	Effort – actual number vessels operational.	0	2	1	na	2	3	2	2	2	3	1.9
	Effort – defined, such as number of days, no of fishing trips, No of hooks, /nets/no of lines/no sets, depending on the gear	0	1	1	na	2	2	3	2	1	1	1.4
	Effort – seasonal distribution	0	2	1	na	2	2	3	3	0	3	1.8
	Catch – total weight	0	2	1	na	3	3	3	0	3	1	1.8
	Catch – composition of major species and gear if multigear use	0	1	1	na	3	3	3	0	2	2	1.7
	Day/night fishing details if light fishing is used	0	2	0	na	1	0	2	0	0	1	0.7
	Frame survey for structural information	0	2	1	na	3	3	3	2	3	2	2.1
	Total	0	45	17	11	40	46	49	30	28	43	32.4

[1] As there is almost no artisanal fisheries in South Africa, SA was not included in the analyses

APPENDIX F

Statbase Metadata reporting

COUNTRY/SECTOR	YEAR	DATA
COMORES		
Artisanal fishery (landing sites sampling)	1994-1996	Catch
Industrial (57 foreign vessels)	2003-2008	Catch
FRANCE/REUNION		
Small coastal fishery (logbook, samples)	2006–	Catch, CPUE, Species
KENYA		
Industrial trawling (logbook)	1979 - 1985	Catch
Shrimp trawling (Logbook)	2003 - 2005	Catch
	2004 - 2006	CPUE by boat
Frame survey	2004, 2006	Census
	1963 - 1989	Catch, Value
	1990 - 2007	Catch, Value, Species
Artisanal fishery (landing sites, beach management units BMU)	2002 - 2007	Assessment Survey CPUE by gear/boat type, Species, Lengths frequency & weights
Sport fisheries	1978-2008	Catch
MADAGASCAR		
Industrial (semi) (logbook)	1995–	Catch, CPUE
Frame survey	1990, 2007	Census
Artisanal fishery (landing sites)	1995-2003	Catch, CPUE
MAURITIUS		
Artisanal fishery coastal (landing sites)	?	Catch, CPUE, Species, Lagoon/ Off lagoon catch, no.fishermen
FADs (landing sites)	2007	Catch, CPUE, Species
Tuna fisheries	?	Catch, CPUE, Species
Swordfish fishery	?	Catch, CPUE, Species
Sport fisheries (formulars)	?	Catch
Bank fishery (logbook)	1992–	Catch, CPUE, Species
Semi-industrial chilled fish fishery (logbook, landing sites, sampling)	?	Catch, CPUE, Species
MOZAMBIQUE		
Artisanal frame survey	2007	Census
Recreational gisheries grame survey	2007	Census
Frame survey (entire coast)	2007	Census
Semi and industrial, shrimp (logbook)	1978 ?-2007	Catch, CPUE, Species
Aquaculture	2005-2007	Production
Artisanal (landing sites sampling)	2096-2007	Catch, CPUE, Species
Marine and inland artisanal fisheries		
Cabo Delgado Province	2005 – 2008	Catch, CPUE, Species
Niassa Province	2006 – 2008	Catch, CPUE, Species
Nampula Province	1996 – 2008	Catch, CPUE, Species
Tete Province	2007– 2008	Catch, CPUE, Species
Zambézia Province	1997 – 2008	Catch, CPUE, Species
Sofala Province	2000 – 2008	Catch, CPUE, Species
Inhambane Province	1996 – 2008	Catch, CPUE, Species
Gaza Province	2005 – 2008	Catch, CPUE, Species
Maputo Province	1999 – 2008	Catch, CPUE, Species
SEYCHELLES		
Schooner fishery (raw/processed data)	1991 - 2007	Catch, CPUE, Species
Whaler fishery (raw/processed data)	1990 - 2007	Catch, CPUE, Species
Small boat fishery (raw/processed data)	1988 - 2007	Catch, CPUE, Species
Sea cucumber fishery	2001 - 2007	Catch, CPUE, Species
Lobster fishery, creel logbook	1992 - 2007	Catch, CPUE, Species
Semi-industrial longline fishery Logbook/landing site/processed data	1995 - 2007	Catch, CPUE, Species
Artisanal CAS sampling survey	1985-	Catch, CPUE, Species
Boat frame survey	2004, 2008	Gear, Species, Vessel
SOUTH AFRICA		
The recreational linefishing for	1984 -	Effort, Catch, Size

KwaZulu-Natal		frequency
Crustacean trawl fishery, multispecies and bycatch fishery	1988 to 2008	Prawn Mast database Catch, CPUE, Species..
Demersal trawl (hake inshore and deepsea trawl, horse mackerel, shallow and deepwater shrimp		Five databases
Small pelagics (sardines and anchovies)		One database
Rock lobster (South West Coast, Natal)		Three databases
Abalone		One database
Netfish		One database
Subsistence fisheries		Various amount
Linefish (traditional; commercial, hake handline, tuna pole, recreational, squid)		Five databases
Longline (hake, shark, large pelagic)		Three databases

Patagonian toothfish		One database
Other (turtle, oyster, seabirds)		Five databases
UNITED REPUBLIC OF TANZANIA		
Semi and industrial fishery (TANFISH)	1989-1996	Catch
RFIS	2002-2005	Incomplete
Frame survey (1995,98,2001,05,07)	1995 - 2007	Catch\effort
Prawn fishery	2005 - 2006	Catch CPUE
Tuna fFishery logbook	2001 - 2006	Catch
Artisanal (landing site sample) CAS	1992-1997, 2006 and 2007	Catch
YEMEN		
Semi and Industrial (demersal, deepsea)	1996-	Catch
Aquaculture	2006	Production
Artisanal (landing site sample)	1996-	Catch, CPUE, Species

	New provisional calendar, assuming that the Statbase activities start in June 2008.																										
	2008												**2009**												**2010**		
Action	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar
1 - WG - Initialization																											
2 - National and regional inventories																											
3 - GT2 - Inventory synthesis																											
4 - Datasets recovery																											
5 - GT3 - Database finalization																											
6 - Atlas production																											

APPENDIX G

Preliminary inventory of the types of artisanal vessels operated in the SWIOFC countries

COMOROS	G 18	Pirogue	Seineur	Palangrier
Length(m)	3 to 9m	2 – 5m		
Gross Tonnage	1 to 3ton	0 – 500kg		
Material	FRP	Wood		
Propulsion	Engine	Paguaie		
Sail		Sail		
Inboard (HP)	11 – 12HP			
Outboard (HP)	15 – 80HP			
Storage	Glace/ice	0	Chamber froide	Chamber froide
Main gears	Line/hook		Seine	Longline
Main target species	Bottom + Pelagic	Bottom fish		
Classification (subsistence, artisanal, small scale, semi-industrial	Artisanal	Artisanal	Industrial	Industrial
No in frame survey (year)	1500	3500	40	17
No registered (year)			40	17

FRANCE/REUNION	
	Petite pêche cotiére
Length (m)	< 10 m
Material	Wood, fibre glass
Propulsion	Motor
Paddles/poles	No
Sail	No
Inboard (HP) outboard (HP)	Inboard outboard
Storage	Ice box
Main gears	Line
Main target species	Demersal and pelagic
Classification (subsistence, artisanal, small scale, semi-industrial)	Petite pêche cotiere

KENYA					
	Dugout Canoe	Hori	Ngarawa	Dau	Dhow/Mashua
Length (m)	2 to 4	3 to 6	3 to 8	3 to 6	6 to 20
Material	Wood	Wood		Wood Fibre Glass	Wood
Propulsion: paddles/poles	Paddles	Paddles			
sail		Sail	Sail	Sail	Sail
outboard (HP)				Outboard (HP)	Outboard (HP)
Main gears	Gillnets and prawn nets	Gillnets or Traps	Handline	Gillnets or Handlines	Gillnets
Main target species	Any	Demersals	Pelagics	Pelagics and Demersals	Pelagics
Classification (subsistence, artisanal, small scale, semi-industrial)	Artisanal	Artisanal	Artisanal	Artisanal	Artisanal
No in frame survey (2006)	1362 (2006)	256	154	84	470

MADAGASCAR			
		pirogue à balancier	pirogue à balancier
Length (m)		3 à 5 m	3 à 5 m
Material		Wood	
Propulsion peddles/poles		Paddles	
Propulsion sail		Sail	
Main gears		Gillnet, seines	Gillnet, seines
Main target species		Poissons, crevettes,	
Classification (subsistence, artisanal, small scale, semi-industrial)		Artisanal	

MAURITIUS		
	Pirogue	Bank-Semi-industrial chilled fish fisher
Length (m)	6-9 M	18-23 m
Material	Wood, fibre glass	Wood, fibre glass
Decked	Decked	Decked
Propulsion	Motor	Motor
Paddles/poles	May be	May be
Sail	Yes	Yes
Inboard (HP)	Yes	Yes
Outboard (HP)	Yes	Yes
Equipment		Winch
Storage	Ice	Cold store, ice
Main gears	Line	Line
Main target species	Lethrinids	Lethrinids
No registered (year)	1800	27
No in frame survey (2006)	Not carried out	
No registered (year) No in frame survey (2006)	249 (2006)	

MOZAMBIQUE							
	Moma typeCanoe	Escaveted three Canoe	Other canoe	Boat (chata)	Motor boat (lancha)	Fiber glass boat	Others
Length (m)	<10m	<10m	<10m	<10m	<10m		
Material	Wood	Wood	Wood	Wood	Wood	Fiber glass	Wood
Propulsion outboard (HP)					Outboard	Outboard	
Main gears	Gillnet, beach seines, handlines	Gillnet, beach seines, handlines	Gillnet, beach seines, handlines	Gillnet, beach seines, handlines	Gillnet, beach seines, handlines	Gillnet, beach seines, handlines	Gillnet, beach seines, handlines
Main target species	Small-pelagic and semi-pelagic	Small-pelagic and semi-pelagic	Small-pelagic and semi-pelagic	Small-pelagic and semi-pelagic	Small-pelagic and semi-pelagic	Small-pelagic and semi-pelagic	Small-pelagic and semi-pelagic
Classification (subsistence, artisanal, small scale, semi-industrial)	Artisanal	Artisanal	Artisanal	Artisanal	Artisanal	Artisanal	Artisanal
No in frame survey (2006)	2713 (2002)	6280 (2002)	2875 (2002)	793 (2002)	2323 (2002)	157 (2002)	124 (2002)

SEYCHELLES						
	Pirogue	Outboard-Mini-Mahe	Lekonomie (Whaler)	Lavenir (Whaler)	Whaler	Schooner
Length (m)	4	4	6	7	7	12
Gross Tonnage	>4	>4			4 to 8	4 to 12
Material	Wood	Fibreglass	Fibreglass	Fibreglass	Fibreglass	Fibreglass/Wood
Decked	Un-decked	Un-decked	Un-decked or partially decked	Un-decked or partially decked	Un-decked or partially decked	Fully-decked
Inboard (HP)			Inboard	Inboard	Inboard	Inboard

Outboard (HP)	Outboard (HP)	Outboard (HP)				
Main gears	Handline, trap, beach seine	Handline, trap, beach seine, encircling gillnet,	Handline, trap	Handline, trap	Handline, trap	Handline, trap, gillnets, loop nets
Main target species	Siganides, Lethrinidae, Lutjanidae, Scaridae	Demersal, pelagics and sharks species	Demersal, pelagics and sharks species	Demersal, pelagics and sharks species	Demersal, pelagics and sharks species	Demersal, pelagics and sharks species, crabs
Classification (subsistence, artisanal, small scale, semi-industrial)	Artisanal	Artisanal	Artisanal	Artisanal	Artisanal	Artisanal
No registered (year)	Registered as Mini Mahe	531 (2007)	49	40	74	54
No in frame survey (2006)	18	238 (2002)	32	71	50	36
SOMALIA						
		CANOES	6.4M GRP	8.5M GRP		
Length (m)		3-5M	6-6.4M	8-8.5M		
Material		Wood	GRP	GRP		
Decked				Decked		
Paddles/poles		Paddle				
Inboard (HP)			15-20	30-32		
Outboard (HP)		5-15 HP	15-30			
Storage				5-10 ton		
Main gears		Longlines	Longline & Gillnet	Longline & Gillnet		
Main target species		Groupers / Snappers	Shark/Tuna	Shark/Tuns		
Classification (subsistence, artisanal, small scale, semi-industrial)		Artisanal	Artisanal	Artisanal		
UNITED REPUBLIC OF TANZANIA						
		Dugout canoe	Boat	Dhow	Outrigger Ngalawa	Mashua
Material		Wood	Wood	Wood	Wood	Wood
Decked		No	No	No	No	No
Propulsion		Paddles	Engine	Sail	Sail/Paddle	Sail/Engine
Paddles/poles		Paddles	Paddles		Paddles	
Propulsion sail			Sail	Sail	Sail	Sail
Propulsion inboard (HP)			Inboard			
Propulsion outboard (HP)			Outboard (HP) 9-75			Outboard (HP) 9-75
Equipment		NO	NO	NO	NO	
Storage			ICE BOX			
Main gears		Traps/lines	Gillnet	Ring nets	Gillnets	Surrounding nets
Main target species		Demersal spp	Seines	Pelagic spp.		Pelagic spp
Classification (subsistence, artisanal, small scale, semi-industrial)		Subsistence and artisanal	Artisanal	Artisanal	Artisanal	Artisanal
No registered (year)					2007	2007
No in frame survey (2006)		3909	607	825	1601	400
YEMEN						
		Hori	Sumbuq (Ubri)	Ubry		Coastal fishing boats
Length (m)		<6 m	6-9m	9-16m		16-24
Material		Fiberglass wood	Fiberglass wood	Fiberglass wood		Fiberglass or metal
Decked				Decked		Decked
Propulsion inboard (HP)				100 -500 HP		500 -1000 HP
Propulsion outboard (HP)		15-50 HP	50-100 HP			
Equipment				Yes		Yes
Storage				Yes		Yes
Main gears			Purse seine/handline	Purse seine/longline		Trawling
Classification (subsistence, artisanal, small scale, semi-industrial)		Subsistence, artisanal	Artisanal	Artisanal		Semi-industrial

APPENDIX H

Mozambique catch tables

Table 1: Industrial and semi-industrial catches in tonnes between 2005 and 2007 (Source: DNEP, 2008)

Resources	2005	2006	2007
Lobster	1	8	8
Crabs	158	107	125
Deep water shrimp	1 774	1 803	1 366
Fish	660	665	764
Shallow water shrimp	8 520	7 393	7 04
Crayfish	149	94	153
Cephalopods	165	114	138
Kapenta	12 991	16 017	8 461
By-catch	1 830	1 725	895
Total	**26 248**	**27 926**	**18 956**
Tuna	5 396	6 691	5 417

Table 2: Artisanal fisheries catches in tonnes between 2005 and 2007 (Source: DNEP, 2008)

Resources	2005	2006	2007
Lobster	-	-	33
Crabs	161	175	121
Marine fish	50 024	57 457	45 511
Inland fish	-	-	15 199
Shallow water shrimp	4 555	3 385	2 860
Cephalopods	239	247	551
Shark	893	776	746
Other non-identified	1 875	1 928	2 351
Total	**57 747**	**63 973**	**72 893**

Table 3: Aquaculture production in tonnes between 2005 and 2007 (Source: DNEP, 2008)

Resources	2005	2006	2007
Shrimp	1 067	995	693
Fish	0.24	53	145
Sea weed	0.24	15	69
Total	**1 068**	**1 063**	**907**

Table 4: Industrial and semi-industrial licensed boats for fisheries activities in 2008 (Source: DNAP)

Fisheries type		National licensed boats	Foreign licensed boats	Total
Industrial	Shallow water shrimp	44	9	53
	Deep water shrimp	2	6	8
	Tuna	0	119	119
	Line fishing	2	0	2
Semi-industrial	Shallow water shrimps	41	8	49
	Line fishing	13	8	21
	For Kapenta	0	213	213
Total		102	363	465

APPENDIX I

Scientific Committee status reports catches and FAO statistics

A) Comparison of the information provided in the Scientific Committee status reports and the statistics of 2006 catches returned to FAO.

Country	FAO (fish stat) 2006	SWIOFC (Scientific meeting, SC)	Comoros (fish stat 2006)		Comoros (SC 2006)	Réunion (fish stat 2006)	Réunion (SC 2005)	Kenya (fish stat 2006)	Kenya (SC 2006)	Madagascar (fish stat 2006)	Madagascar (SC 2006)	Maldives (fish stat 2006)	Maldives (SC 2006)	Mauritius (fish stat 2006)	Mauritius (SC 2006)	Mozambique (fish stat 2006)	Mozambique (SC 2006)	Seychelles (fish stat 2006)	Seychelles (SC 2006)	Somalia (fish stat 2006)		Somalia (SC 2006)	South Africa (fish stat 2006)	South Africa (SC 2006)	Tanzania, United Rep. of (fish stat 2006)	Tanzania, United Rep. of (SC 2006)
Selected groups																										
Spiny and rock lobsters			20		1	6	93	101	550	500			8		106	1	6	6	500	v		68	374		v
Coastal tunas and related spec			10270		3231	3814	381	273		10000	167059	*	2007	1594		6668	87327	*		v		535	946	4315	3364
Peneiodae							215	671	9382	9300					12823	8340						133	275	1800	312
Sharks					63		189	263			900	v	161				141	15		v		8	796	2423	v
Slope water snappers														1674						v					
Octopus and squids					2	2	378	1054	600	1000			84		133		29	29	600			20	1	703	v
Seacucumbers							18	18	500	820	100			340			421	421						1	v
Bivalves							249	38	400						61								?	277	v
	Total		10290	0	3297	3822	1523	2418	11432	21620	168059	0	2260	3608	13123	15009	87924	471	1100	0		764	2393	9519	3676
Others	Demersal fishes**				69	81	2677	3398		55000		16000	3555	5149			2321	2204				254	1704	11537	v
	Semipelagic fishes		1200		135		629		12000				25				977	1089				10		5389	
	Small pelagic		2180		5	104	138	192				20000				64000	254	254						10446	v
	Pelagic fishes (nei)						792	1940								3000									
	Marine fishes (nei)		1400		74		1297		79385		16099	150	2499		11346	3226	829		28700			9		11978	
	Subtotal other f		4780	0	283	185	5533	5530	91385	55000	16099	36150	6079	5149	11346	70226	4381	3547	28700	0		273	1704	39350	0
	Crabs				6		110	110	1600	1525			2		1847		48	48				31			
	Seaweeds								5300																
	Total othe		4780	0	289	185	5643	5640	98285	56525	16099	36150	6081	5149	13193	70226	4429	3595	28700	0		304	1704	39350	0

* No input

** Without sharks, slope water snappers

nei Not elsewhere included

v Assessment of stock status but no catch results

b) FAO FISHSTAT 2006 catch statistics for the SWIOFC region assembled as per the Scientific Committee groups

SWIOFC stock/management unit			British Indian Ocean Ter	Comoros	Réunion	Mayotte	French Southern Terr	Kenya	Madagascar	Maldives	Mauritius	Mozambique	Seychelles	Somalia	South Africa	Tanzania	Yemen	Grand Total
Selected groups																		
Spiny and rock lobsters				20	0.5		183	93	550	0	8	106	6	500	68		510	2044.5
Coastal tunas and related species			0	10270	3231	3761		381	0	167059	2007	0	87327		535	4315	29795	308680.5
Peneiodae								215	9382		0	12823			133	1800	2680	27033
Sharks				0	63	11		189		900	161	0	141		8	2423	13060	16956
Slope water snappers																		
Octopus and squids				0	2		0	378	600	0	84	133	29	600	20	703	13260	15809
Seacucumbers								18	500	100		0	421			0.5	400	1439.5
Bivalves								249	400			61				277		987
	Total Selected groups		**0**	**10290**	**3296.5**	**3772**	**183**	**1523**	**11432**	**168059**	**2260**	**13123**	**87924**	**1100**	**764**	**9518.5**	**59705**	**372949.5**
Others	Demersal fishes (other than sharks and slope water snappers)																	
		Acanthurids - Other									139							139
		Catfishes - Other														891	4350	5241
		Croakers -Other													47			47
		Demersal fishes nei - Other			9			1286	0				128		5		12700	14128
		Emperors - Other						477			2969		168		0	7070	6150	16834
		Goatfishes - Other			3						204		0					207
		Groupers - Other			6						44		122		29	500	4500	5201
		Grunts - Other						88							1		3500	3589
		Mullets - Other						221			3					291	1100	1615
		Halibut - Other														55	1850	1905
		Snappers - Other			43			193			106		1624		0.5		3700	5666.5
		Sparids - Other													171.5			171.5
		Threadfins - Other			8										0	616	6450	7074
		Rabbitfishes - Other						412			90		279			1481		2262
		Wrasses - Other														633		633
		Subtotal demersal		0	69	0	0	2677	0	0	3555	0	2321	0	254	11537	44300	64713
Semi-pelagic fishes		Barracudas - Other			4			246					210			1373	4600	6433
		Carangids - Other		600	129			238			25		767		0.5	2480		4239.5
		Seerfishes - Other		600	2			145	12000		0	0			9	1536	2100	16392
		Subtotal semi-pelagic		1200	135	0	0	629	12000	0	25	0	977	0	9.5	5389	6700	27064.5
Small pelagic		Indian Mackerel - Other		230									254			5600	2000	8084
		Small pelagics - Other		1950	5			138			0				0	4846	15700	22639
		Subtotal small pelagic		2180	5	0	0	138	0	0	0	0	254	0	0	10446	17700	30723
	Pelagic fishes nei - Other							792							0		121000	121792
	Marine fishes nei - Other		0.5	1400	74	2000	80	1297	79385	16099	2499	11346	829	28700	9	11978		155696.5
		Subtotal Other fish	**0.5**	**4780**	**283**	**2000**	**80**	**5533**	**91385**	**16099**	**6079**	**11346**	**4381**	**28700**	**272.5**	**39350**	**189700**	**399989**
	Crabs - Other				6			110	1600		2	1847	48		31		125	3769
	Seaweeds -Other								5300							0		5300
	Total Other groups		**0.5**	**4780**	**289**	**2000**	**80**	**5643**	**98285**	**16099**	**6081**	**13193**	**4429**	**28700**	**303.5**	**39350**	**189825**	**409058**

The second Working Party on Fisheries Data and Statistics was attended by participants from Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, South Africa, the United Republic of Tanzania, Yemen, the Indian Ocean Tuna Commission (IOTC), the Regional Programme for the Sustainable Management of the Coastal Zones of the Indian Ocean (ReCoMap) and the South West Indian Ocean Fisheries Project (SWIOFP).

The Working Party received updates of the status of monitoring of the fishery catches by the member countries of the South West Indian Ocean Fisheries Commission. Some countries were upgrading their systems, others continued with existing systems that operated satisfactorily. Comoros and Somalia had no systems in place.

The Working Party discussed minimum data requirements for effective fisheries management in three artisanal fishery types: tuna, shark and small pelagic fisheries. Each country provided the existing availability of data for these requirements. As requested, the Working Party also examined the standardization and synchronization of frame surveys from a technical presentation on frame survey design as well as from information provided by the countries at the meeting. Due to the large variety of artisanal vessels in the region a more detailed analysis would be required in order to provide recommendations to the Scientific Committee. The Working Party commented on Statbase metadatabase descriptions made by countries and clarified some of the terms and definitions. In the process it was recognized that closer comparision of the datasets in respective countries was necessary. Other metadatabases discussed included WioFish and Transmap. The statistics of fishery catches in each country was examined and recommendations made for their improvement. The catch statistics held by IOTC for tuna fisheries and their bycatch, the SWIOFP data management plan and the activities supported by ReCoMap, were presented.

The Working Party made recommendations on improving the situation of fisheries data and statistics for the consideration of the Scientific Committee of the SWIOFC.

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