

SOUTH WEST INDIAN OCEAN FISHERIES COMMISSION

Report of the

FIRST WORKING PARTY ON FISHERIES DATA AND STATISTICS

Mombasa, Kenya, 24–27 April 2007



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PREPARATION OF THIS DOCUMENT

This is the final version of the report of the first Working Party on Fisheries Data and Statistics held in collaboration with the Kenya Marine Fisheries Research Institute, Mombasa, Kenya, 24–27 April 2007. The country reports appear as presented by the authors/participants.

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Other interested nations and international
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ABSTRACT

The first Working Party on Fisheries Data and Statistics was attended by participants from Comoros, France, Kenya, Madagascar, Maldives, Mauritius, Mozambique, Seychelles, South Africa, the United Republic of Tanzania and Yemen.

The Working Party received national reports of each of the countries and examined the status of fisheries catch and effort data and statistics. Several countries do not produce annual fisheries statistical reports. In most cases countries attributed weaknesses in data collection to lack of funds and insufficient numbers of enumerators.

The Working Party discussed minimum data requirements for effective fisheries management in five generic fisheries types: industrial shrimp, artisanal shrimp, trap fisheries, demersal line and beach seine fisheries. Each country provided the existing availability of data for these requirements. Major issues of data collection (structural data, operational data and biological data), data processing, data analyses, data dissemination and other related matters were identified.

A list of metadata fields was presented to assist member countries provide data to the regional data coordinator of the South West Indian Ocean Fisheries Project (SWIOFP) in order to set up a regional metadatabase. The availability of relevant regional and global information systems was discussed. WioFish, a fisheries metadata management system, was initiated to collate available information from small-scale fisheries of the Western Indian Ocean countries. The FishCode-STF (Strategy for improving information on status and Trends of capture Fisheries) project and the Fishery Resources Monitoring System (FIRMS) are two initiatives towards a global strategy to improve information on status and trends of capture fisheries. StatBase software has already been adopted by the SWIOFP project for regional data management and would be available for South West Indian Ocean Fisheries Commission (SWIOFC) member countries for reporting, disseminating, gathering and sharing data. A schematic representation of the relationship between organizations, institutions, projects and information systems was produced. The Working Party was appraised on the development of a SWIOFP Web site and provided with a demonstration on applications of Geographical Information Systems (GIS) in fisheries management.

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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OPENING

1. The first Working Party on Fisheries Data and Statistics (WPFS) was held at the Soleil Beach Club Mombasa from 24 to 27 April 2007 and organized by the Kenya Marine Fisheries Research Institute (KMFRI).
2. The Working Party was attended by 27 participants from Comoros, France, Kenya, Madagascar, Maldives, Mauritius, Mozambique, Seychelles, South Africa, the United Republic of Tanzania and Yemen. The list of participants is given in Appendix B.
3. Mr Micheni J. Ntiba, Professor of Biological Sciences at the University of Nairobi and Chairman of the Scientific and Technical Committee of the Board of Management of KMFRI opened the work of the WPFS. The full statement of Prof. Ntiba is attached as Appendix D to this report.
4. Prof. Ntiba pointed out the need to have a common approach in solving regional issues. He said that fisheries resource management can only be effectively done based on scientific information. While giving his comments on monitoring, control and surveillance of fisheries, he said that these efforts are still hampered by lack of adequate investments further compromising the management of crucial fish stocks including straddling and transboundary fisheries. He concluded by advising that fisheries data and statistics underpins the management of fisheries in the region.
5. 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 make their country contributions whilst covering 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 presented the status of collection of fisheries landings information and fisheries data management in their respective countries.

Comoros

8. The fisheries of Comoros are entirely artisanal and consist of boats of 3 to 9 m in length. The last estimates made together with the fisher associations in 2002 indicated that there were about 7 550 fishers and 3 200 boats (900 of which are motorized). Drop lining (with disposable rock sinkers) is undertaken by small canoes (pirogues), while trolling is undertaken by motorized boats. Small pelagics (*Tylosorus* spp. et *Ablennes* spp.) that come close to the coast are fished with circling seines. The estimated catch of 13 300 tonnes (65 percent tunas and the remainder of other species) is still derived from 1995 statistics.

9. A statistical system of monitoring of landings based on a regular sampling was established in 1994 by the Association Thonier of the Commission de l'océan Indien. The system defined 12 strata within three islands with five primary sites in Grande Comoros, four primary sites in Anjouan and three primary sites in Moheli. Detailed information was randomly collected directly from the boats by fish recorders. The landings monitoring system continued until the end of the project in June 1996. Fish landings have not been monitored since.

10. The Ministry of Fisheries intends to set up a monitoring system this year keeping much the same structure as system that was in place from 1994 – 1996. The problem involved in setting up a landings monitoring system in Comoros include lack of funds, numerous landing sites (104), insufficient recorders, lack of computer support for processing and analysis and reluctance of some fishers to have their catch monitored or handled. There have not been any biological studies undertaken of species at the level of the artisanal fishery. Scientific studies to examine if there are different stocks and their interactions between countries would be useful.

11. The Working Party noted that, without basic landings information, Comoros is severely limited in its capacity to contribute to subsequent SWIOFP working parties or in the Scientific Committee of SWIOFC. Possibilities for assisting Comoros set up a catch monitoring system to obtain information for a national database and used in assessments of the status of its fisheries resources were discussed. The ability of the Comoros to support and manage a monitoring system over the long term is a critical factor for determining the technical assistance that could be provided and type of system that should be developed. It was noted that there will be some support in SWIOFP for capacity building which would improve the data management capacity.

France

12. The Reunion fishery sector consists of a small coastal fishery with a catch of 800 tonnes of mixed fish and a longline fishery that caught 3400 tonnes of tunas and billfishes in 2005. The entire fishing fleet consist of 279 vessels. An elaborate system for the monitoring these fisheries was set up in 2006 by the French Research Institute for Exploitation of the Sea (IFREMER) with similar fishing concepts and statistical processes as exist elsewhere in the European Union (Appendix G). The monitoring system seeks to capture the totality of fishing activity including seasonal, spatial as well as economic and social aspects. It consists of two levels: an administrative/management/reporting level done by Direction des pêches maritime et de l'aquaculture – DPMA and an analytical/operational level which is variously undertaken by different agencies depending on their competences (such as IFREMER, the Institut de Recherche pour le Développement (IRD), Muséum national d'Histoire naturelle (MNHN), University of Caen) while still under the administrative mandate of DPMA.

13. Details of the information collected for the small coastal fishery were presented. Monitoring is based partly from information collected when the vessels are registered or from frame surveys as well as subsequent verification and enquiries on the actual fishing trips. A team of a coordinator and two investigators are responsible for the data collection and preliminary data preparation in Reunion. The data are sent to France and entered into a national system for the monitoring of marine resources (Système d'information halieutique français) managed by another team responsible to ensure standardized methods, appropriate reference systems, data management, processing and distribution. The statistical analysis is undertaken by IFREMER, Brest, through a HARMONIE front – end to an ORACLE database. Effectively only one person of the team in France manages the data from Reunion. In June 2007, IFREMER will be releasing a statistical bulletin of the 2006 fishing results for Reunion. A national dynamic SiG-based Web site is under construction that will allow interrogation of all French fisheries statistics and fishery regulations.

14. Difficulties encountered in Reunion related to night fishing which was difficult to monitor and estimate, and over-reporting of catches in questionnaires and logbooks to take advantage of fuel subsidies. The participants from France noted that fisheries statistical monitoring systems are grounded on a combination of general needs (regulation of fishing licences, monitoring of landings or transshipment, respect of international agreements) as well as specific needs based on the context or history of the fishery. This context which is especially evident in artisanal fisheries providing for richness as well as complexity which should, to the extent possible, be captured by the monitoring system. Within SWIOFC, it is important that countries can adequately monitor their various fisheries and resources with all their national specificities. However for regional purposes, the national data needs to be available in a standardized

form that can be exchanged and analysed to allow regional monitoring at appropriate spatial and temporal scales.

15. The working party reflected on the difficulty of monitoring artisanal fisheries particularly in with regard to seasonal or even daily changes of fishing method by a fishing vessel. It noted that the monitoring system used did not require much manpower but it was technically demanding and costly. It also noted that, in time, the monitoring system that had been set up would enable very detailed analysis of the small coastal fishery, its impact upon coastal fishery resources, and of the economic and social contribution of the sector. It was noted that all vessels were registered and licensed but that the fisheries are not as yet closed to entry.

Kenya

16. The collection of fisheries landings data in Kenya is mainly undertaken by Fisheries Department staff and recently by Beach Management Units (BMUs). Other organizations such as Kenya Marine and Fisheries Research Institute (KMFRI) and Coral Reef Degradation in the Indian Ocean (CORDIO) as well as recreational fisher associations have also collected fish landing statistics for variable periods in particular areas to address specific ecological or socio-economic issues. The data resides with the original organization or association usually as hardcopies of responses to forms, questionnaires or logbooks. Administratively landings data is first reported at the District level. The data are aggregated at species level into fish groups and then summed at district level and finally into a simple statistical report showing total national landings by fishery sub-sector. Constraints include insufficient capacity, dependence on untrained BMU members, absence of a central repository and insufficient processing and analysis of the data collected. Without adequate monitoring control and surveillance (MCS) and vessel monitoring systems (VMS) requirements, the resultant illegal, unreported and unregulated (IUU) fishing is likely to seriously undermine Kenya's ability to know how much fish is caught in its exclusive economic zone (EEZ) (Appendix G).

17. In the discussions that followed, the working party (WP) examined in more detail the method by which the operational effort was obtained from frame surveys, as well as the collection of logbook information from licensed vessels fishing in the EEZ. A lack of manpower to monitor the artisanal catch could be resolved by employing more staff or by collaboration with other institutions and non – governmental organizations (NGOs). With regard to an apparent lack of a national centralized marine fisheries database in Kenya, it was noted that there were scattered institutional databases available which included KMFRI, and other NGOs (CORDIO, Coral Reef Conservation Project CRCP) who conducted catch assessment surveys. They are in varied formats but mainly in Excel (80 percent). There is also available a long term sport fishery database. It was perceived that there was a need to develop a national fisheries database coordinated between Fisheries Department (FiD) and KMFRI to harmonize their marine fisheries data sets (i.e. similar to Lake Victoria). This would assist in providing more comprehensive information for management as well as facilitate the provision of information to other regional and international organizations such as Indian Ocean Tuna Commission (IOTC), the Oceanographic Research Institute ORI (West Indian Ocean fish database WIOFISH) and FAO.

Madagascar

18. Fish production statistics are derived from logbooks (in the shrimp fishery), from reports, from sporadic surveys and from projecting past data (Appendix G). The total catch is estimated at 120 000 tonnes to 130 000 tonnes per year. Increase of total production is due to the development of shrimps culture and artisanal fishing. Statistics on the export of fish products is collected by the Administrative declaration (Health certificate and customs declaration). Exports of fish products from capture fisheries are important as a source of foreign currencies, and contribute 2.3 to 3.0 percent of gross domestic product (GDP). The consumption of fish, which is an important source of protein for the population, is estimated every 10 years by sampling. It is estimated that about 20 percent of the artisanal catch is consumed by fishers and their families and do not appear in official statistics. The

contribution of fisheries to employment is obtained by census and frame surveys. Subsistence and part-time fishers are grossly underestimated in frame surveys.

19. Shrimps are the most studied fisheries resource. The stock units have been identified and key biological parameters estimated with assessments made using the Thompson and Bell model. A logbook system established in 1993 and standardized in 1995 is used to monitor the catches of the shrimp fishery and the data store within the "BANACREM" database which has been managed since 1998 by Fisheries Administration. There have been instances when difficulties in the transmission of information and the capture of data have introduced errors into the database.

20. Previous monitoring of artisanal fisheries incorporated both frame and catch assessment surveys. Frame surveys in particular are considered essential for collecting statistical information from the artisanal fisheries. These have taken place roughly every 10 years and the last general census took place in 1990. A census (with World Bank support) is expected this year (2007). Catch assessment surveys set up using FAO Approaches, Rules and Techniques for Fisheries Statistical Monitoring (ARTFISH) software were undertaken in Toliara (South-West) in 1995, in Toamasina (East) in 1996 and in another region in 2000. The system that was in place has not been operational since 2003 because of a lack of funds.

21. Madagascar participates actively in the data collection activities of the Indian Ocean Tuna Commission (IOTC). Scientists from Institut de recherche pour le développement (IRD) and Spanish Oceanographical Institute (IEO) in collaboration with Antsiranana Tuna Statistical Unit (USTA) routinely monitor purse-seiner catches. The data are entered and archived in AVDTH (an application to acquire and validate data on tunas).

22. Estimates of the total capture of tunas depend largely on declarations of the captains of foreign vessels fishing in the Malagasy EEZ. Logbooks are not systematically returned and viewed more as administrative documents.

23. In discussions following the presentation by the Malagasy participants, the enormity of the task of assessing the catch of artisanal fisheries over the 5 000 km of coastline was noted. Madagascar was clearly the major country in the region where this posed the greatest logistical and technical difficulty as it was a continental island with eastern, western, northern and southern coastlines. It was noted that present day catch statistics for the artisanal fishery are still largely extrapolations made from a frame survey undertaken in 1990. The working party was aware that a workshop on vessel registration had been held last year. Discussions examined the benefits and limitations of a good registration system as compared to occasional frame surveys to know how many boats are involved in a fishery. The WP was requested to look into possibilities of improving the collection of fisheries statistics in Madagascar.

Maldives

24. A well-established artisanal tuna fishery existed well before the 14th century and a data collection system for fisheries was established in 1959. Possibly the earliest quantitative estimates of Maldives fish production was reported in FAO yearbook of Fisheries Statistics 1947 (FAO, 1948). Fishing has constituted around 6.6 and 8.9 percent of GDP in the past ten years.

25. Today, the live bait pole-and-line fishing fleet produces around 180 000 tonnes/year mainly of skipjack and yellowfin tuna and these two species constitute the main local consumption. Reef fisheries started in Maldives in the early 1970s. Some of the species of reef fish are targeted mainly for export such as groupers, aquarium fish and sea cucumbers. Giant clams have been over fished to commercial extinction and their export is now banned; sea cucumbers have restrictions on the method of harvest and there are concerns that the grouper fisheries which are approaching maximum sustainable yield become overexploited.

26. Data in Maldives are obtained from each vessel by the island offices and reported on a daily and monthly basis to Ministry of Fisheries, Agriculture and Marine Resources (MoFAMR) via the Atoll office (Appendix G). Because of the predominant volume and importance of tuna and tuna related species, the highest priority during data collection is to obtain this information. Reef fish and other marine fish catch are reported by vessels and resorts in separate forms to the MoFAMR as well. Biological data including length and weight frequencies are collected by the Marine Research Centre (MRC) as sample surveys and through various stations in selected locations.

27. Concerns exist over the quality of some of the data been collected. However it is believed that the statistics provide an accurate reflection of the general trend in the catch of various species. Pilot surveys are being conducted to test new mechanisms of data collection.

28. Difficulties in data collection and analysis include: insufficient trained staff in the statistics section; low-level of awareness among the fisherfolk about the importance of providing fisheries data; lack of information on geographical position of fish catch; under-reporting and over-reporting of fisheries data; and inadequate information of the recreational and sports fisheries.

29. In follow up discussions, the Maldivian participants emphasized that any regional attempt to standardize catch assessment systems should carefully consider the specific geographical situations. It was noted that the fishing method (handlining, pole-lining) largely determined the species of tuna that was recorded in the landings (yellowfin and skipjack tuna respectively). Catches of both tuna and reef fish are provided in annual fisheries bulletins. Decreases in the catches of grouper evident from the statistic were more likely a result decreasing abundance which also coincided with a movement of fishing effort from reef fish to tunas. This could benefit from further scientific examination.

Mauritius

30. The participants from Mauritius emphasized the importance of the fisheries sector which provided direct employment to about six thousand people and significant source of foreign exchange earner. The main fisheries within the sector are: coastal artisanal; banks; semi-industrial chilled fish; fish-aggregating-device; sports; tuna and swordfish.

31. They provided statistics on the total catch, fishing gear, main species caught, numbers of boats and numbers of fishers for each fishery. They also explained how each fishery was monitored, the software used, and the processing and analysis undertaken. The status of exploitation of these fisheries was presented and their available assessments (Appendix G).

32. Mauritius considered that good catch and effort statistics are fundamental in the evolvement of management measures. These are analysed and published in Statistical Bulletins and in an Annual Report. Based on the statistics and recommendations by the scientists, the Ministry issues licences to local and foreign vessels and decides upon the imposition of limited entry or catch quota in some subsectors like the bank fishery. Tuna fishery statistics are also of great help during the negotiations of fishing agreements. Processed statistics are regularly transmitted to FAO, IOTC, Common Market for Eastern and Southern Africa (COMESA) and Southern African Development Community (SADC). Locally these are used by the Central Statistics Office in deriving economic parameters.

33. Much emphasis is placed on the collection and processing of good standard data as this assists the country in assuming its responsibilities both as an flag and port state. It also assists in cooperating with regional and international fisheries bodies for proper management of fisheries resources.

34. In follow up discussion, the Working Party noted that the catch assessment system also included the island of Rodrigues. The system of managing the banks fishery using a quota system was based on occasional monitoring at sea, the use of logbooks and the record of landings when the motherships returned to Port Louis. Logbooks used could be made available to the Working Party.

Mozambique

35. Mozambique has a coastline of about 2 750 km and three main fishery subsectors: artisanal, semi-industrial and industrial. The total fisheries catch in 2006 was about 90 500 tonnes, an increase of 7 percent over 2005. About 70 percent of the total catch came from artisanal fisheries. The most caught resources were two species of shrimp and deep sea prawns mainly off the south coast and a freshwater sardine from inland waters. Tuna are taken offshore along the entire coast mainly by licensed EU and Japanese vessels.

36. The data on the catch of the industrial and semi-industrial fisheries subsectors are collected using a logbook system while a systematic and functional landings monitoring system is used for artisanal fisheries.

37. The artisanal fisheries monitoring system is based on stratified random sampling with landing sites having similar features grouped into strata (Appendix G). Catch recorders are residents of the fishing community that are trained for the purpose and act in teams of one sampler and one assistant. The system now covers almost the entire coastline (all coastal districts) as well as some inland areas. Catch, effort, CPUE, species composition and length frequencies of the most important species are collected. The analysed results are provided to public as well as private entities, and used for stock assessment and advice for management measures.

38. The main constraints of the system are related to expense, limited financial resources, difficulty in covering all the required landing sites, and limited stock assessment experience.

39. In follow up discussions, it was noted that while the data is reliable it does not adequately include some fisheries (such as the crab fishery). However, currently all coastal provinces are being covered whilst in 1996 only two districts were covered. Mozambique has significant fisheries for short-lived, abundant species (eg small pelagic) that have very variable and sometimes large catches. These present particular technical difficulties to the level of enumerator coverage in a stratified sampling scheme. Enumerators are residents of coastal villages that are identified, trained and paid allowances by the Institute primarily responsible for catch assessment (IIP). The monitoring system is costly and ways are being examined to ensure continued funding. The system includes monitoring of the price of the fish (by family groups) though this needs improvement.

Seychelles

40. The Seychelles participants presented information predominately focusing on the major artisanal fisheries in Seychelles and their associated monitoring systems. Artisanal fisheries, which are multispecies, multigear, typically catch between 4 000 and 5 000 tonnes annually. Three main monitoring systems are employed (Appendix G):

- a) The catch assessment survey (CAS) is a catch, effort and species composition sampling system that is stratified geographically and by boat/gear type.
- b) Boat surveys, four types within the CAS aiming at a wide range of trap, line, net, and foot fisheries.
- c) Logbook-based monitoring programmes in the sport (recreational), the lobster and the sea cucumber fisheries.

41. The various monitoring programmes provide adequate coverage of the fisheries and data that are reliable and of good quality. They have been in place continuously since the early 1980s. Some smaller scale fisheries and the recreational sub-sector are not monitored, leading to underestimation of total catch and other parameters. Problems with the sampling strategy were identified, and the data management approaches and software require revision and modernization to provide better utilization of data for management. The latter issue is being addressed through the development of centralized data repository system at Fisheries Information and Statistical Systems (SFA), although the modules for artisanal fisheries have not yet been designed.

42. Fisheries data have been well utilized for stock assessment, for ecological research and for fisheries policy and development, but the lack of management plans inhibits further utilization of the data. Most fisheries remain open access with no harvest strategies, reducing the utility of stock assessment. Demographic parameters exist for many of the key species, but other parameters for analytical stock assessment are estimated or sourced from other areas.

43. In terms of the regional issues, Seychelles noted that regional standardization of monitoring was not appropriate and that monitoring should be implemented according to local circumstances. Particularly in the case of transboundary stocks, regional approaches to minimum data requirements was advocated, and it was noted that stock assessments should be conducted at as fine a spatial scale as possible to account for local fishing effects.

44. In the discussions that followed, the WP noted the importance of spatial scale and availability of data on the recreational fisheries for decision making. The WP also noted the efforts being made to have an operational, centralized information system.

South Africa

45. Most of South Africa's important commercial fisheries occur outside of the SWIOFC area. The two South African fisheries (excluding tuna and billfish) with connection to the SWIOFC region are the line and crustacean trawl fisheries.

46. The line fishery is one of the oldest fishing activities in South Africa and has recreational, commercial and subsistence components. Although many of the species are endemic to South Africa, several important target species are shared stocks with other South Western Indian Ocean countries. The crustacean trawl fishery is a small multispecies fishery that operates off the KwaZulu-Natal coast and targets various commercial prawn species and occasionally crabs and lobsters.

47. The participants from South Africa presented the history and changes that had taken place in the monitoring of these two fisheries since the 1970s (Appendix G). They covered collection of catch and effort data, other standard biological sample data (lengths, weights, sex, maturity and gonad condition), submission of mandatory as well as voluntary returns depending on the recreational or commercial nature of the fishery, the use of trained land-based and at-sea observers, and the utility of hand-held electronic systems for the collection of landings and bycatch data. They drew attention to issues of data quality, the complexity of explaining CPUE trends from a multispecies fishery, and the difficulties of standardizing CPUE across different gear types.

48. The linefish data are stored in the National Marine Linefish System (NMLS) with a customized Delphi front-end to a Sybase database structure. The crustacean fishery data is in an Access database. The NMLS produces comprehensive as well as specific reports on the catch, catch-per-unit-effort (CPUE) and size frequencies that can be further processed in Excel spreadsheets by end users for their own particular analyses. From the Access database, standard reports on trends in catch, effort and CPUE of the major species are compiled annually. These systems or databases are compatible with and in due course will form a part of a centralized Marine Administrative System (MAST) which links all facets of Marine and Coastal Management (MCM) functions to allow for an integrated analysis of fishery performance and tracking of total allowable catches.

49. Owing to the large number of species, and the difficulty of having them all quantitatively assessed, other interim indicators of stock status (such as historical trends in catch and effort) are being developed to respond to the needs of a protocol that requires management plans to be eventually set up for all the major species. Ongoing studies in South Africa recognize three methods as potentially suitable for quantitative assessment of linefish stocks using existing data or data collected from these fisheries over the longer term: per recruit analysis; dynamic, age-structured production modelling and ad hoc tuned Virtual Population Analysis (VPA).

50. The crustacean fishery is currently managed in terms of Total Allowable Effort (TAE) measured by the number of vessels. A surplus production stock assessment is being undertaken this year, using subsets of the crustacean trawl system data.

51. The participants from South Africa considered that given the complexities highlighted, it would be difficult, but not impossible to establish a regional data system. A clear understanding of the information required and how it would be analysed was required. Also a basic understanding of the life history strategy of a species or group of species was a prerequisite for any successful management intervention. As there is little information on connectivity between South African stocks and those of other parts of the southwest Indian Ocean, genetic studies (most likely at micro satellite level) were required for stock identification.

52. In follow up discussions the Working Party noted the significant long term datasets that were available in South Africa. Also that even when good data was available, the use of less quantitative assessment indicators such as catch and effort trends was still important. Standardization of CPUE could be difficult but had been possible between South Africa and Mozambique for lobsters. It was important to understand the connectivity between some of the fish species for which there is long term data in South Africa, and the same species elsewhere, as further analysis of these datasets could shed insights into changes that may have taken place elsewhere in the region. The WP also noted that the cost of catch data collection is financed by licences and revenue from the fishery. South Africa has established databases for most fisheries, mostly using volunteers to assist in data collection. The fluctuation in landings of swordfish was in part due to a significant drop in catch rates and shifting to other areas.

United Republic of Tanzania

53. The Tanzanian marine fishery is mainly artisanal with a small industrial fleet which targets commercially important species like prawns and tunas. Fisheries statistics have been collected since 1960s and various systems have been used. The Tanzanian participants traced the history of catch monitoring from a Tanzanian Fisheries Information System (TANFIS) between 1989–1996, subsequent years of difficulty following decentralization when regional/district fisheries officers ceased to be answerable to a central Fisheries Division, a catch assessment system produced under the SADC Regional Fisheries Information Systems (RFIS) program 2002–2005 which produced a database but was incomplete, more recent programming initiatives was through the Fisheries Training Programme (FTP) of the United Nations University (UNU) and supported from the IOTC (Appendix G). Frame surveys describing the fishing, landing, processing and marketing patterns were undertaken in 1995, 1998, 2001 and 2005. Currently catch assessment of the marine landings is based on 22 of 259 coastal sites identified in the 2005 frame survey. Data input is from five districts that are in five different administrative regions.

54. The data collected has generally been inadequate, inaccurate and unreliable apart from a few years such as in 2006. The catch is mostly aggregated into family groups. At least for major stocks species-level data are required for stock-assessment. There is therefore a need to improve the national capacity in terms of the quality and availability of fisheries data and the ability to collect fisheries statistics. The major constraints on the evaluation and analysis of fisheries data in artisanal fisheries is a lack of answerability of data recorders employed by respective districts to the Ministry responsible for fisheries, a lack of fisheries data recorders employed by the Fisheries Division itself, insufficient logistical facilities such as bicycles, motorbikes, insufficient data processing equipment, and use of local names which differ between places. In the industrial fisheries constraints include absence of an observer program, insufficient monitoring (Vessel Monitoring System [VMS] is being established but is not yet operational), lack of fishing port facilities so that most of the tuna catch leaves the EEZ unrecorded, and vessel returns that were summaries of catches and insufficiently detailed to be useful. There was inadequate and insufficient reporting in the artisanal and the tuna industrial (EEZ) fisheries.

55. Information on fish population biology is old, limited and scattered. The last comprehensive stock assessment was conducted in 1983, though there have been intermittent surveys on crustacean resources.

56. There was need for an improved ability to use landings and effort information to assess the state of fish stocks and provide appropriate management advice on sustainable yields and recommended total allowable catches within the context of clearly articulated stock harvesting strategies.

57. The Tanzanian participants considered that there was need for a collective approach to deal with shared fishery resources in the South West Indian Ocean, to harmonize datasets, collection procedures and data analysis so that management strategies can be implemented harmoniously. They considered that this required the establishment of a regional data system, to be fed by the national systems. There was also need to develop the capacity for stock identification and separation.

58. In the discussions that followed the Working Party examined the situation with regard to management of artisanal fisheries and existing data that may help. Presently the artisanal fishery is open access, and very scanty data exists to study the fishery. Fisheries data and statistics are aggregated to gross estimates of weight, effort and value of fish. The WP was informed that no boat census data exists. No fisheries bulletin has been produced to date but the first will be produced later this year. The WP suggested that Tanzania should seek to have a standardized data collection method including vessel descriptions defined by the CWS handbook from the International Fisheries Commission.

Yemen

59. Yemen has a coastline of about 2 500 km and some 70 000 fishers mostly organized into 130 cooperatives with 17 000 boats. The artisanal fisheries produced 98 percent of the total catch of 230 000 tonnes in 2006. The country has many islands one of which (Socotra) is located within the zone of competence of the SWIOFC. The fisheries sector includes artisanal industrial, aquaculture and tuna-processing subsectors. Aquaculture represents a new investment in fourteen locations along the coast (Appendix G).

60. Whilst monitoring of landings started before 1990 it was only in 1996 that data of good quality data was collected. In all the landing centres, there are cooperatives and data collectors from the Ministry of Fisheries who collect information on the catch and effort. In any case all fishery products have to be registered before sale. Data are collected by data collectors in each coastal region and sent to the Ministry of Fisheries. Data is stored in Excel and results are produced every third months of the catch, fishing effort, price, export, species composition, aquaculture production, and tuna canning output.

61. Yemen's constraints include lack of a database, biological information and technical capacity for stock assessment.

DATA GAPS ANALYSIS (IDENTIFICATION OF PARAMETERS)

62. Five working groups were set up to examine the minimum data of requirements for effective fisheries management in five generic fisheries types: industrial shrimp, artisanal shrimp, trap fisheries, demersal line and beach seine fisheries. The requirements and the status of data for each of the countries are in Appendix H. The following observations were made with respect to each of the fisheries:

Industrial shrimp trawling

63. Information is generally well documented and port-based. There was concern about the level of precision. There was a need identified for observer programmes to validate the data that was

provided by fishing companies. There was also an urgent need to standardize the species, gears, and vessels regionally according to FAO accepted codes and criteria.

Artisanal shrimp fishing

64. The artisanal shrimp fishery is more dispersed and thus more difficult to monitor than industrial fishery. Boats are mostly unregistered and data can best be obtained through surveys or sampling. Frame surveys should be conducted every two years. There are requirements for biological data more especially growth parameters. Environmental data such as river discharge and socio-economic data would also be necessary.

Trap fishery

65. The primary data needs for this fishery are size at first maturity, spawning periods/grounds, trap/ gear efficiency and, saturation soak time.

Demersal line fisheries

Species composition

66. Recognizing that these fisheries are multi-specific, dominant (key, indicator) or critical (overexploited) species should not be aggregated. Other species may be aggregated to family or other level. A regional study is required to identify critical and key transboundary species in the fishery so as to list species and groupings for reporting.

Effort

67. Fishing effort, in fisher days as a minimum, should be available by sector, year and region. Better measures may be appropriate, at least at the sector level. A SWIOFP project should look at gear efficiency and standardization of effort. Problems with CPUE calculated from commercial catch and effort data were discussed, and an alternative approach to assessing status was considered important.

Frame (fleet structure) survey

68. Should be periodic (every five years) according to standard (FAO) criteria. A regional frame survey could be undertaken as a SWIOFP project.

Length frequency

69. Given that CPUE is often not a reliable indicator in multi-species line fisheries, it is important to have an alternative approach. Depending on data quality, maximum size, size at capture, minimum size, etc. could all be used as indicators in addition to utility of the data for analytical stock assessment. Routine collection of these data will be simple in some countries and not others. Key species for sampling (e.g. transboundary) require identification. Difficulties with obtaining random, representative samples were identified.

Mean weight

70. Where length frequency data collection is not feasible or catches are relatively uniform, mean weight data could also be collected.

Beach seines

71. There is variability in the unit of effort used e.g. number of hauls/day/net, number of days fished/month. These need to be standardized. Currently the following information is available:

- Kenya (data for 4 years up to 2006): total catch; total effort (by net);
- Tanzania (data is available but not processed);
- Mozambique (data for 6 years for all areas up to 2006; in database): total catch and total effort (by nets); catch composition by size and by species (most important species);
- Yemen (data for 7 years for all areas up to 2006): total catch only.

Major data issues in selected fisheries

72. Six areas of data management were considered in relation to selected fisheries in respective countries. These were data collection (structural data, operational data and biological data), data processing, data analyses, data dissemination and any other general matter. The selected fisheries were: industrial shrimps, artisanal shrimps, industrial line, artisanal line, recreational line, subsistence line, artisanal trap, beach seine and industrial trap. The matrix below provides the fisheries for which each country reported.

	Comoros	France	Kenya	Madagascar	Maldives	Mauritius	Mozambique	Seychelles	S. Africa	Tanzania
Industrial shrimps			√	√		√			√	√
Artisanal shrimps			√	√						
Industrial line			√		√	√	√		√	√
Artisanal line		√	√		√	√	√	√		
Recreational line		√	√				√	√	√	
Subsistence line									√	
Artisanal trap			√				√	√		
Beach seine			√				√	√		
Industrial trap								√		

Industrial shrimps

73. Structural data was sufficiently available. The operational data was however all aggregated and lacked geospatial information except for Mozambique. Biological data on target species and bycatch was insufficient or altogether missing except for Mozambique.

74. Madagascar and Kenya reported minimal data processing including lack of specialized software and no quality checks on their data sets. All the countries had limited capacity on data analysis including modelling work. South Africa, Madagascar and Kenya reported the need for improvement on dissemination including production of statistical year books

75. Other general issues included environmental assessment of the prawn trawl fisheries, stock separation, and cross boundary connectivity. There was also lack of staff and limited funding to carry out observer programs for data collection.

Artisanal shrimps

76. Structural data was either out of date as in the case of Madagascar where frame survey was lastly carried out in 1998, or non existent. In Kenya operational data is aggregated and limited, whereas in Madagascar the data is of poor quality due to inaccessibility to the landing beaches, high gear variability and multispecies nature of the fishery. Biological data does not exist. There was no activity on data processing, data analysis and data dissemination due to limited capacity.

Industrial line

77. Structural was widely available. In Kenya illegal fishing hooks exist but were not well documented. Operational data was generally not reliable except for South Africa who reported the use of VMS. Mozambique has sufficient biological data. There was lack of quality checks in most of the countries except South Africa. Other issues included lack of MCS systems, delays in data dissemination as well as lack of observer programme.

Artisanal line

78. Number of fishers and hooks are unknown for both Kenya and Mozambique. Seychelles have data up to 2004. Except for Mozambique and Mauritius, the countries reported problems with operational data including inaccurate reporting and highly aggregated data sets. Biological data was available for only Mozambique and Mauritius.

79. Mozambique, Mauritius and France reported no problems with data processing. It was generally reported that there was limited capacity in carrying out data analysis as well insufficient funding.

Recreational line

80. There was no problem with structural data except for Mozambique and Seychelles who reported unreliable reporting in log books. All the countries had none or insufficient biological and operational data. Data processing, data analysis and dissemination are insufficient or non-existent in most of the countries.

Subsistence line

81. Data collection on the structures, operations and biology was sufficiently done. Data processing, analysis and dissemination needed improvement.

Artisanal trap

82. Data collection on structures, operations and biology is insufficient. Number of traps per vessel is not known and also the operational data is aggregated and unreliable. Trap fisheries are multispecies, mainly for demersal species and difficult to monitor. The only information disseminated has been through scientific studies.

Beach seine

83. Out of the information reported for the three countries, most of the issues are in the Kenya and Seychelles data and include aggregation and unreliability of data. Operational and structural data is poor in the countries while the biological data is poor in all the three countries. There is no data dissemination in Kenya. Seychelles also reported diminished catches through changes in fleet structure.

Industrial trap

84. The last major boat survey was done in 2004. Operational data is species aggregated. There is no routine stock assessment programme. There are no problems in data analysis, however dissemination experiences a 8-month delay.

METADATA REPORTING

85. A list of metadata fields was presented to help the member countries report statistical data to the regional coordinator to make a combined regional meta-database. The comprehensive table is available as Appendix G. It is expected that the data reported will form part of the regional but the schema may also be useful for national databases.

86. In the discussions that followed it was agreed that in-country data should be reported to the SWIOFP Data Coordinator in the next few weeks up to August 2007. The data held outside the region will be handled at the onset of the SWIOFP project since resources are already set aside in the project.

FISHERIES DATABASES

WioFish database

87. WioFish is a form of a fisheries metadata management system. Development of the database to collate all available information from small-scale fisheries of the WIO was initiated as a component of a Norwegian International Development Agency (NORAD) funded programme to assist WIO countries in implementing the Jakarta Mandate of the Convention on Biological Diversity. The ultimate goal of this component is to ensure that the coastal fisheries of the WIO are sustainable based on a cohesive and scientific management approach. Furthermore, since the focus is on regional collaboration, it is hoped that there will be an associated increase in institutional capacity.

88. Objectives were:

- improved understanding of biological and socio-economic aspects of fisheries;
- regional overview of inshore fisheries including problems and management needs;
- enable comparisons of policy and management strategies among fisheries;
- provide semi-quantifiable indicators of status of, and progress in, management of fisheries;
- increase understanding of threats to biodiversity by fishing.

89. Inception meeting was held in Mombasa, February 2000 which formulated the WIO Marine Biodiversity Project and established a Task Force. The ORI was appointed as the lead for the project and developed, in partnership with other institutes in the region, the project approach and data collecting strategies

90. The project commenced with the creation of a data gathering template (see table).

Fishery description	The catch
Sector classification	Target species
Geographic change	Species composition
Habitat/ecosystem	Catch rates
Depth range	Total catch
Socio-economic aspects	Bycatch
Markets and processing	Seasonality
Impacts on biodiversity	Management
Sustainability	Management system
Threatened species	Access
Habitat impacts	Monitoring
	Programme linkages
	Conflicts
	Management problems
	Research status
Other issues	References

91. As a first step, each country node was asked to identify all the possible fishing activities that could be described from that country. A total of seven broad fishery sectors were defined and a total of 213 different fishery types were identified. A review workshop was held in December 2002 in Mombasa which reached the consensus that a lot of interesting information and data has been gathered in the first stage.

92. A follow-up Technical Review Workshop in Durban, March 2004 was held to review and finalize the structure and format of the database, develop a web-based interface with the database, resolve issues regarding access and access permissions to the database and Web site and provide a platform for the expression of any objections by the participants to the database. The outcome of the workshop was a training session in November 2004 in Nairobi which was attended by representatives from South Africa, Tanzania, Seychelles and Kenya

93. The online version of Wiofish is available at www.wiofish.org. At present data has been entered for the small-scale fisheries of Kenya, Mozambique, Seychelles, South Africa and Tanzania. It is hoped in the future to extend this network of collaboration to include Madagascar, Mauritius, Comoros, Somalia and Reunion (France). The national nodes are IIP (Mozambique), KMFRI (Kenya), UDM (Tanzania), ORO (RSA) and SFA (Seychelles). Further funding has been confirmed by TFESSD Fund (World Bank).

94. In the discussions that followed, members felt that efforts to use WioFish database can be linked with the development of StatBase database. It was noted that the information structure of WioFish is useful describing various fisheries in the region.

StatBase database

95. The participant from France gave an overview of StatBase software. Participants were reminded that the software is intended for use by the SWIOFP project once the project activities begin. He said that there would be need for training of the users during its implementation. It is an open source software, so there will be no further maintenance.

96. He said that implementation of the StatBase activities is scheduled to begin in September 2007 assuming that SWIOFP project is to begin then (see tables below). Although SWIOFP only targets specific fisheries, it gives an opportunity to expand to the wider fisheries as well.

97. In the discussions that followed, it emerged that most countries do not have a national fisheries database. The software can be available for SWIOFC member countries to be used for reporting, disseminating, gathering and sharing data but it is not conceived to manage daily or routine information. In addition the software is not designed to manage scientific data. Since each country will have specific needs and ways of collecting data, StatBase simply accommodates national databases which should be structured around their own needs.

98. The software would be available to manage the SWIOFP regional database. Each country can present all the data sets that they want to include on the regional database. Anyone interested can access the data and make their own checks since the system could be installed in a regional (internet) platform.

The strategy for improving information on status and trends of capture fisheries (FAO – STF Project)

99. The participant from FAO explained how FAO implements the Strategy-STF, improving information on status and trends of capture fisheries through two actions:

- the FishCode-STF project;
- the Fishery Resources Monitoring System (FIRMS).

The Fisheries Resources Monitoring System (FIRMS): Status and prospects

100. The Fisheries Resources Monitoring System (FIRMS) is a partnership of international organizations and regional fishery bodies. The aim is to provide decision-makers with information in order to develop effective fisheries policies in accordance with the Code of Conduct for Responsible Fisheries. It was established in 2004, and functions under the framework of the 2003 FAO Strategy for Improving Information on Status and Trends of Capture Fisheries which has been endorsed by the United Nations General Assembly. Each partner agrees to regularly provide relevant information on the exploitation, assessment, management and status and trends for species and fishing areas for which they have primary responsibility. SWIOFC is among the 14 partner organizations.

101. Information is presented in synthesized fact sheets and State of Resources Summaries. These include images, maps of geographical distribution, general biological and habitat characteristics, scientific assessment results, management considerations and status and trends statements. For each collection of fact sheets, the FIRMS Data Quality Assurance statements describe the set of criteria applied, enabling users to evaluate FIRMS information content.

Status of FIRMS Marine module database – inventory and fact sheets

Partner	Stocks – Marine resources in the inventory	Fact sheets published
CCAMLR	3	
CCSBT	1	1
FAO	22	22
CECAF	220	86
GFCM	36	8
SWIOFC	264	41
IATTC	37	21
ICCAT	22	16
ICES	148	148
IOTC	15	5
NAFO	18	18
TOTAL	786	366

102. FIRMS data sharing occurs under the agreed FIRMS Information Management Policy (IMP) using a list of standard terms for Marine resources status descriptors (e.g. abundance level = "low abundance", or exploitation rate = "high fishing mortality"). This will enable users for example to search stocks with similar status across all information contributed to the system. FIRMS Web site is www.firms.fao.org.

103. Presently regular inventories of marine resources and Fisheries in the SWIOFC region have not been initiated. Two sources for the development of these inventories were identified by the FIRMS Secretariat:

- the list of Marine resources or fisheries on which some Status and Trends knowledge is available can be compiled from the SWIOFC Scientific (SC) meeting report;
- the inventory of small scale fisheries sponsored by IUCN known as the WIOFISH initiative provides a comprehensive list from which the SWIOFC inventory can be elaborated.

104. Further the inventories can be updated online or submitted as XML format subsequently loaded and published in FIRMS.

105. FIRMS will hold Technical Working Group meeting between September and November 2007 which will: i) train partners in using the final version of the workflow management system; and ii) validate the draft fisheries modules and its underlying data model, and welcomed the attendance of SWIOFC experts.

The FishCode – STF project

106. The FishCode – STF project started in November 2004, to support the implementation of "The STF – Strategy" world wide, with special emphasis on developing countries. The project aims at improvement of information at national or regional level to be used for strengthening of national or regional policy-making and sustainable management of fisheries.

107. Operationally the project looks at the following inventories:

Complete description of how information on fisheries is collected, with analyses on strengths and weaknesses by reporting on the following:

- Institution in charge
- Scope (e.g. fisheries monitored)
- Type of monitoring system
- Spatial and time coverage
- Data source
- Data unit
- Strategy (sampling, full enumeration)
- Population size
- Collection method
- Data management
- Data analysis-reporting (including indicators)
- Finance

Information on how the different fisheries are monitored reporting on the following topics:

- Overview
- Fishing area
- Fishing ground
- Species
- Fishing gear
- Fishing vessels
- Exploitation indicators
- Socio-economic indicators
- Post-harvest use
- Management
- Bibliographic references

108. Regional workshops focusing on coastal fisheries are organized to discuss the following:

- review of the fisheries and data collection systems inventories;
- seek for practical solutions (data collection in a budget and manpower limited situation);
- partnership with regional initiatives.

109. The Project has been involved in the following field activities:

- study on the impact of IUU fisheries on statistics in the Arafura Sea (Indonesia);
- establishment and support to regional working group on fisheries statistics of OSPESCA;
- standardization and preparation of guidelines on Queen conch monitoring in Caribbean and Central America;
- support to information collection on small-scale fisheries in Nicaragua;
- support to the development of sample based fisheries survey systems in China;
- support to the improvement of fisheries monitoring in Brazil and Yemen;
- support to improvement of inland fisheries monitoring in SE Asia.

110. The project can work in collaboration with the Working Party on the following areas provided that funding is identified:

- standardized inventories on fisheries monitoring systems and fisheries inventories (FIRMS);
- technical support to the working group on statistics;
- development of regional training programs on sample based surveys or GIS;
- support to development and implementation of national/regional pilot programs for improvement on monitoring;
- technical assistance.

111. In the discussions that followed, there was unanimous agreement that FIRMS and FishCode-STF represented potentially excellent systems for use by both SWIOFC and SWIOFP and that its

adoption and inclusion would be progressively considered as activities of SWIOFC and SWIOFP intensified.

112. A schematic representation of these databases was presented (see figure next page) to guide the regional data management activities. Relevant database systems and suitable institutional structures are shown.

FISHERIES AND INFORMATION TECHNOLOGY

SWIOFP Web site being developed through the IW:LEARN project

113. Participant from KMFRI Mrs Edna Onkundi presented SWIOFP Web site presently being developed by her with technical assistance of the International Waters: Learning Exchange and Resource Network (IW:LEARN). The Web site is currently being hosted by IW-LEARN at the UNDP (United Nations Development Programme) offices in Nairobi –Kenya, and can be reached through <http://plone25.iwlearn.org/sites/swiofp/about>.

114. IW:LEARN works with GEF International Waters projects to improve online sharing of data and information relevant to managing international waters, including marine, coastal and freshwater ecosystems. An important activity of IW:LEARN is to implement its Web site Toolkit, Plone 2.5 using Zope 2.8 which provides support for developing a dynamic content management system.

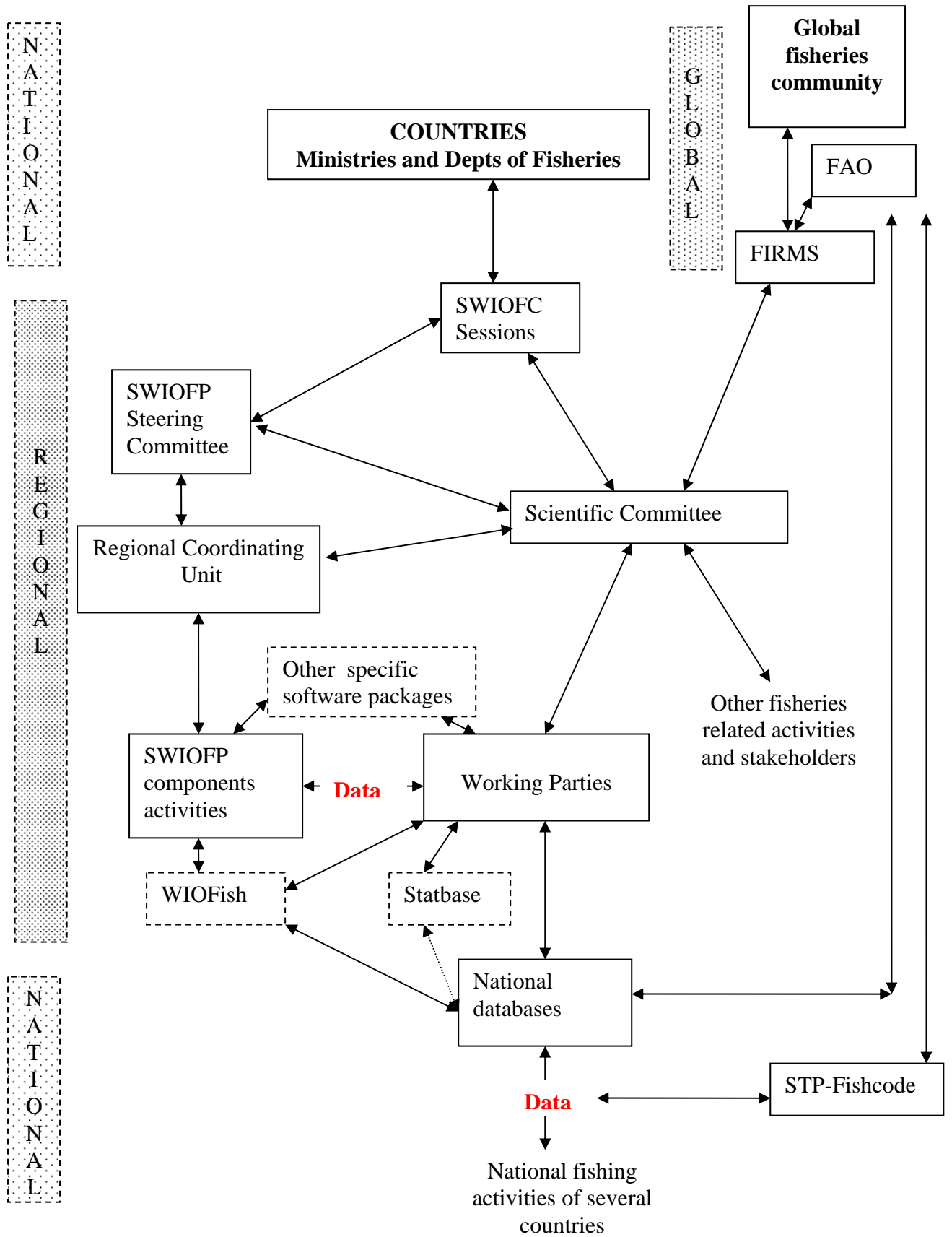
115. The presenter also attended training workshop organized by IW-LEARN for Web development late last year (2006) in Mombasa –Kenya where she participated and acquired the knowledge of web development using the IW:LEARN newly launched toolkit.

116. In the discussions that followed, participants commended the good work being carried out on the Web site development. The participants asked for more information including the likely implications of hosting large databases and interactive updating of information. The meeting was informed that so far the IW:LEARN project provides technical assistance at no cost. Members proposed that SWIOFC Web site be developed with this arrangement after seeking commitment during the next session of the commission.

Use of GIS in fisheries and fish stocks management

117. Participant from KMFRI, Miss Jane Ndung'u made a demonstration of how Geographic Information System (GIS) can be applied in fisheries and stock management. The demonstration involved identification of fish spawning areas, migratory corridors, main fishing areas, geodistribution of their abundance, and suitable seasonal habitats. She demonstrated with an aid of a management problem, how the water depth, water temperatures, Secchi depth, chlorophyll, larval abundance, clupeids, larval abundance, adult carp were combined together in GIS overlays to support a decision making process in a fisheries, in this case the creation of a fish sanctuary and determination of MSY to curb problem of overexploitation.

118. In the discussions that followed, Mr Gertjan, FAO, informed the working group that he was closely involved in developing this particular GIS application module which has now been released as a technical FAO guideline on geospatial fisheries management. This is free licence software and it is available and can be requested by email. Several other sets of software are similarly available on request.



RECOMMENDATIONS OF THE WORKING PARTY

119 The working party recommended the following:

- Countries that have not already established integrated information gathering systems are urged to establish such systems relating to their fisheries, in particular the minimum requirements such as catch and effort. FAO through partnership with FishCode seek to assist with the catch and effort information on request by the countries.
- Countries that have not put the minimum requirements such as catch and effort in their national databases are encouraged to set up national databases capable of generating various sets of information and statistics, and optionally feed onto the designated regional database (i.e. StatBase). Countries are encouraged to collaborate with different agencies that collect fisheries (relevant) data so that these should become available to the Working Party. Other stakeholders are encouraged to contribute to this Working Party.
- National centres may hold a national workshop for metadata based on regionally agreed minimum parameters, if required.
- The Working Party recognized the usefulness of contributing to the FIRMS database through the SC of SWIOFC to facilitate or highlight fisheries issues of the region.
- The Working Party recognized the difference in availability of information between the artisanal and industrial fisheries. Further in recognition of global initiatives to recognize the importance of artisanal fisheries and its technical and resource difficulties, member countries and the project are encouraged to contribute and participate in these initiatives.
- Focal institutions should report the current descriptions of relevant data held in the format agreed on during this Working Party, by August 2007 to the RMU. Support on the schema will be available from IRD (e-mail: Pierre.Chavance@ird.fr).
- Countries are encouraged to participate in WioFish project as a useful information system.
- The Working Party recognized the capability of GIS in fisheries information management and recommended that future national datasets should incorporate geospatial information as much as possible, to facilitate the use of GIS analytical tools.
- The SWIOFP regional Web site being developed at the RMU, should provide an additional Web platform for SWIOFC information dissemination.
- Recommends that the Project assist countries strengthening the capacity in ICT especially GIS.
- The next Working Party should consider increasing focus on ecosystem approach and climate issues.
- The value of a regional framework survey was recognized as a useful tool in information gathering and should be investigated further.
- Recognize the importance of harmonized registration of vessels and seek guidance on studies already undertaken.
- Importance of discriminating fish stocks was highlighted and accordingly countries are encouraged to initiate studies on connectivity of stocks.

- The meeting agreed that FishCode-SDF, FIRMS, StatBase presented a range of opportunities that could enhance the development of several aspects of the SWIOFC and SWIOFP in particular information management, data integration, resource monitoring and improving the quality of national data sets, and that their adoption and inclusion would be progressively considered as activities of SWIOFC and SWIOFP intensified.
- Recommend that SWIOFP/C experts attend the forth coming FIRMS workshop on standardization of resource data. The meeting recommended that SWIOFP manager appoint the project nominee to attend.
- The Working Party requests FAO and SWIOFP and other partners to investigate the possibility of supporting the Comoros and Madagascar in revitalizing their artisanal fisheries monitoring systems.
- The meeting considered further meta-database options and recommended that a table of available systems to be made available by ORI.

CLOSING OF THE WORKING PARTY

120. The closing remarks were delivered by the new acting Executive Secretary for the SWIOFP, Dr Kaitira Katonda. In his remarks he recognized the contribution that 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 in short notice. Noting that activities of the WP and SWIOFP are complementary, he said that the WP meeting was timely as the SWIOFP is almost set 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).