

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA



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SUMMARY OF FAO AND CITES WORKSHOPS ON SEA CUCUMBERS:
MAJOR FINDINGS AND CONCLUSIONS

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Advances in Sea Cucumber Aquaculture and Management (ASCAM), convened by the Food and Agriculture Organization of the United Nations (FAO); 14-18 October 2003, Dalian, China

2. In October 2003, FAO gathered in Dalian, China, 11 local and 37 international experts from 20 countries on sea cucumbers biology, ecology, fisheries and aquaculture in the "Advances in sea cucumber aquaculture and management (ASCAM)" workshop. This workshop was organized because of the intense fishing effort for many sea cucumber species all over the world, the ever increasing market pressure for harvesting these species and recent technological developments on fishery management, aquaculture and stock enhancement techniques.
3. The workshop had three sessions focusing on: (i) Status of sea cucumber and utilization; (ii) Sea cucumber resources management; and (iii) Aquaculture advances. As a whole, the workshop presented up-to-date information on the status of different sea cucumber populations around the world. It also emphasized the experience of each participating country in management and identified information gaps that needed to be addressed. Additionally, it devoted one session to the advances of artificial reproduction, aquaculture and farming of selected sea cucumber species, with special emphasis on *Apostichopus japonicus*. The ASCAM workshop provided recommendations that were designed to help international and regional organizations and countries to identify priority activities regarding the commercialization and conservation of sea cucumbers. In further CITES deliberations, much attention was given to the ASCAM proceedings and its main recommendations as they form the basis for collaboration in different fora on conservation of sea cucumbers worldwide (Lovatelli et al. 2004).
4. The FAO workshop was divided into three working sessions: (i) Status of resources and utilization; (ii) Resources management; and (iii) Aquaculture advances. Each session was followed by group discussions in which major issues were raised. The comments from these groups' discussions were the basis for a list of recommendations provided in Lovatelli et al. (2004).
5. Major findings and recommendations from Session I and II:
 - Critical need to establish and implement management plans towards sustainability of fished populations. It was also emphasized that those management plans are needed before the commencement of a fishery activity.

- Data on catches, processing and exports are needed at the national level in order to manage and regulate the fishery; whilst statistics at the national and international levels should be standardized to simplify data gathering and global statistic compilation.
- Technical assistance on post-harvest handling should be provided to fishers in order to minimize the sub-standard product that enters international trade as low value item. This should include development of manuals and training courses or workshops for best practices in post-harvest handling and processing.
- Increase public awareness on the vulnerability of sea cucumber populations to overexploitation. Promote networking and cooperation amongst researchers and fishery workers.
- Promote joint work amongst international organizations (i.e. IUCN, FAO, CITES) to aid conservation and management of sea cucumbers.
- Stock assessment activities should be performed before the fishery opens in order to obtain information on virgin biomass; and monitoring the recovery of stocks after a fishery has been closed should be encouraged.
- It is important to deal with sea cucumber fishery as a multispecies one, hence acknowledge the different ecological and biological traits amongst species.
- Management plans for sea cucumbers should be conservative due to the high vulnerability of stocks to overexploitation, with the depletion of sustainable breeding populations as one of the highest threat to such populations. As key recommendations were: restriction of SCUBA or 'hookah' to protect deep water stocks; develop of a 'code of conduct' to promote responsible fishing practices; analysis of the importance and occurrence of sea cucumbers as by-catch in trawl nets and dredges to reduce the impact on population and habitats.
- As critical research needs, the following were identified: (i) seed parameters for fishery models (i.e. growth, mortality, recruitment, larval ecology); (ii) maximum sustainable yields should be estimated for different types of fisheries and per species; (iii) minimum stock size for viable breeding populations in order to ensure successful reproduction and natural replenishment of the population; (iv) general ecological studies (i.e. factors affecting the dispersal of sea cucumber larvae, source and sink populations, ecology of juveniles sea cucumbers particularly for grow-out and restocking programmes, effects and benefits of sea cucumbers on ecosystems); (v) effectiveness of Marine Protected Areas (MPAs) or No-Take Zones (NTZs) on sea cucumber populations, with emphasis on research on appropriate sizes, numbers and spatial design of MPAs); (vi) a literature review of existing literature and case studies on MPAs; (vii) stock delineation; (viii) evaluate the taxonomic status of some of the most valuable sea cucumber species; and (ix) evaluate the usefulness of restocking, which should be implemented only when other management measures have failed. Needed information include: economic viability and returns from restocking programmes, value and significance of restocking to ecosystem functioning and long-term repopulation needs, genetic libraries and genetic variety (i.e. spawners in sufficient numbers so as to ensure genetic diversity), diseases, parasites and introduced species from restocking programmes, the carrying capacity in number and biomass of the habitat, and the best strategies for releasing juveniles.

6. Major findings and recommendations from Session III:

- Publication of a manual or guide on sea cucumber aquaculture, which should compile the various techniques currently used or in development for the main commercial species of sea cucumbers. It should include (i) hatchery techniques; (ii) Farming and sea ranching techniques; and (iii) General advice.
- Enhancement of international exchanges by bringing together experts from the scientific, technical and business aspects of sea cucumber aquaculture. Technology transfer should be encouraged and a directory of specialists from the different fields of work should be collated and made available.

- Suggestions for future research and development: (i) Fundamental biological research (i.e. reproduction, feeding ecology, behaviour, substrate selectivity, predation on all life stages and chemical defences, effect of captive breeding and diseases and parasites affecting cultured sea cucumbers; (ii) Hatchery techniques (i.e. mechanisms to induce spawning, metamorphosis from pelagic to benthic forms, formulation of feeds, control of disease outbreaks); and (iii) Farming and sea ranching which should include research on grow-out methods to maximize cost effectiveness of the procedure, and the possibility to use abandoned infrastructure (i.e. shrimp ponds) for sea cucumber aquaculture.

International technical workshop on the conservation of sea cucumbers in the families Holothuriidae and Stichopodidae, convened by the CITES Secretariat, 1-3 March 2004, Kuala Lumpur, Malaysia

7. The international technical workshop on the conservation of sea cucumbers in the families Holothuriidae and Stichopodidae was organized by the CITES Secretariat and held in Kuala Lumpur, Malaysia, from 1 to 3 March 2004. This workshop had the following objectives:
 - a) To review information on the status, catches and bycatches of and trade in species of sea cucumbers within the families Holothuriidae and Stichopodidae; and on domestic measures for their conservation, including consideration of the adequacy of these measures;
 - b) To establish conservation priorities and actions to ensure the conservation of sea cucumbers within the families Holothuriidae and Stichopodidae, addressing *inter alia* trade monitoring and controls, national legislation and regulations, fisheries management options, conservation management and research, enforcement and capacity building; and
 - c) To formulate findings and recommendations that would contribute towards the discussion paper on the biological and trade status of sea cucumbers within the families Holothuriidae and Stichopodidae to be prepared by the Animals Committee for discussion at the 13th meeting of the Conference of the Parties.
8. The workshop provided for plenary sessions to present a series of general background documents and discuss the outcomes of smaller working groups. Session I included a review of the biology, taxonomy and distribution of sea cucumber species; the main species in trade; and the origin, trade routes and utilization (food, traditional East Asian medicines, live aquarium trade). Session II focused on current fishing practices and management options; opportunities for sustainable wild harvest and trade controls; and the CITES mechanisms and the inclusion of *I. fuscus* in Appendix III by Ecuador. Session III included reports from 16 participating countries, mainly on population status, fisheries, trade, national policies on sea cucumber management, and measures for their conservation and protection. Session IV presented the major findings of ASCAM. Session V presented working group reports on (i) national fisheries management; (ii) priorities for international conservation and protection; and (iii) potential CITES implementation issues (Bruckner 2005b).
9. The CITES workshop was divided into three working groups: (i) national fisheries management; (ii) priorities for international conservation and protection; and, (iii) potential CITES implementation issues. The comments from these groups' discussions were the basis for a list of recommendations provided in Bruckner (2004b).
10. Major findings and recommendations from Session I on national fishery management:
 - Management tools such as quotas, minimum size, gear restrictions and seasons have biological and economic benefits, and their adoption should be considered through an adaptive management process based on the status of the fishery, available information and feasibility with each location. No specific management tool has been regarded as the best, but their joint use can yield practical benefits to a particular fishery.
 - The community should be involved in the process of designing a management strategy for the fishery. It is encouraged to build a sense of responsibility and resource ownership within the community.

- Three possible management scenarios were identified: (i) open access fisheries with little or no information on the fishery; (ii) marine tenure or community based resource management with some knowledge of the fishery; and (iii) local to national management with specific measures to protect the species and methods to obtain scientific information.
- The following were identified as some of the essential steps for an adaptive management process: (i) characterization of the fishery; (ii) application of a minimum size for export; (iii) evaluation of minimum size limit by using fishery dependent and independent assessments; (iv) if the data shows that the population is in decline, then area closures should be implemented; (v) seasonal closures and rotational harvest could be applied as a precautionary approach; (vi) a Total Allowable Catch should be established as soon as there is enough data; (vii) if stocks are still in decline, total area closures should be established to allow the recovery of exploited stocks; and (viii) continue gathering catch data and undertake population surveys.
- Implementation of monitoring programmes for the resource, fishery and trade monitoring, and data acquisition. This should include a standardized methodology for reporting exports (by species and by processing state), identification of trade routes aimed at stopping proliferation of black markets. Additionally, although methods for monitoring populations may not be unique for all countries, fishery data should allow comparison over time within countries and regions.
- Enhance participation of fishers, community and industry in monitoring programmes and development of management plans. Help capacity building by means of training programmes. Improve education, training and dissemination of resource tools to assist in sea cucumber identification, best collection practices, reporting provisions, processing techniques and management approaches at all levels.
- Develop communication networks (i.e. Web based) as an effective mean to transfer information and technical assistance. This should include national and local advisory groups, fishers, processors, buyers, managers, as a way to promote conservation, management and address socio-economic needs.
- Improve enforcing capacities to address poaching and illegal trade, which in the case of developing countries may need substantial support from developed nations.

11. Major findings and recommendations from Session II on priorities for international conservation and protection:

- Identified priority species for international conservation and protection, with a total of 41 sea cucumber species with some level of concern. Each species was ranked according to different levels of concern. 5 species were of 'high concern' (*Holothuria fuscogilva*, *Holothuria nobilis*, *Holothuria scabra*, *Isostichopus fuscus* and *Thelenota ananas*), 7 species were of 'concern in certain countries of its range' (e.g. *Actinopyga echinites*, *Actinopyga Mauritania*, *Stichopus horrens*), 4 of 'potential for future concern as harvest increases' (i.e.g. *Cucumaria frondosa*, *Isostichopus badionotus*, *Parastichopus californicus*), 15 of 'no concern' (e.g. *Apostichopus japonicus*, *Holothuria edulis*, *Parastichopus parvimensis*) and 6 were 'minor species of little commercial importance' (e.g. *Holothuria impatiens*, *Stichopus mollis*). The following seven criteria were used to designate these categories: (i) commercial value; (ii) vulnerability to harvest and environmental fluctuations; (iii) geographic distribution; (iv) historical and present status of the different populations; (v) importance in world trade; (vi) concern raised by several countries; and (vii) knowledge of particular biological features (i.e. slow growth) or genetic information (i.e. isolated populations).
- The following areas were identified as geographical hotspots for sea cucumber diversity: the east coast of Africa (Egypt, Kenya, Mozambique, Somalia, Sudan, Tanzania and Yemen), West Indian Ocean island countries (including the Comoros, Madagascar and the Seychelles), the western Pacific (Fiji, New Caledonia, Papua New Guinea, Solomon Islands, Tonga, Vanuatu), Asia (China, Indonesia, Malaysia, the Philippines, Thailand, Viet Nam) and the central and north western parts of South America (Costa Rica, Ecuador, Guatemala, Honduras, Mexico).

- Identified types of measures and proposed actions, with consequent implications for the stakeholders. The group identified six measures or activities: (i) basic biology and ecology; (ii) fishery assessments; (iii) trade measures; (iv) fishery management; (v) capacity building; and (vi) communication and awareness.

12. Major findings and recommendations from Session III on potential CITES implementation issues:

- Identified the pros and cons of including sea cucumber species in the Appendices of CITES; some of the pros were: (i) curtail illegal trade and harvest; (ii) awareness rising amongst stakeholders and decision-makers; (iii) comprehensive measures to comply with CITES provisions; and (iv) perpetuation of sustainable fisheries. The group also identified cons, which are as follow: (i) burden on both range and importing countries; (ii) short-term economic impacts; and, (iii) potential to diminish cooperation in market surveys and IUU trade investigations.
- The following activities were recommended for CITES in the 'No additional listings' scenario: (i) endorse the FAO ASCAM findings; (ii) CITES authorities should draw attention to national fishery agencies of the importance and vulnerability of sea cucumber fisheries, with particular emphasis on those species in international trade; (iii) encourage the formation of Regional Fishery Management Organizations (RFMOs); (iv) CITES parties should encourage their national fishery agencies to collaborate in drawing international protocols for population surveys and trade protocols; (v) raise awareness of sea cucumber conservation problems; (vi) CITES Parties involved in international trade in sea cucumbers should help in developing universal markings and labelling schemes for trades species. In the 'Listing scenario': (i) promote listing of *I. fuscus* in Appendix III by all range States; (ii) promote Appendix-III listings for other sea cucumber species as a means to complement national laws, regulations and management plans; (iii) Parties should propose all commercially important sea cucumber species in the families Stichopodidae and Holothuriidae (some 42 species) for inclusion in Appendix II; (iv) Parties should propose a smaller number of commercially important species for inclusion in Appendix II and monitor effectiveness; or (v) Parties could include all sea cucumber species in the families Stichopodidae and Holothuriidae in Appendix II.
- In case a range State would include one or more of its species of sea cucumbers in Appendix III, it should consider taking the following measures: (i) inventory and if necessary revise pre existing laws, regulations or management measures that affect international trade; (ii) establish a CITES permit system in coordination with relevant national agencies; (iii) acquire knowledge of the species in trade and the different forms in which they are traded; (iv) consider labelling of products in trade and facilitate identification
- In case a species of sea cucumber is included in Appendix II, all the range States of this species should consider taking the following measures: (i) all measures mentioned above for Appendix III; (ii) undertake surveys and trade analysis to establish non detrimental levels of export; (iii) monitor export levels to ensure sustainable harvests; and (iv) organize law enforcement training.
Additional measures to facilitate Appendix-II listings: (i) feasibility analysis for labelling; (ii) Identification tools and protocols (i.e. forensic techniques); (iii) technical assistance for population survey methods, quota setting, etc.; (iv) training and consultation in making non-detriment findings; (v) public outreach to stakeholders, decision makers and NGOs; (vi) inter-institutional and interagency collaboration (i.e. CITES, law enforcement agencies, NGOs, etc.); and (vii) promote collaboration between traders, fishers, fishery managers, relevant governmental agencies, etc.