

**Report of the presentation of the 'Principles for a Code of Conduct for the Sustainable Use and Management of Mangrove Ecosystems' at the:
INTERNATIONAL UNION OF FOREST RESEARCH ORGANIZATIONS
XII WORLD CONGRESS
'Forests in the Balance: Linking tradition and technology'
Brisbane, Australia 8 – 13th of August 2005**

Background

A presentation and discussion session on the draft Principles for a Code of Conduct for Sustainable Use and Management of Mangrove Ecosystems was arranged within one of the Scheduled Technical Sessions on Day 3 of this international meeting. The Technical Session was titled *'Mangroves and the protection of coastal areas'*. This session was organised in response to the recent tsunami that struck many several countries in South-east Asia on 26 December 2004.

The following is an outline of the Technical Session overall, and of the specific within which the draft Principles for a Code of Conduct for Mangroves were presented and discussed.

1. Introduction to Session

Brad Walters, Canada, IUFRO and Mount Allison University, New Brunswick Chairman of session

2. Mangroves and environmental security

Brad Walters, Canada

3. What we know and don't know about the role of waves in mangrove ecosystems

Ariel E. Lugo, Puerto Rico, USDA Forest Service

4. Changing climate changing mangroves

Norman Duke, Australia, University of Queensland

5. Introduction to the Principles for a Code of Conduct for Sustainable Management of Mangrove Ecosystems: A Work in Progress for Public Discussion

Angus McEwin, Australia

6. Mangrove conservation and management: A view from the International Tropical Timber Organisation

Alastair Sarre, Japan, ITTO

7. Panel Discussion and Questions

The Presentations

The presentations prior to the draft Principles for a Code of Conduct presentation are of particular relevance to the Code. The abstracts for these presentations are attached in the Appendix.

In summary, it was established that:

- human security is closely linked with environmental security
- we, scientists and natural resource managers, know very little about the role of waves in mangrove ecosystems (there are very few studies published on this issue)
- mangroves cannot typically withstand the direct impact of tsunami-sized waves and so many will be destroyed by such an event however, mangroves can provide some protection from tsunamis and against storms by acting as a buffer of wave energy
- areas where mangroves are present along the coastline may provide relative protection from the impact of storms and tsunamis; this is not so much because of the protective role of mangroves, but because, implicitly, where there are mangroves, human settlement is further from the coast and thus not on the most vulnerable and exposed areas
- the issue of mangroves and coastal protection is an issue of land use zoning and management as much as anything
- mangroves are adapted to regular storm events, but not to irregular and very rare events such as tsunamis
- mangrove forests cannot withstand the impact of tsunamis and will be destroyed
- storms and tsunamis can change environmental conditions fundamentally such as hydrological regimes, the substratum and salinity, with implications for the associated flora and fauna
- changing climate, such as changes in average temperature levels and rainfall, has implications for mangroves and salt-marshes
- in some cases, climate change can be over a relatively short period of time (10 years) and mangrove cover can respond (expand or retreat) quickly to these changes depending on local rainfall and temperature conditions
- climate change has implications for the area of mangroves and the proportion of the inter-tidal area colonised by mangroves, and therefore, for mangrove management and land management
- climate change has implications for the effectiveness of mangroves protecting shoreline and buffering of severe tidal surges, large waves and severe winds, since mangroves are reduced in spatial cover and height in colder and drier climates

Discussion and Questions

The general feeling and concerns of the meeting were uncertainty and caution regarding the use of tsunami aid funds and the role of mangroves as protection from further tsunamis. Concern was expressed regarding:

- the effective use of aid money for tsunami relief, i.e. to implement the best solutions or actions

More specifically it was debated that:

- mangrove planting is not always a good idea and won't necessarily be effective protection from tsunamis
- there appeared to be a call for some clarification and guidance in this regard and in regard to the value of mangroves for coastal protection and appropriate management responses to the tsunami
- one man asked about the value of mangroves for coastal protection and asked about the other values of mangroves - (Norman Duke) explained that the coastal protection value of mangroves was usually the one overlooked because it was overshadowed by the other mangrove values for livelihoods, environmental services, etc
- Norman Duke went on to say that the role of mangroves in protecting shoreline has not been studied in sufficient detail to enable scientists to offer unequivocal advice. There is an urgent need to undertake studies targeted toward answering the key questions surrounding the role of mangroves, including shoreline protection. The recent article (Dahdouh-Guebas, F., L.P. Jayatissa, D. Di Nitto, J.O. Bosire, D. Lo Seen & N. Koedam, 2005. How effective were mangroves as a defence against the recent tsunami? *Current Biology* 15(12): R443-447) highlights the state of current research knowledge regards shoreline protection.
- Angus McEwin commented that there were indeed some studies in Vietnam regarding the value of mangroves for coastal protection of dykes and aquaculture ponds as well as protection from typhoons. As such, planting mangroves for storm protection was not a new or untried idea. I also mentioned the study in Thai Binh Province, Vietnam, on the role of mangroves as a buffer against wave energy (Mazda, Y., Magi, M., Kogo, M., and Hong, P. N. 1997 *Mangroves as a coastal protection from waves in the Tong King delta, Vietnam*. *Mangroves and Sub Marshes* 1 p.127-135, 1997)
- Publication of a review of the storm protection role of mangroves and associated projects and studies was called for.

Specific questions after the presentation of the Code

Significant interest was shown in the project and the Code. Two questions and suggestions specific to the development of the Code were raised which were in keeping with the theme of the session and the prior presentations:

Dr. Ariel Lugo

- From the table of contents of the Code, there appears to be a need for some guidelines for managers dealing with the effect of tsunamis and irregular/ rare storm events on mangroves and the implications for management
 - that is, there are ecological implications of such events which should be acknowledged along with management implications
- Angus McEwin replied that this may be so. There are some articles in the Code dealing with the storm protection role of mangroves and providing guidance for planting and rehabilitation. However, there perhaps could be a more detailed explanation providing guidance for making decisions about whether, and where, and on what basis to plant mangroves after such an event. This issue will be looked at – Dr Lugo is to send his ideas to Don Macintosh.
- Dr Ariel noted that the tsunami is an acute event that may or not change the conditions for mangrove growth. Therefore, decisions about replanting mangroves after the event need to take into consideration the residual conditions of hydrology, geomorphology, and salinity. Mangroves can be replanted where post event conditions are deemed suitable for their growth. Also, where mangroves colonize naturally they could be protected and allowed to grow.

Dr. Norman Duke

- Similarly, there should also be a section on the impacts of climate change and the possible ecological, and thus management, implications.
- Angus McEwin felt that this may be a little more long-term than what is relevant for the Code which is a field-book for managers. (I also felt that it may be too complicated or beyond the scope that could reasonably be expected from mangrove managers and researchers in developing countries).
- Norman disagreed because in some cases, climate change can occur over a relatively short period and have implications for the ecological zone suitable for mangroves and therefore total mangrove coverage and associated mangrove and land-use management. This was illustrated in his presentation, which included Moreton Bay in Australia as an example.
- Angus McEwin replied that perhaps there was a need for inclusion of the implications of climate change. Norman is to send his ideas to Professor Donald Macintosh (don.macintosh@biology.au.dk).

After the presentation, further interest was shown in the progress of the country case studies and field-testing / adoption in particular countries, namely by participants from Senegal (Mr Diagane Diouf) and India (Dr Joachim Schmerbeck).

Interest was also shown in specific issues, as follows:

- Yong-Kwon Lee of the ASEAN-Korea Environmental Cooperation Unit of Seoul National University asked about the Code's recommendations regarding mangrove rehabilitation and also about rehabilitation experiences. He is involved in a project that plans to rehabilitate / replant mangroves in areas affected by the tsunami in Sumatra.
- Mr Harley Spence of Coastline Consultants Ltd, New Zealand, asked about the process and mechanisms for field testing of the Code in Vietnam and Brazil. He suggested that the process of 'handing over' the Code for field testing was a critical step and could be greatly improved by the addition of small processes to facilitate this. He said he would follow-up his ideas by sending an email to Don Macintosh and myself soon.

One of the most important points raised in the discussion was that if we really want to reduce future tsunami impacts, we cannot rely on simply planting more mangroves along the perimeter of developed, foreshore lands, since many of said lands are simply not suitable for mangroves to grow. Rather, we will need in most cases to reclaim back into mangroves some of the foreshore lands that were previously cleared of mangroves and that are currently under aquaculture and other development. It was realised that this is probably going to be the most politically challenging aspect of the restoration/coastal protection process. The Principles document should not shy away from making this point... and making it forcefully.

Comment by Norm Duke. Restoration of mangrove buffers is a complex issue. There are concerns about land ownership, access to the sea, and many other things associated with socio-economic imperatives. However, even where restoration is given approval there are considerable technical issues for planting and restoration projects along relatively exposed shorelines. In some cases, physical structures may need to be installed to protect planted trees while they grow to a sufficient size to support themselves. This might take up to 10-20 years. In many locations, exposure-resistant vegetation has been removed long ago, and it is very difficult to replace. This is especially evident in locations where the tidal profile has been altered, and erosion has removed sediments needed for healthy mangrove development.

In addition, it appears beneficial also to restore shoreline vegetation behind the mangroves as these act in unison to minimize effects of the episodic occurrences of damaging incidents.

Participants

The Technical Session was attended by about 25 people from a diverse range of backgrounds. There was no official reporter for the session and no list of participants (the session being open to anyone). I managed to collect the names and organisations of all but a few (4-5) of those present, as attached. This list is in addition to the 5 presenters outlined above. (The email addresses of some of the other participants can be added if needed).

List of participants

Name	Organisation	Email address (selected)
Mr Diegane Diouf	University of Cheikh Andiop, Dakar Senegal	dioufd@ird.sn
Marlotte Jonher	Wageningen University, The Netherlands Student	
Narasimha Hegde	'Prakruti'. Basavaraj Nilay, Karnataka, India	
Dr Joachim Schmerbeck	Albert-Ludwigs University of Freiburg, Germany, Institute of Silviculture	Joachim.schmerbeck@wald bau.uni-freiburg.de
Mr Yong-Kwon Lee	ASEAN-Korea Environmental Cooperation Unit, Seoul National University Deputy Coordinator, Research section	akecu@nicern.snu.ac.kr
Mr Harley Spence	Coastline Consultants, Rotorua, New Zealand Director	Harley@coastline.co.nz
Sagheb – Talebi	Research Institute of Forests and Rangelands, Tehran, Iran Head Forest Research Division, Silviculture	
Mr Mike Cameron	Nelson Mandela Metropolitan University, Nature Conservation, South Africa Head of Department	
Dr Yau-Lun Kuo	National Pingtung University of Science and Technology, Taiwan Professor, Department of Forestry	
Somporn Maelim	Silviculture and Restoration Ecology Lab, Department of Forest Sciences, College of Agriculture and Life Sciences, Korea and Thailand Ph. D student	
Dr Stuart M Davey	Australian Government Bureau of Rural Sciences Principal Scientist, Forest and Vegetation Sciences	

"Principles for a Code of Conduct for the Sustainable Use and Management of Mangrove Ecosystems"
Special Session at the IUFOR XII WORLD CONGRESS 2005

Ruchi Badola	Wildlife Institute of India, Uttaranchal, India Reader in Wildlife Science	
S.A. Hussain	Wildlife Institute of India Reader in Wildlife Science	
Stephen Mitchell	The University of British Columbia, Forest Sciences Centre Associate Professor, Silviculture	
Prof. Murakami Kimihisa	Seigaku-in University, Environmental Policy Course, Japan Forest Hydrologist	
Prof. Gerhard Glatzel	Head of Institute of Forest Ecology, Vienna, Austria	
Francisco Dallmeier	Smithsonian Institution, Washington DC Senior Conservation Biologist, Monitoring and Assessment of Biodiversity Program	fdallmeier@ic.si.edu
Dr Gebhard Schuler	Research Institute for Forest Ecology and Forestry, Department of Forest Growth, Trippstadt, Germany Head of section 'Forest Site and Soil Protection'	
Dr Tessie Tumaneng-Diete	Queensland Government Australia, Natural Resources, Mines and Energy Senior Policy Officer (Economics), Land Protection	
Dr Ariel Lugo	USDA Forest Service, Puerto Rico	
Brad Walters	Canada	
Norman Duke	Australia	
Alistaire Sarre	International Tropical Timber Organisation, Japan	

Appendix - Abstracts of the Technical Session presentations prior to the Code presentation.

Session 168

Mangroves and the protection of coastal areas

Organizer: B.B. Walters (*IUFRO 1.07.08 Working Party Coordinator & Mount Allison University, Canada; bwalters@mta.ca*)

Mangrove forests and environmental security. Walters, B.B. (*Department of Geography, Mount Allison University, Canada; bwalters@mta.ca*).

Scientists and decision-makers are increasingly interested in the relationship between environmental change and human security, i.e., "environmental security". Research from the Philippines and elsewhere suggests that mangrove forests illustrate this relationship particularly well. Mangroves and the diverse resources they provide -- wood, food, fuel -- are critical to the livelihood security of highly vulnerable coastal populations throughout the tropics. At the same time, their restricted coastal distribution, which is often proximate to population concentrations, makes them the frequent loci of conflict between competing human interests. Studies of mangrove planting and human settlement along the coast demonstrate the value of mangroves for protecting property and livelihood from storm impacts. Preliminary observations of the Asian tsunami of 2004 further highlight this protective role and provide a stark reminder that environmental sustainability and human security are inseparable.

What we do and don't know about the role of waves in mangrove ecosystems. Lugo, A.E. (*International Institute of Tropical Forestry, USDA Forest Service, Puerto Rico; hanael@caribe.net*).

Mangroves are ecosystems that flourish in low energy coastlines and are usually incompatible with high energy conditions. In high energy coastal conditions, mangroves occur behind sand dunes, protected from direct wave action. High tidal surges also limit mangrove establishment. Therefore, mangroves will not survive chronic high wave activity because the capacity of their extensive root systems to absorb tides and waver action is limited. A tsunami is an acute disturbance event similar to a hurricane, and both can cause extensive short-term mangrove mortality, but allow for mangrove recovery if coastal conditions (substrate and hydrology) return to pre-disturbance states. Long-term effects of these disturbances on mangroves will depend on the degree that coastal geomorphology, hydrology, and soil change after the acute events.

Changing climate changing mangroves. Duke, N.C. (*Centre for Marine Studies, University of Queensland, Australia; n.duke@uq.edu.au*).

Climates around the world are changing. And, these changes are taking place at an increasing rate brought on by the growing demands and pressures of human population. Like other

natural habitats, mangroves and tidal wetlands, must accommodate if they are to survive. Although there is nothing new in the processes taking place, it is the high rates of change that threaten, especially in combination with human disturbances preventing life-saving, natural shifts. Case studies from Australia and the Western Pacific provide important new insights into the key responses taking place in tidal wetlands. In one example, changing rainfall patterns drive shifts in mangrove-saltmarsh ecotones. In another, human-damaged mangroves leave coastlines more exposed to more severe storms and tidal surges. In an effort to build a sustainable future, such indicators are tools in the development of new ecological models for better prediction and management of expected effects and consequences.

Principles for a Code of Conduct for the Sustainable Management of Mangrove Ecosystems: A Work in Progress for Public Discussion. McEwin et al. (Environment & Social Development Department, East Asia and Pacific Region, The World Bank, Washington, DC; gusmcewin@yahoo.com.au)

The Principles for a Code of Conduct for Sustainable Management of Mangrove Ecosystems is a guide to assist states, local and national non-governmental organizations and other stakeholders to develop cooperatively local codes, laws and/or regulations to protect mangroves and the critical functions they serve with regard to contributions to local livelihood, biodiversity conservation and coastal protection through sustainable management. The objective is to help bring attention to the importance of mangrove ecosystems, particularly to policy makers, to help arrest and reverse their loss. The Principles, being a work in progress, are being discussed in a range of forums that involve representatives from governments, NGOs, multilateral organizations, research institutions, grassroots organizations and other interested individuals and groups. The Principles were formulated based on a review of global mangrove management experience, about fifteen country case studies from all regions where mangroves exist, and seven regional workshops to date. The purpose of the presentation at this IUFRO forum is to gain additional feedback from researchers, in particular, to provide input on the content of the Principles. The Principles and many of the background documents and summaries of the feedback from workshops conducted to date can be found on the following website:

< http://mit.biology.au.dk/cenTER/MCB_Ph2_ToR.htm>.

Mangrove conservation and management: a view from the International Tropical Timber Organization. Alastair Sarre, Japan, ITTO; itto@itto.or.jp

ITTO is an intergovernmental organization with a mandate to promote the conservation and sustainable management, use and trade of tropical forest resources. It has a substantial program of field projects in the conservation and sustainable use of mangrove forests, which are managed mostly by national-level government institutions and by non-governmental organizations. ITTO offers a mechanism for the field delivery of mangrove-related overseas development assistance and the development of international-level mangrove-related policies.