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Importance of community involvement in coastal area management: A review of International and Pakistani scenario

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Abstract

Coastal areas are the biologically active zones of Earth that play a significant role in ecological and socio-economic welfare of any society. Inopportunely, like most of the Earth's resources they are subjected to a lot of natural as well as anthropogenic pressures that render them less productive and more vulnerable. Consequently, there is a need to develop strategies to not only protect them but also manage them in a sustainable way. Researches reveal that best way to achieve that is through avid community participation. The current paper for that reason focused on providing evidence from literature (past and present) about the level of effectiveness of community involvement for coastal area management at different scales with special emphasis to the efforts being made in Pakistan to manage the coastal resources.

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Introduction

A coastline is defined by The American Heritage Dictionary of the English Language (2000) as an area where the sea or ocean meets the land. It is further referred to as a boundary line between the ocean or sea and the land. On the contrary, *Costal Zone* refers to the area or region where land and sea processes interact (Nelson, 2013). Due to these interactions, coastal zones are continually changing. The geology of a coast may vary on the basis of its origin, characteristics of its forming sediments or the coast's structure. The geological composition of a coastline takes place over thousands of years as a product of different physical and chemical processes (U.S. Army Corps of Engineers [USACE], 1984). Different regions formed in a coastal area as a result of these processes are illustrated in Fig. 1.

The sediments that form the region from *Upland* to *Nearshore* zone vary in size i.e. from silt or sand to gravel to consolidated rocks.

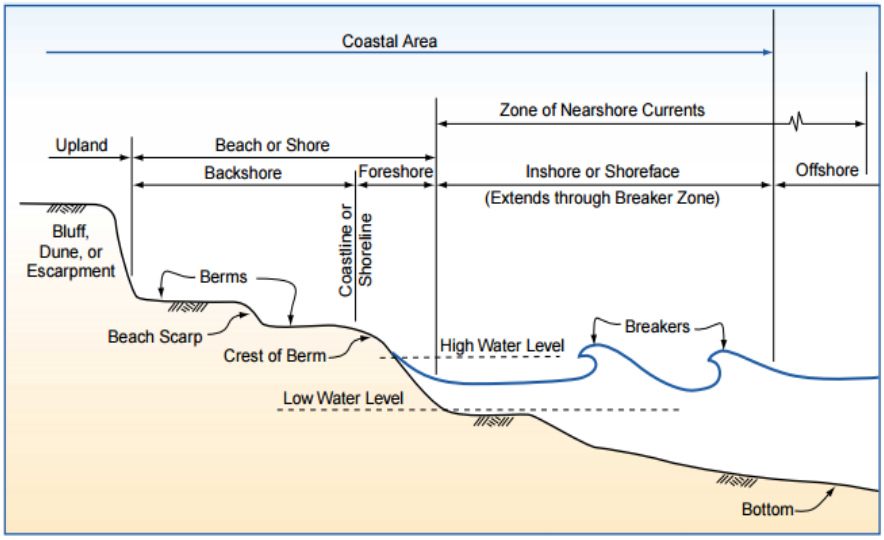

Fig. 1. Different regions of Coastal area (Source: USACE, 1984).

The concept of coastal zone management is a somewhat new one, emerging less than four decades ago from the need to tackle an array of interconnected problems associated with population growth and development along our nation's coasts. The Coastal Zone Management Act (CZMA) was passed in 1972 and provided a formal structure to address the challenges of continued growth in coastal areas. Administered by NOAA, the CZMA recognizes that ensuring access to clean water and healthy ecosystems that support a vibrant coastal economy requires effectively integrating science, technology, and public policy. The goals of the CZMA are to "preserve, protect, develop, enhance, and restore where possible, the coastal resources."

One program under the CZMA, the National Coastal Zone Management Program, encourages coastal states and territories to work in partnership with the federal government to design and enforce local programs consistent with the CZMA and accompanying regulations. Today, 34 of the 35 eligible coastal and Great Lakes states and territories have entered into the voluntary partnership. As a result of the Coastal Zone Management Act and the success of its programs, coastal communities are equipped to better address continued economic development of the coastal zone while accounting for natural resource management. This will ensure the health and stability of the coast, both environmentally and economically, into the long-term future.

Types of Coasts

Classification of coasts is important because different coastlines react to same management plan in different ways (Mangor, 2004). Therefore, definition and legal recognition of the coastal regions is necessary for their preservation.

There are several processes that influence the classification of different coasts. These include climate of the coast; exposure to winds, waves and ocean currents; tectonics; tidal range and intensity of the current; and sediment supply and transportation. On the basis of these processes the types of coasts across the world are classified in to different classes such as *Ice-push coasts* (Alaskan), *Marginal seas type coasts* (Gulf of Mexico), *Coral Reef coasts* (Hawaii), *Barrier Breech coasts* (Atlantic), and *Steep, Cliff-backed coasts* (Pacific) (Mangor, 2013; Inman, 1994).

Importance of coastal zones

The importance of the coastal zones rely in the fact that majority of the population of World reside there. Furthermore, coastal areas are source of a variety of resources that benefit the whole society (Cooper and McKenna, 2008). They provide a range of ecological as well as economic services to humankind.

The output of all the interconnected and inter-related physical, socio-economic and bio-chemical systems and processes generate a diverse range of services (such as capacity to assimilate wastes) and economic goods (Turner, *et al.*, 1998).

Some of the major services provided by coastal areas include: medicinal services (for instance mangroves), aesthetic services, tourism services, energy sector services, biological productivity (fish, shrimp, oysters, shellfish), international trade, oil and gas exploration, pollution control management, shipping, nutrient distribution, coastal aquaculture and livelihood services for coastal communities etc. (Koch, *et al.*, 2009; Han, *et al.*, 2003).

Threats to Coasts

Most of the coastal areas today are in one way or another subjected to destructive and unsustainable use by humans which leads to their deterioration (White, *et al.*, 1994).

Coastal areas around the globe are threatened by urbanization and population growth which leads to development of tourism around these areas; mining, dredging, fishing waste disposal and drilling (Elliott, *et al.*, 2001; Inman, 1994). Some of the major threats faced by global coasts are enlisted below

- Oil spills in the seas and oceans is one of the major concerns related to coastal area management around the globe.
- Coastal erosion: Residents of coastal area as well as property owners face significant direct loss due to sediment erosion at coasts (Cooper and McKenna, 2008).
- Loss of biodiversity and habitat destruction (Huang, *et al.*, 2006; Gray, 1997).
- Cyclones and sea storms.
- Excessive use of dynamites for fishing.
- Distribution of trace metals in sediments (Ip, *et al.*, 2007).
- Massive development of offshore windmill farms (Petersen and Malm, 2006).
- Coastal Floods: Coastal floods can be hazardous to a site depending on a few factors such as intensity, frequency and nature of flood events, erodability, topography and elevation of coastal site (Federal Emergency Management Agency [FEMA], 1995).
- Excessive Tourism: Since 19th century, concept of coastal tourism has emerged and expanded over time. This increasing trend posed number of threats to the coastal environment either due to sheer number of tourists at coasts and their augmenting demands or resulting from the individual transports. Most significant of threats of coastal tourism are evident by reduced biodiversity, fragmentation of habitat, littering, intertidal tramping, deterioration of coral ecosystem, land and water pollution and transmission of non-native species (Davenport and Davenport, 2006; Hall, 2001; Miller and Auyong, 1991).

Coastal Conservation and management projects across the world

The most effective way to manage and protect coastal environment is through integrated and participatory management of these areas with avid involvement of local community in each step of planning, management as well as monitoring (both short and long term).

Such participation however, requires commitment, time and sensitivity on the part of community. It could be achieved by devising and adapting case and area specific objectives and strategies (White, *et al.*, 1994). There are any successful case studies, some of which are outlined in Table 1, show the effectiveness of community participation especially at small spatio-temporal scale. These case studies show how creative community involvement approaches at local, regional, national and international level have played a significant role in management of coastal areas.

Table 1. Case studies showing effectiveness of community participation in Coastal area management at different scales.

Management Project	Brief Description	Community involvement	Region	Successfulness	Reference
Coastal Fisheries management	The report centered on coastal fisheries management in Malaysia, Vietnam, Cambodia and Thailand through community participation.	Cambodia was new to coastal management, Thailand faced fiscal decentralized responsibility, Malaysia lacked community based management and Vietnam showed community based management trend for their fisheries.	Malaysia, Vietnam, Cambodia and Thailand	The success rate varied for each country depending on the status of involvement of local community and Thailand was found to be lacking effective management of coastal resources.	(Nasuchon, 2009)
Coastal Erosion Management	The research focused on determining effectiveness of short-term local and long-term global management of coastal erosion by inclusion of social justice aspect.	The research showed that public involvement at local and short-term scale was strongest and most effective. However, with the expansion of coastal management scale the effectiveness weakened significantly.	England and Wales	Only at national level	(Cooper and McKenna, 2008)
Community Participation in Marine Protected Area Management	The research employed designation of Marine protected area to protect the coral reefs of Indonesia and investigated the impacts of involving general public in protection and management plan. However, the research revealed that prioritization of local livelihood needs required to be adapted in protection regulations for the efforts to be sustainable.	The research investigated the potential of involving rural population in appraisal, planning and management of the protected area	Indonesia	Park management plan did not address the needs of local people at the time of study indicating towards need to revise the plan.	(Elliott, *et al.*, 2001)
Integrated coastal resources management in a small island setting	The study outlined the need for adaptation of a resource management strategy that involves not only avid participation of local communities but also socio-spatial organization of management plan.	Involvement and participation of small cohesive communities that live on islands for planning and management of natural resources was found to be the key to the successful sustainable management.	Island of Pohnpei in the Federated States of Micronesia.	Based on the practical experience, the study reported that the integrated special area management strategy was arguably more successful in small island setting than any other management strategy.	(Dahl, 1997)
Community based Coral reef management	The research provided several case studies that indicated that community participation	Community involvement was highly focused in the research	Philippine, Florida, Indonesia and Thailand	The research revealed that the success rate of community involvement was	(White, *et al.*, 1994)

Management Project	Brief Description	Community involvement	Region	Successfulness	Reference
	if achieved by sensitivity, time and commitment can be highly effective for promotion of sustainable coral reef management.	especially for monitoring of management plans, generating awareness and promoting integration efforts.		achieved by adopting different strategies for different regions	
Integrated management of coastal zones	142 integrated programs for the coastal area management around the globe have been working in 57 different states. Further increase in this number is leading to some difficulties in making the efforts successful. Surveys are being conducted to determine the root cause of the problem and prepare an interactive database for expanding integrated coastal zone management.	-	57 different Sovereign and semi-sovereign states	The augmentation in the number of programs has reduced the management efficiency because of difficulties like coordination, information exchange and international communication.	(Sorensen, 1993)

However, prior to development of any coastal area management program, it is necessary to conduct a preliminary assessment of requirements of coastal zone management. Such an approach was adopted by Price (1990) for assessment of Saudi Arabian Gulf coastal zone. The research first analyzed the state of coastal environment, and then identified the areas concentrated with resources as well as those having most impacts. After that, prioritization for the management of the coastal areas was done on the basis of overlap in the areas with maximum resources and impacts. This approach was considered to be one of the most effective approaches for detailed management of coastal zones.

Pakistan's Coastal Areas

Pakistan is situated at the gateway of the Persian Gulf, lying close to the important countries like India, Iran, Oman, and the many central Asian countries. It thus allow Pakistan to get benefit from its geo strategic position. However the important environmental threats that require immediate actions include the increasing levels in the coastal regions and degradation of the marine resources of the country.

Pakistan has a total of about 900km coastline along with the adjacent coastal zone of Northern Arabian Sea that is 240,000 square km, which can be explored and urbanized into tourist resorts new ports, and industrial sites.

The coastal zone of Pakistan consists of two distinct units, the active margin of Baluchistan coast which stretches over 760 km and the passive margin of Sind which stretches over 370 km. Pakistan occupies a very fundamental position on the major oil and trade supply routes from the Persian Gulf to Pakistan's location that are not far-off from the Red sea.

The geographical location of Pakistan gives it an opportunity to dominate the vital routes and crucial stretches across the Arabian Sea. There are many living and nonliving resources that are associated with the Pakistan's coastal zone (Qureshi, 1985). The living resources comprise of mangroves forest along Baluchistan and Sindh coast with Indus Delta harboring the world 6th largest mangrove forest.

The marine fisheries resources of Pakistan that are commercially important include 350 different species. The coastal ecosystem in Pakistan is associated with a multifaceted array of natural resources providing economic services and goods. These goods and services are both non-marketed e.g. mangroves for their medicinal uses and marketed e.g. fish, shell fish along with their functions as nursery areas for juvenile fish and also buffers against storm surges.

All these goods and services have an enormously valuable long term strategic values (Saifullah, 1997).

Socio-economic significance of Pakistan's Coasts

Pakistan's biggest trade and economic coastal center is Karachi that handles the country's major seaborne trade while the city surrounding Karachi accounts for nearly half of the government revenues and contributes to a total 20% of Pakistan's GDP (Rasool and Saifullah, 2005). The major sectors of economy that make use of the coastal marine environment in Pakistan are as follows:

- Shipping and ports
- Forestry and Fisheries
- Roads and Communications
- Agricultural use of Coasts
- Building of Boats
- Gas and oil mineral explorations
- Mineral and Salt industries
- Tourism
- Control and management of Pollution
- Energy sector and Coastal power plants

Threats subjected to Coastal Areas of Pakistan

The significance of the coastal zone relative to the national economies has been widely recognized. However these coastal lands are heavily populated and various physical events that are resulted from the anthropogenic activities and the ocean-atmosphere interface have impacted the coastal areas including: delta/land subsidence due to sediment starvation and uncontrolled ground water extraction, tsunamis, cyclones, harmful algal blooms, oil spills, eutrophication, and tourism etc. Both direct and indirect consequences of global climate change (coastal flooding, sea-level rise, and coastal erosion) are expected to be pronounced within the coastal areas. Besides, as population increase and industrialization occurred, the economic, social and environmental importance of this area had also increased, thus intensifying the pressures on coastal resources (Qureshi, 2011).

Pakistan's coasts lands are under threat today, including:

- Sea intrusion due to diversion of rivers water for agriculture hydropower, generation and storage (Tarbela, Mangla, Mirani, Shadi Khor Dams, etc.).
- Scarcity of fresh water for the people and ecosystems.
- Alarming rate of species and habitat loss (mangroves cutting use of sand for land filling from turtle beaches).
- Absence of community involvement in planning and implementation of developmental programs.
- Waste disposal and pollution.
- Improper management and over exploitation.

Coastal Area Management Initiatives of Pakistan

In Pakistan, two important trends were discernible on the national scene. The first, acting independently and secondly to get influenced by the developments including the rapid socio-economic development in coastal areas in particularly Karachi at the international level. The series of legislative measures are guiding the effects of both that are adopted by the government encompassing both public and private sectors.

However the various sectors involvements in the coastal areas has been either service-oriented or resource based, the interactions between these sectors tended to be either weakly coordinated or were neglected, this may occur due to the insufficiency of effective coordination and data availability about the impact of the development on the resources and environment of coastal areas.

The consequence of these conflicting uses of space is increasingly seen in the deterioration of environments and associated resources. Therefore immediate actions at the national level in order to address these issues have thus been recognized.

After recognizing the seriousness of the problems, associated with the coastal areas of Pakistan, the Ministry of Science and Technology took the initiative and organized an International Workshop in May 2011 on the Integrated Coastal Zone Management. The Workshop was implemented with financial support and close collaboration of the IOC. The UNDP Islamabad also provided financial support, while other ministries such as Ministry of Communication, Ministry of Food and Agriculture, Urban Affairs and Division of Environment and also

the University Grants Commission provide support by participating in the workshop with their respective experts. A total of fifteen foreign experts participated with the two experts representing ESCAP and UNEP.

For the management of coastal areas there is a dire need to understand the social dynamics that are dictating the patterns of human behavior in different coastal zones along with a need to maintain a balance between economic priorities and coastal development against long-term sustainability strategies and environmental issues.

Scientists from various disciplines including social scientists, governments, industry, and society and the Oceanographers must collaborate for the management of these important resources for achieving an area where quality of life, environmental health, and economic benefit are balanced. This approach towards the coastal management is called Integrated Coastal Area Management (ICAM) that has been mandated by the United Nations and was authorized by the international community. Some of the ongoing projects for the management of Pakistan's coastal and marine areas are outlined in Table 2.

Table 2. Pakistan's Ongoing Projects for Coastal and Marine Management.

Management Project	Brief Description	Organization's involved
An Assessment of cetacean mortality in tuna gillnet fisheries in Pakistan (March 2013 – Ongoing)	In order to collect the information about mortality of cetacean and other by catch, the project was started. Monitoring of landings at Karachi Fish harbor which is the main landing centre was started as well as an observer programme was initiated.	Department of Sustainability, Environment, Water, Population and Communities, Australia
Cage culture of local marine species at Keti Bundar	This project demonstrated the economic and ecological benefits of using a cage culture system to grow out captured juveniles of several high-valued species in a transfer of technologies from Southeast Asian countries to Pakistan.	Food and Agriculture Organization
Conservation of Cetaceans in North Arabian Sea, along the Baluchistan Coast, Pakistan (July 2010 to June 2013)	Identification of marine cetacean species and hotspots off Baluchistan coast and collect important baseline data on the seasonal distribution, habitat use and conservation needs of cetaceans in coastal areas of Baluchistan. It also increased knowledge, awareness and understanding of marine cetaceans and habitat and their conservation needs in the local population.	Department of Sustainability, Environment, Water, Population and Communities, Australia
Restoration and Rehabilitation Pogramme of Coastal & Marine Areas of Pakistan (1985 – To date)	The purpose of this project was to improve the legal and regulatory framework for coastal zone management (CZM) and to contribute to adequate field-level coordination of government and non-government agencies involved in rehabilitation activities in the coastal zone.	International Union for Conservation of Nature, Pakistan
Mangrove Rehabilitation Programmes in Indus River Delta and Baluchistan Coast (2005 – Ongoing)	This project involved preparation of an inventory of mangroves forest based of SPOT imageries and demarcation of various land use classes and also provides recommendations for rehabilitation of mangrove ecosystem, research, training and coastal management.	IUCN-Pakistan, Sindh & Baluchistan Forest Department, Shirkat Gah, WWF International Society for Mangrove Ecosystem (ISME), Coastal Communities; Gwader Development Authority (GDA) Coastal Development Authority (CDA)

Conclusion

During the last decade, the coastal areas have totally reversed their role by becoming the driving force behind the economic welfare rather than just being an inhospitable place. Conversely, the overuse of the territory related to those factors and the demographic pressure and in the proper beach (sewage discharge, dry goods extraction and crops) as well as in the hinterland (dams in the rivers, farming and tourism) has caused a universal decrease in the sediments contribution to the coastal areas with a marine or a continental origin. Thus it is hard to find a unique solution for all these issues and problems. Though, it can be concluded that for the management of coastal areas it is necessary to have an integrated and participatory management approach for these areas with avid involvement of local community in each step of planning, management as well as monitoring (both short and long term).

Such participation however, requires commitment, time and sensitivity on the part of community. Moreover, an improved distribution and dissemination about the existing information is supposed to be achieved.

For this purpose, it is necessary to have a better coordination among the existing governmental bodies that deal with coastal management. Furthermore, it is essential to have an improved environmental education for the sustainable development of the coastal areas.

References

Cooper JAG, **McKenna J.** 2008. Social justice in coastal erosion management: The temporal and spatial dimensions. Geoforum **39(1),** 294-306.

Dahl C. 1997. Integrated coastal resources management and community participation in a small island setting. Ocean and Coastal Management **36(1-3),** 23-45.

Davenport J, **Davenport JL.** 2006. The impact of tourism and personal leisure transport on coastal environments: A review. Estuarine, Coastal and Shelf Science **67,** 280-292.

Elliott G, **Mitchell B**, **Wiltshire B**, **Manan IA**, **Wismer S.** 2001. Community Participation in Marine Protected Area Management: Wakatobi National Park, Sulawesi, Indonesia. Coastal Management **29(4),** 295-316.

Federal Emergency Management Agency (FEMA). 1995. Flood Insurance Study Guidelines and Specifications for Study Contractors. FEMA 37.

Gray JS. 1997. Marine Biodiversity: patterns, threats and conservation needs. Biodiversity and conservation **6,** 153-157.

Hall CM. 2001. Trends in ocean and coastal tourism: the end of the last frontier? Ocean & Coastal Management **44,** 601–618.

Han X, **Wang X**, **Sun X**, **Shi X**, **Zhu C**, **Zhang C**, **Lu R.** 2003. Nutrient distribution and its relationship with occurrence of red tide in coastal area of East China Sea. The Journal of Applied Ecology **14(7),** 1097-1101.

Huang X, **Huang L**, **Li Y**, **Xu Z**, **Fong CW**, **Huang D**, **Qiuying H**, **Hui H**, **Yehui T**, **Liu S.** 2006. Main seagrass beds and threats to their habitats in the coastal sea of South China. Chinese Science Bulletin **51(2),** 136-142.

Inman DL. 1994. Types of Coastal Zones: Similarities and Differences. In Environmental Science in the Coastal Zone: Issues for Further Research. Pg. no. 67-172. California: The National Academic Press.

Ip CC, **Li XD**, **Zhang G**, **Wai OW**, **Li YS.** 2007. Trace metal distribution in sediments of the Pearl River Estuary and the surrounding coastal area, South China. Environmental Pollution **147(2),** 311-323.

Koch EW, **Barbier EB**, **Silliman BR**, **Reed DJ**, **Perillo GME**, **Hacker SD**, **Granek EF**, **Primavera JH**, **Muthiga N**, **Polasky S**, **Halpern BS**, **Kennedy CJ**, **Kappel CV**, **Wolanski E.** 2009. Non-linearity in ecosystem services: temporal and spatial variability in coastal protection. Frontiers in Ecology and the Environment **7,** 29-37.

Mangor K. 2004. Shoreline Management Guidelines. DHI Water and Environment P. 294.

Mangor K. 2013. Classification of coastlines. Retrieved 24th[t] November, 2016 from: www. coastalwiki.org/wiki/Classification of coastlines.

Miller ML, **Auyong J.** 1991. Coastal tourism: a potent force affecting environment and society. Marine Policy 76-99.

Nasuchon N. 2009. Coastal management and community management in Malaysia, Vietnam, Cambodia and Thailand, with a case study of Thai Fisheries Management. Division for Ocean Affairs and the Law of the Sea Office of Legal Affairs, the United Nations, New York.

Nelson SA. 2013. Coastal Zones. Retrieved 23rd December, 2015 from: www.tulane.edu/ ~sanelson/Natural_Disasters/coastalzones.htm

Petersen JK, **Malm T.** 2006. Offshore windmill farms: threats to or possibilities for the marine environment. AMBIO: A Journal of the Human Environment **35(2),** 75-80.

Price ARG. 1990. Rapid assessment of coastal zone management requirements: A case-study from the Arabian Gulf. Ocean and Shoreline Management **13 (1),** 1-19.

Qureshi MT. 1985. Working plan of coastal forests (Mangrove Forests) in the Indus Delta from 1965-85 and 2004-2005. Wildlife and Forest Department, Karachi. Govt. of Sindh Publication 88.

Qureshi T. 2011. Coastal and Marine Resources Management and Poverty Reduction in Pakistan. IUCN.

Rasool F, **Saifullah MS.** 2005. A new technique for growing the grey mangrove *Avicennia marina* (Forssk.) Vierh., in the field . Pakistan Journal of Botany **37(4),** 969-972.

Saifullah SM. 1997. Management of the Indus Delta Mangroves in Coastal Zone Management imperative for Maritime Developing Nations. Pakistan Journal of Botany **37(4),** 869-872.

Sorensen J. 1993. The international proliferation of integrated coastal zone management efforts. Ocean and Coastal Management **21(1-3),** 45-80.

The American Heritage Dictionary of the English Language. 2000. Coast. The American Heritage Dictionary of the English Language: Fourth Edition. Retrieved 21st November, 2016 from: http://www.bartleby.com/

Turner RK, **Lorenzoni I**, **Beaumont N**, **Bateman IJ**, **Langford IH**, **McDonald AL.** 1998. Coastal management for sustainable development: Analysing Environmental and Socio-Economic changes on the UK Coast. The Geographical Journal **164(3),** 269-281.

US Army Corps of Engineers (USACE). 1984. Shore Protection Manual.

White AT, **Hale LZ**, **Renard Y**, **Cortesi L.** 1994. Collaborative and community-based management of coral reefs: lessons from experience. ISBN 1-56549-032.