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Research Paper

INDIGENOUS KNOWLEDGE VALUES FOR MARINE CONSERVATION IN UNGUJA ISLAND, ZANZIBAR

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Abstract

A growing number of studies on the value of indigenous knowledge has underscored the importance of integrating local knowledge and practices into management and conservation programme. A study was conducted to assess indigenous knowledge system responsible for conservation of marine resources in Zanzibar. A survey was carried out in four fishing villages within Menai Bay conservation area. The presented study revealed the existence of indigenous knowledge system within the area as indicated by most of the respondents (>60%). Our findings showed that indigenous knowledge is responsible for identification of fishery regimes, fishing stocks and seasonality on fishing. The findings further revealed formal and informal tradition institutions were useful in biodiversity conservation as they managed access and control of resources along the Menai bay area. We concludes that indigenous knowledge and Institution are important in the conservation of Menai Bay and that the existing knowledge and Institutional systems needs to be protected and inherited for sustainable conservation and management of fisheries resources along the Menai Bay area.

Key words: Conservation, Indigenous knowledge, Menai Bay, Resource management.

INTRODUCTION

Indigenous Knowledge (IK) refers to the local knowledge that is unique to a given culture or society that forms the basis for decision making in the face of familiar problem [1,2]. IK is not static but is continuously changing and has inherent capacity for absorbing relevant new knowledge from outside [2]. A growing awareness of the value of IK has prompted calls for its use within various discipline including conservation and biodiversity, disaster risk reduction and natural resources management. [3, 4, 5].

In Zanzibar, declarations of protected areas have often elicited some degree of resentment from the local communities. To some extent this resentment is justifiable as many of the laws and rules governing the protected areas do not take on board some of the existing indigenous practices. Local communities have for ages developed and maintained IK and practices for the management and conservation of biological resources [2]. The IK and practices exist and are used by the local people but not fully by the government. The government's reluctance to streamline indigenous practices into the formal regulatory tenets arises partly from lack of empirical evidence of their values. Thus IK and practices have remained in the informal sector, usually preserved in oral traditions and cultural rituals. In the face of rapid cultural changes and globalization many unwritten traditional practices are either lost or modified to the extent that diminishes their significance in biodiversity conservation. Several authors have acknowledged the practical value of IK as an entry point for participatory conservation of terrestrial ecosystems [5, 6, 7].

Differences between scientific and IK world views continue to create barriers to meaningful collaboration, as does the widespread assumption that science is superior to other knowledge systems. However, effective and sustainable biodiversity conservation requires encouragement of traditional institutions and development of local practices that are consistent with biodiversity conservation [7]. Over decade, there has been a worldwide growing awareness of the role of traditional resources, management institutions may play in helping to conserve natural resources, at least at a local level [8]. Hence currently they are seen as pivotal in discussions on sustainable development and poverty alleviation in developing countries [9].

To our knowledge, little has been reported on the value of IK in the conservation of marine biodiversity of Zanzibar. The main objective of this study is to document existing indigenous knowledge, practices and traditional institutions related to environmental conservation and management of marine and coastal resources with the view to extract valuable practices that will be harmonized within the government regulations and conservation measures.

MATERIALS AND METHODS

Study Area

Zanzibar archipelago is located in the Indian ocean, just off the coast of East Africa, lying at 39^0 East and 6^0 South of Equator. It consists of major two islands of Unguja and Pemba with a total land area of 2,643km^2 (Unguja 1,658 km^2 and Pemba 985 km^2). Administratively, Zanzibar is divided into five regions and 10 districts. The districts are further divided into constituencies, Shehias and villages.

The study was carried out at the Menai Bay Conservation area located in the south western tip of Unguja Island. It lies between latitudes $6^0$23'S and longitude $30^0$22'E. The Area extended into 2 regions with 3 districts; West District, Central District, South District, and 18 villages with 27,000 people.

Data Collection

A multistage sampling approach involving purposive and random techniques was employed. A purposive sampling technique was used for the selection Menai Bay Conservation Area based on availability of biodiversity doorway. The four villages were also purposely selected from 19 villages based on their closeness. Moreover, the random selection was used in selecting one street from each village to make a total of four streets. The four villages were within the Central and the South districts, all of which lie along the South coast of Zanzibar Island. A survey was conducted in four villages using structured questionnaires to capture reliable information on household characteristics, identification of IK, extent use of IK, and institutions of the study area. A total of 120 respondents (fishermen and farmers) were selected randomly by holding a village meeting, in which, by the help of the village leaders, 30 names of respondents to be interviewed in each village were selected.

There were two Focus group discussion (FGDs) each comprised about 8 – 12 participants, one group was for men and the other was for women in order to allow full participation in each village. A set of questions were used to interview workers of community development and MBCA officers so as to capture information related to household and socio economic characteristics respectively. Checklists were administered to allow coding and analysis of data collected.

Data Analysis

The analysis of descriptive data were carried out to assess the respondent's views and opinions on existing IK and the extent use in relation to marine conservation in the Menai Bay area. Descriptive data analysis performed on Statistical Package for Social Sciences (SPSS) software version 20.0 and Microsoft Excel Software package (1993-2003). Analyzed information were presented in tables, charts and graphs.

RESULTS AND DISCUSSION

Identification of Indigenous Practices in Fishing

Over 60% of respondents mentioned that stars in the sky are the primary reference marks that are used for locating previously set fishing traps (gillnets, lines, basket traps, lines and wooden traps). A few fishermen 8% also indicated that big trees on land may be used as reference marks. Further probing on this question responded that fishermen may use a combination of all the major options in defining their reference marks. The

principal determinant of the method used is the distance from the shore. Fishermen going in larger vessels further away from the shore tended to rely more on the stars than those in smaller boats fishing close to the beaches. Similar observations have been reported by other workers in East Africa [10].

The use of terrestrial land marks (e.g. big trees) provides an example of holistic conservation measures linking the land with the sea. In recognition of the importance of such landmarks one may presume that it is in the interest of the fishermen that terrestrial land marks remain conserved. Basket traps in Swahili dema are usually set close to the beaches using reference marks on land. The practice involves setting the traps at low tides and visiting them for inspection or collection at high tides. Traps are set in a manner that would normally be on a site in line to an identified object (e.g. baobab tree, coconut palm, mango tree etc.) on the land. Preferred sites for locating the nets (such as Gillnet or Jarife) are those areas known locally as mkondo which is an area of fast moving ocean current usually formed by a narrow channel between two separate formations of coral rigs. Such locations provide breeding grounds for fish and are thus more likely to give higher catches to the fishermen. When setting nets along mkondo fishermen mark location of their nets using stars in the sky (if at night), or under water coral reefs during the day. The IK for using stars or identifying correct reef formation for setting nets and traps is well established in the Menai bay area and elsewhere [4, 11].

Scheduling the fishing activities

Results of the common IK cues used in defining fishing schedule and locations of fishing grounds is presented in the table 2. The study revealed that by scheduling fishing activities at a particular time of the year can mitigate any conflicts toward key areas example spawing , feeding and migration. These spatial and temporal scheduling mitigations could potentially apply to the identified sensitive fisheries areas in the MBCA. Optimal scheduling to avoid sensitive life stages is particularly important for species at risk.

In all villages a combined cue of Wind and Lunar cycle is employed. Generally, fishing schedule is concentrated during or shortly before the new moon (Waxing Crescent) and throughout the new moon period .During this phase the moon is invisible, creating dark skies ideal for night fishing. This phase also corresponds to period of high tides, locally known as bamvua –kubwa. A period of high fishing activities ensues lasting for about 5-9 days (Table 3).

This is followed by a lull in activities before another phase shorter than the first one comes into effect. This phase begins at Waning crescent in swahili muandamo wherein fishing activities are done at low level (lower catches and shorter hours at sea) . This level of activities bamvua-ndogo continues throughout the third quarter moon to Waning Gibbous, a period just shortly before the full moon. At full moon fishermen

usually come offshore for boat repairs in Swahili kukalafati and for farming activities. Similar patternof fishing schedules was reported in L. Victoria [12].

Locating fishing grounds

One of the most critical elements of successful fishing is the ability to locate the right fishing spots. Since the fishermen in this study have no access to modern technology such as sonar equipments or GPS, they have developed their own IK objects for locating correct fishing grounds. Nearly half of the fishermen respondent reported that they are also able to locate fishing grounds by using indicators of fish habitats. These included marine coral formations. Some fishermen may combine other cues e.g. knowledge of fish migratory routes and marine vegetation in identifying fishing grounds. Many authors have reported the practical value of IK in fihseries [4,11, 12].

Extent of the use of IK in Fishing Areas

The extent of the use of IK in this study focuses on the extent over how fishermen practice biodiversity conservation. They include application of IK in fishing activies, availability of fish catches, fishing seasons and other related management measures. In this study, seasonal closure refers to a halt in fishing activities for a considerable long duration to control and regulate resources exploitation and protect marine environment in a given area. During the South-East Monsoon forexample, fishing camp were closed in the Menai Area of Pungume and Kwale islands [13]. It was reported elsewhere in Zanzibar, other villages were applied a similar practice in the management of octopus fishery [14]. The study showed that in many areas the fishing catches were reportedly higher during six months of the cool North-East monsoon winds starting October than during the next six months characterized by stronger winds and rough seas of the South-East Monsoon. As a rule, North-East Monsoon winds pave a way for maximum fishing, as opposed to fishing and sailing unfriendly during the South-East Monsoon that leads to low catches. It was also revealed that about one-third of the respondents selected the islets (Nyemembe and Miwi) as the most suitable sites for seasonal closure, while about 27% of respondents preferred Pungume Island for the purpose. More than one-third of the respondents preferred Kizimkazi and the neighbouring villages for seasonal closure.

Extent of use of marine species

Although it is hard to find exact amount of the catches due to lack of traditional practice to measure their fish in kilograms, but more than 50% of the respondents preferred to catch tuna fish, billfish, kingfish and sharks. It should also be born in mind that the catch limit of the specie depends on the kind of gear and the site of fishing. According to Jiddawi [15], more than 500 species of fish were used for subsistence purposes, with reef fishes like emperors, snappers, sweet lips, parrotfish, surgeonfish, rabbit fish, groupers and goatfish being the most important category. As eel fish, catfish, mullet fish, silver biddy and shrimps accounted for third of all catches, the lowest catch accounted for 20% was observed in relation to shark, tuna fish, turtle and dolphin. However, fishing of turtles and dolphins is officially considered illegal and traditionally,

a taboo believed to call bad omen, the fishermen tend to return their catches back to the water on accidental fishing (Table 4). This system of fishing and taboo to large extent has significance implication to natural resources conservation within Menai Bay area.

Alternative indigenous activities

During the low season of fishing, villagers shift to seaweed farming and rope making using coconut husks treated with salt water to supplement their income since the former enjoys wider market by virtue of its being an export crop than rope making which is limited to the internal market. Similar study done by FAO [16] reported that Rope making is one of the long-time activities mostly done by women along the coast of Zanzibar. Due to the length of the process, the activity cannot be relied upon as the main source of income. However, ropes derived from this source remains a cultural symbol of Zanzibar as it is used in making beds, in dhows and in construction. Although not traditional activity, seaweed farming has gained popularity amongst islands women due to its "instant money" where about 30,000 farmers (90% are women) were currently engaged in seaweed farming in Zanzibar [17].

Informal traditional institution

Majority of respondents acknowledged the existence of the informal institutions in the study area, while only a few denied that there were not any such institutions (Table 6). It was observed that 66.7% and 33.3% of respondent from Mwembeni-magoroto and Potwe-ndondondo respectively are aware of the existing rituals places in their area. According to Mbwambo [6], the internal sponsored institutions which are essentially traditional are important in natural resources management and play a greater role in regulating access and utilization of various natural resources in a given society. Traditional institutions represent the established local system of authority and other phenomena derived from the socio cultural and historical process of a given society [18].

Sacred Sites and Rituals

It was observed that 22.5% of respondents acknowledge the presence of ritual sites in Bungi (Kwabihole and Kichangaweni). About 30 % of respondents cited a number of ritual sites including Mfaume Omadi, Mkwajuwamini, Makime, Nyemebe forest and Fungu Yasini (sand bank) in Unguja Ukuu. Meanwhile, 31.7% of respondents said there were two ritual sites in Kisakasaka (Mwana Mkuu and Pangakogwa spring). These ritual activities are limited to the custodian of ritual leaders and people from Kisakasaka strictly without any alien involvement. This culture has implication to natural resources conservation as it drives the ritual sites into staying safe and not over used where intruders' involvement is regarded a taboo. In addition to that, 16% of respondents suggested that the old mosque of Kizimkazi commonly known as Msikiti wa Kizimkazi is also a ritual site. Other study conclude that the presence of traditional leaders, traditional taboos, sacred species and sites had active roles in conservation and utilization of forest and wildlife resources[5, 19].

Table 1. Shows the various forms of marking fishing sites employed by the local fishermen.

Practical knowledge	% Respondents by villages				
	Unguja Ukuu	Bungi	Kisakasaka	Kizimkazi	Total (n= 120)
Use marks	63.3	53.3	56.7	53.3	56.7
Use stars	23.3	33.3	36.7	46.7	35.0
use big trees	13.4	13.4	6.8	0.0	8.3
Total	100	100	100	100	100

Table 2. Shows response to determine *Bamvua*

Determine the duration of Bamvua	% Respondents by villages				
	Unguja Ukuu	Bungi	Kisakasaka	Kizimkazi	Total (n = 120)
Wind and Arabic calendar	76.7	93.3	86.7	93.3	87.5
Arabic calendar	23.3	6.7	13.3	6.7	12.5
Total	100	100	100	100	100

Table 3. Shows response on duration of bamvua

Period of Bamvua	% Respondents by villages				
	Unguja Ukuu	Bungi	Kisakasaka	Kizimkazi	Total (n = 120)
5 days	3.3	0	0	0	8.0
7 days	43.3	83.3	50.0	26.7	50.8
8 days	26.7	13.3	26.7	43.3	27.5
9 days	26.7	3.4	23.3	30.0	20.8
Total	100	100	100	100	100

Table 4: Use of marine species in the study area

Common species	% Respondents by villages				
	Unguja Ukuu	Bungi	Kisakasaka	Kizimkazi	Total (n = 120)
tuna, billfish, kingfish, and sharks	50.0	40.0	43.3	56.7	48.3
eels, catfish, mullet, silver biddy and shrimps	30.0	46.7	36.7	20.0	32.5
sharks and tuna, accidental turtle and dolphin	20.0	13.3	20.0	23.3	19.2
Total	100	100	100	100	100

Table 5: Indigenous activities done apart from fishing in the study area.

Activities done apart from fishing	% Respondents by villages				
	Unguja Ukuu	Bungi	Kisakasaka	Kizimkazi	Total (120)
Rope making	46.7	56.7	43.3	30.0	44.2
Seaweed farming	53.3	43.3	56.7	70.0	55.8
Total	100	100	100	100	100

Table 6: Responses towards the existence of informal institutions in Menai Bay

Village	Responses on presence of Informal institutions					
	Yes		No		Total	
	N	%	N	%	N	%
Unguja ukuu	26	21.7	4	3.3	30	25
Bungi	28	23.3	2	1.7	30	25
Kisakasaka	30	25.0	0	0	30	25
Kizimkazi	27	22.5	3	2.5	30	25
Total	111	92.5	9	7.5	120	100

Table 7: Ritual sites found in MBCA

Rituals	% Respondents by villages				
	Unguja Ukuu	Bungi	Kisakasaka	Kizimkazi	Total (n= 120)
Kwa Bihole and Kichangaweni	0.0	66.7	3.4	20.0	22.5
Mfaume Omadi, Mkwajuwamini, Makime, Nyemebe (forest)	93.3	10.0	3.3	13.3	30.0
Mwanamkuu, Pangakogwa (spring)	6.7	20.0	93.3	6.7	31.7
Msikiti wa Kizimkazi (old mosque)	0.0	3.3	0.0	60.0	15.8
Total	100	100	100	100	100

CONCLUSIONS

In conclusion, IK have active roles in conserving the natural resources and marine biodiversity and promotes sustainable fishing practices in the Menai Bay Conservation Area. It play great role in defining fishing scheduling, locating fishing grounds, spawing and feeding areas. This is done by using IK cues such as denoting traps by considering marks and sign on the sea and land, use of local and hand crafts gears like baskets, wooden weapons and follow lunar calendar which goes hand in hand by nature and are essential for sustainable exploitation of marine resources and conservation. This findings illustrated how IK value is an important practice for management and conservation of marine ecosystems in the MBCA. Policy makers should consider preserving such effective, traditional management system and improve on them to

ensure sustainable management and conservation of fisheries resources in Zanzibar water.

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