

Editorial

Changing Livelihoods in the Coastal Zone of the Western Indian Ocean and East Africa

The uniqueness and diversity of natural resources in the Western Indian Ocean (WIO) coastal region has attracted much attention by natural scientists, but research on the social, economic and cultural dimensions of coastal life and livelihoods has been limited. The vast range of interesting and important features of WIO-East African coastal life warrants both single- and multidisciplinary research. Perspectives are needed of both natural and social science to provide comprehensive knowledge of events and processes involving change, as these affect coastal and marine ecosystems and the associated options for and constraints on viable livelihoods amongst coastal communities. Important topics of social science research include the rapidly changing livelihood options under current environmental, climatic and macroeconomic conditions and the wealth of experience-based knowledge on natural resources and processes in coastal settlements.

Historically, the coastal communities in the WIO region and East Africa have undergone major changes. In the 18th and 19th centuries, slavery formed part of trade across the ocean, benefitting the Persian Gulf and the sugar cane plantations in the islands of mainly Mauritius and Reunion, at high cost to the tranquil social, economic and cultural fabric of the WIO-East Africa region. The scramble for Africa and its eventual partition during

the 1884-1885 Berlin Conference ushered in colonisation of the African continent, which in turn imposed further suffering and exploitation. With the exception of a few coastal towns and cities like Mombasa, Tanga, Zanzibar, Dar es Salaam and Maputo, most of the coastal communities remained small and beyond the influence of centres of economic growth. For many of them, fishing, subsistence agriculture and hunting were the main sources of livelihood. Mangroves, reefs, seagrass beds and scrub in the vicinity of the coastal villages used to be the principal sources of food production. The fishing gear and techniques were inefficient, restricting their catches, and the number of fisher folk was low, limiting the impact on fish stocks.

In the 21st century, changing conditions in WIO coastal areas are resulting in growing population pressure on the resources. Many coastal communities are still very much dependent upon subsistence agriculture and fishing, and use both traditional and improved technologies to exploit the resources with little diversification in livelihood. Globalisation through trade in coastal resources which include fish and seaweed, as well as tourism, provide new opportunities for and challenges to the transformation of the livelihoods and wellbeing of coastal communities. Change has evolved over time where top-down management approaches by governments

have increasingly been replaced by participatory approaches such as Community-based Natural Resources Management (CBNRM), which recognises the role of various stakeholders in the formulation and execution of policies, strategies and plans. The governance and effective management of coastal resources are crucial for the resilience and sustainability of supplies in socio-ecological systems, particularly when one considers the onset of the effects of climate change in the region. As projected elsewhere, climate change is expected to profoundly alter the natural environment in WIO coastal areas, causing profound effects on the livelihoods and the living conditions of people dependent on marine and coastal habitats. Since the failure of the Copenhagen Summit in 2009, world leaders have been unable to find common ground for a drastic reduction in carbon emissions (David, 2012). Faced with the current global economic crisis, most industrial countries place emphasis on economic growth. The extraction of fossil fuels and other pollutive sources of energy, such as coal and shale gas, is viewed as an efficient way to sustain this growth. The increased use of these energy sources will add to the already unsustainable levels of greenhouse gas in the atmosphere which will speed up global warming and subsequent climate change. If no strong and courageous decision is made on this matter at the global scale in the next decade, most societies and ecosystems in the WIO may be adversely and irreversibly affected. Thus, the WIO region is at a turning point in terms of both its marine environment and coastal livelihoods.

This special issue aims to provide examples of current local livelihoods and living conditions in coastal communities in the WIO area, at a time when the impact of climate change is just being felt. Until now, changes experienced by coastal societies have been driven mainly by humans, with a heavy impact on natural environments whose state of health has deteriorated. These human drivers are divided into two groups. The first is composed of endogenous factors shared by all the countries in the region, i.e.

population growth in coastal communities, their integration into the market economy, the rapid development of urban areas and the implementation of inappropriate development policies at the national level. The second group deals with exogenous factors grouped under the generic term of globalisation. This includes the international demand for fish products, increased tourism and aquaculture production. These internal and external factors, combined, result in a change, even transformation, of livelihoods and living conditions of coastal communities in the region. This change has taken mainly two forms: an intensification of existing human activities in coastal and marine areas, including an increase in fishing effort; and the diversification of the coastal economy with the development of e.g. tourism and aquaculture.

As outlined by Katikoro *et al.* (2013) in this issue (whose findings may cautiously be extended to the entire region), "traditional" fishing in Tanzania was the main livelihood of coastal communities in precolonial times. Their southern Tanzanian study revealed that fishing, as an economic activity, has undergone major changes over the past 20 years. These have included the modernisation of fishing gear and techniques, involving a decrease in the number of traps and lines and an increase in the number of nets. This trend is common to all coastal regions, where it is generally accompanied by a shift from subsistence to commercial fishing. Indeed, the need to earn an income has become the key motivation for involvement in fishing. The desire to produce for sale is even more prominent when fisher folk have lucrative opportunities to sell their catch and when the need for cash is high. The introduction and expansion of a market economy is a common denominator in all the countries of the region. It is also a powerful driver for an increase in the number of fisher folk and thus the fishing effort.

When the modernisation of fishing gear is accompanied by the modernisation of vessels (which usually involves the use of engines), the radius of fishing activity grows but the effort per unit area may remain moderate or decrease. This is not the case in southern

Tanzania where, according to Katikoro *et al.* (2013), most of the fisher folk have not benefited from modern boats. However, while they have continued to fish their traditional fishing grounds, their numbers dramatically increased in the latter half of the 20th century and they now use deleteriously more efficient methods. This has resulted in overexploitation of the fish stocks in many places, especially where dynamite is being used. Despite the prohibition of dynamite fishing, its total lack of selectivity and its destructive effects on marine habitats, some fisher folk still resort to its use. This practice is observed mainly in Tanzania, but it has occasionally been recorded in Madagascar and the Comoros Archipelago.

The severe and increasing degradation of fishery resources and habitats in the region begs the question as to effectiveness of the fishing regulations. Due to financial constraints, most authorities have difficulty surveying their national waters on a regular basis to control poaching. As the enforcement of fishing laws is quite challenging, emphasis is increasingly placed on the creation of Marine Protected Areas (MPA) as a tool to regulate fishing effort in fisheries areas (FAO, 2012). This process is well underway in West Africa (Garcia *et al.*, 2013) and it is also emerging in the Indian Ocean (Daw *et al.*, 2011).

Since the 5th World Parks Congress held in 2003 in Durban, the number of MPAs has increased considerably and many countries have made a commitment to protect 10% of their coastal areas in this manner. This often entails considerable and continued financial expenditure, resulting in the real risk of a reduction in their enforcement and, hence, their lowered biodiversity conservation. The risk of this was pointed out ten years ago by Agardy *et al.* (2003). It has led conservation NGOs to put emphasis on Community-based Natural Resource Management (CBNRM) to organise environmental management (see Rabe and Saunders, 2014, this issue). Locally Managed Marine Areas (LMMAs) represent the main output of this quite new trend in the region (Grilo, 2011). LMMAs first appeared in the Pacific (David, 1994; Johannes &

Hickey, 2004; Govan *et al.*, 2008). According to Zorzi and Rabearisoa (2013) in this issue, "LMMAs are one of the best solutions for the environmental adaptation to climate change and a green economy".

In this issue, Westerman and Benbow (2013) present one of the most successful examples of a LMMA in the WIO region, the "Velondriake project". It is a win-win project because it satisfies both conservationists and local populations whose main activity is fishing. The key to success is based on three pillars: a) the rapid growth of octopus (*Octopus cyanea*), allowing stocks to recover after a few months of fishing closure, b) business opportunities through two fish trading companies which regularly visit the villages to buy octopus to sell them on the urban market or to process them before export, and c) "Blue Ventures", a British NGO that has successfully organised the fisher folk of Andavadoaka into an association of 25 villages called Velondriake. Another key to success observed by Westerman and Benbow (2013) is the involvement of women in the fisheries and the management structure of the Velondriake LMMA. On this basis, CBNRM could be seen as a panacea to ensure optimal management of coastal environments and fish stocks.

Rabe and Saunders (2013) are doubtful about this assumption. In their paper dealing with the community based management of the Jozani - Pete mangrove forest in Zanzibar, they considered this type of CBNRM a failure. If "participatory management" is the foundation of CBNRM, it rarely comes from below, according to these two authors. Instead, it is usually implemented in a top-down process. When management includes some prohibitions in use, the process generates few winners and many losers. In the Jozani - Pete example, the vicinity of Zanzibar town induced widespread mangrove cutting for charcoal production. The integration of most of the Jozani - Pete villagers' wood harvesting and farming areas into the Jozani - Chwaka Bay National Park reduced overexploitation of the mangroves. Nevertheless, the cost

was heavy for those villagers whose main source of income disappeared in the process. Failed expectations regarding the economic benefits of mangrove conservation in terms of economic activities from its implementation have led to economic marginalization and opposition to the CBNRM.

There is a big difference between the Velondriake and Jozani-Pete areas in terms of CBNRM implementation. In the first case, the creation of the MPA was concomitant with the arrival of buyers and international exporters of octopus which gave coastal villagers an unprecedented income. The creation of the LMMA was therefore seen as an economic opportunity for the majority of the population. This positive experience greatly facilitated the acceptance of the MPA and has driven more than 20 neighbouring villages to Andavadoaka to join the Velondriake association. In contrast, the majority of inhabitants in the Jozani-Pete villages experienced the MPA creation as a negative initiative. The main lesson one may draw from these two studies is that the success of the CBNRM depends on community structures and conditions relevant at the implementation level and the manner in which participation is facilitated.

The exploitation and benefits from coastal and marine resources should ideally lead to better lives for coastal communities. It is assumed that this can be accomplished through access to an abundance of resources. The article by Kulindwa and Lokina (2013) in this issue reveals that other factors may result in fisher folk benefiting the least from their efforts, compared to other actors in the finfish trade. The reasons there are more losers than winners in the fish trade are determined by factors such as fish market arrangements which lead to reduced bargaining power, a lack of capital for modern equipment, a lack of trust among fisher folk to form cooperatives and a lack of institutional support to regulate sales. Although the finfish trade in East Africa is a free market operation, market imperfections do exist. Governments could act to remove the imperfections of exploitative monopolistic

tendencies (competition involving many sellers but few buyers) in small-scale finfish trading and facilitate the creation of a level playing ground.

As underlined by Rabearisoa and Zorzi (2013) in a short communication focusing on small-scale fisheries in northeast Madagascar, education is fundamental to enable people to make the most of their abilities. Education is the key to diversification of economic activities and, hence, improved livelihoods of coastal populations. Across the region, tourism and aquaculture are the best means to diversify coastal economies. Despite the opportunities offered by tourism and aquaculture, they may also lead to user-conflict and sometimes create new vulnerabilities.

Zanzibar offers a good example of such vulnerabilities. As shown by Tobisson (2013) in this issue, tourism in Zanzibar has been fluctuating (as elsewhere in the world) due to global economic and political events, processes and shocks, as well as national policies and politics. In Zanzibar, these fluctuations affect both simpler facilities for backpacker tourism and international class hotels, although Tobisson (2013) has shown that the decrease in backpacker tourism has had a more devastating effect on Zanzibar local economy. Local people testify that backpacker tourism offers a real opportunity to drive local development through the provision of market opportunities for local products (e.g. handicraft, produce from fisheries and agriculture) and by offering employment, particularly for women. The last-mentioned is not limited to Tanzania; there are similar reports from several countries in the region of tourism providing a much-needed opportunity for women to earn cash.

Seaweed farming also offers interesting opportunities for women to earn an income. In Zanzibar, this activity was introduced on trial to small groups of men in the late 1980s but the production was soon taken over by women and is now almost exclusively in their hands. Seaweed is cultivated in shallow waters accessible from the shoreline. Although remuneration for this highly labour-intensive activity is low, says Tobisson (2013), it offers a

regular income to large numbers of women in coastal communities. Tanzania and Zanzibar pioneered seaweed farming in the region and lessons learned from these experiences would be applicable in Madagascar where many locations are suitable for seaweed farming. The activity raises the hopes of many women where the need for an income is dire.

The customary, experience-based knowledge that guided fishing practices and the use of mangroves environments some decades ago needs to be supported and complemented by new information to be effective. Thus, the advocacy recommended by Rabearisoa and Sorzi (2013) in this issue regarding the education of fisher folk in Madagascar is in line with this reality. It could be extended to the whole WIO region and to other activities which may improve the livelihoods of coastal communities. Some local traditional knowledge in the WIO region is today being captured and translated into Traditional Ecological Knowledge (TEK) to fit scientific language. TEK is currently being integrated into the scientific corpus dealing with biodiversity and ecosystem services in the region. But the integration of traditional knowledge through TEK into the scientific discourse on ecosystems is a slow process and has involved very few coastal communities. Thus, it is time to compile a comprehensive inventory of traditional, experience-based knowledge and associated practices on coastal and marine natural resources, and incorporating this in the formulation of effective adaptation strategies to mitigate the impacts of climate change in the WIO region.

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