



Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/mpb

Viewpoint

Dynamite fishing in Tanzania

Lorna M. Slade^{a,*}, Baraka Kalangahe^b^a Mwambao Coastal Community Network, P.O. Box 3810, Zanzibar, Tanzania^b P.O. Box 214 Bagamoyo, Tanzania

ARTICLE INFO

Article history:

Received 30 July 2015

Accepted 2 August 2015

Available online xxx

Keywords:

Dynamite

Tanzania

Fishing

Blast

Enabling factors

ABSTRACT

Fishing using explosives is common in Tanzanian waters; it is considered to be more widely practised now than at any other point in history. Mwambao Coastal Community Network, a Tanzanian NGO carried out a multi-stakeholder consultation in April 2014 initiated through the concern of private investors and tourism operators. Consultations were held with villagers, fisheries officers, government officers, hoteliers, dive operators, fish processors, NGOs and other key individuals, and shed some light on key factors enabling this practice to flourish. Key areas identified for attention include engendering political will at all levels, upholding of the law through a non-corrupt enforcement and judicial system, and defining clear roles and responsibilities for monitoring and surveillance. The work identified other successful initiatives which have tackled this pervasive practice including projects that build local capacity for marine governance, villages that have declared themselves intolerant of blast-fishing, and private–public partnerships for patrol and protection.

© 2015 Elsevier Ltd. All rights reserved.

Fishing using explosives is common in Tanzanian waters and reports indicate that it has been practised here since the 1960s (Samoilys and Kanyange, 2008). Despite being made illegal by the Tanzanian Government in 1970, it is currently considered to be more widely practised now than at any other point in history, to the extent that on some parts of the coast it is becoming 'fishing as usual'. Mwambao Coastal Community Network, a Tanzanian NGO based in Zanzibar, was approached to carry out a multi-stakeholder consultation by the Hotel and Tourism Association of Tanzania (HAT) and was funded by BEST-AC, IUCN and the Lighthouse Foundation. Mwambao's vision is that Tanzanian coastal community livelihoods are improved and sustainably supported by the ecosystem services provided by a healthy bio-diverse coastal environment. The consultation took place in April 2014 and involved meeting with stakeholders from the village of Mkubiru on the southern border with Mozambique, to the village of Moa on the northern border with Kenya. The work was initiated through the concern of private investors and tourism operators on the Tanzanian coast who are witness to the rampant nature and recent surge in 'blast fishing' in areas that they operate. Consultations were held with villagers, fisheries officers, government officers, hoteliers, dive operators, fish processors, NGOs and other key individuals, and shed some light on key factors enabling this practice to flourish. The work also highlighted isolated initiatives which have shown success in tackling this pervasive practice.

The historical evolution of dynamite fishing in Tanzania was confirmed by various elders in Mtwara and Kilwa including Mzee Omari Ali Kionga of Somanga in Kilwa District. According to Mzee Omari,

fishermen from Mtwara were the first to practise dynamite fishing in their coastal waters and soon the practice spread further north and reached Kilwa. The practice was promoted by the collaboration of business individuals from Dar es Salaam who came with dynamite supplies and cool boxes for collecting fish. These fishers from the "South" soon moved to other coastal waters of Tanzania from Msimbati in Mtwara, to Moa in Tanga (Fig. 1).

The practice of fishing with explosives is considered to be the most destructive of all human impacts on coral reefs (Wagner, 2004). Each blast completely reduces the reef to rubble within a few metres of the blast site, while killing all fish and most other organisms within a 15–20 m radius (Guard and Masaiganah, 1997). Devastation over the years has been severe; Horrill (1996) in a north coast survey of 14 coastal reefs, 17 inner patch reefs and 27 outer patch reefs, estimated that 12% of reefs were completely destroyed, 24% were in good condition with the remaining 64% in poor or moderate condition. Information from communities and monitoring indicated that most of the damage to reefs north of the Pangani River was the result of dynamite fishing. It is an ecological calamity on par with elephant poaching and arguably worse, as it results not only in the destruction of large numbers of marine organisms but also in complete obliteration of their habitat.

"I can no longer take guests to these 'dead areas' — it is like bombing in the middle of Ngorongoro crater but because no-one sees the damage under the ocean, no-one cares". *Dar es Salaam dive operator.*

Major towns such as Mtwara, Dar es Salaam and Tanga appear to be the hubs from which most of the 'dynamite fishing' originates with powerful well-connected businessmen and others financing the operation and using local villagers as crew (Fig. 2). These locations are also the

* Corresponding author.

E-mail address: lornaslade@mwambao.or.tz (L.M. Slade).



Fig. 1. Map showing incidence of dynamite fishing in Tanzania, 2009. Copyright World Resources Institute.

final market destination for fish caught in this manner. Village fishers also engage in the practice at a local level on their own, both on foot at low tide, and using local boats. Explosive devices no longer rely on traditional sticks of dynamite; home-made bombs are easily created using plastic bottles, granular fertilizer, petrol, detonator caps and small amounts of explosive gel (Fig. 3). One 'bomb' might cost less than Tsh. 15,000 (\$8). Fishers are well aware of the detrimental effects of blast fishing on the environment – they complain that blast fishing is affecting their livelihood. They recognise that dynamite has resurfaced with great vigour in the last five years and report that it is normal to hear from 20 to 50 blasts a day in the major affected areas. Local fishers use dynamite due to the pressures of poverty and the

quick returns afforded by the use of explosives – they realise that they are often operating as pawns in a larger game.

There has always been frequent and widespread fisher migration along the East African Coast with fishers operating seasonal camps far from their home village. As boat engines have become more accessible, people travel further and can reach market more quickly. The 'de facto' open access to fisheries is a challenge, limiting the control that government and resource users have on fisheries management.

(You ask) "why haven't people changed their ways – they feel the natural resources are not theirs. People don't cut down their own cashew trees to get cashew nuts. We need to convince people that



Fig. 2. Blast fishing off of the Dar es Salaam coast.



Fig. 3. Explosive gel used in home-made 'bombs'.

the resources are theirs. The message is not 'not to use', but 'to use wisely' as it belongs to them." *Government Fisheries Officer Mtwara.*

The government demarcated Beach Management Units (BMUs), aim to promote co-management through decentralisation and were successfully introduced on Lake Victoria in the 1990s. They are a relatively recent introduction to the coast however, and are currently largely ineffective as a result of limited capacity building at the village and local government level. Thus, in practise, much of the access to marine resources is not controlled or monitored.

"The sea belongs to everyone – it is our responsibility to look after it, but the numbers of fishers have really increased and the BMUs do not function as there is no training. We cannot refuse access to outsiders to our waters as we also fish in the areas of others." *Fishers from Mgao village, Mtwara.*

Coastal tourism investors who take guests swimming, snorkelling and diving are concerned about the impact on the environment as well as their businesses, not to mention the safety of their guests. Recreational divers in the water feel unsafe and their physical wellbeing is at risk. Visitors to the country find it hard to comprehend how the practice is allowed to continue. There is real concern that Tanzania's reputation as a safe tourist destination is in jeopardy.

"Dynamite fishing is totally out of control, with serious risks to national security as well as to the tourism industry. I will not mention the damage to the reefs, ecosystem and environment in general, as that is obvious." *Hotel operator Songosongo.*

The consultation summarised past and present initiatives in combatting dynamite fishing and reports stakeholder views on their effectiveness. There have been several initiatives to curb the use of dynamite along the coastline both by communities, private sector, government and donor funded projects. Some of these initiatives demonstrated some success and for a few years between 1997 and 2000, there were significantly fewer incidents of blast-fishing along the coastline. Hard-line and indiscriminate tactics such as those taken by the navy over two years of operation from 1998 to 1999 witnessed dynamiting being reduced to almost zero (Wells, 2009). While navy intervention was effective in the short-term, it resulted in widespread traumatization and is not welcomed by stakeholders as 'the solution'.

Alternative income generating activities and provision of boats, revolving funds etc. have not proved to be effective. Fishers have difficulties repaying loans, and often it is the 'criminal' who is rewarded for bad practise rather than the bona fide fisher who uses sustainable fishing methods. Dynamite fishers near Mtwara were apparently encouraged to leave the practice of dynamiting by being donated large boats and engines to enable them to fish in deeper water (Dive operator, Mtwara (pers. comm.)).

The Rural Integrated Project Support (RIPS) Mtwara was funded by the Finnish Government and implemented a marine protection

programme in 1994. Through slide shows, training lectures, participatory video and film shows and technical assistance, the project mobilized 12 communities in three coastal districts of Mtwara, Lindi and Kilwa which resulted in a community based management strategy and the 'Sudi Declaration'. The signatories of this declaration vowed to stop dynamite fishing in the three districts and formed a committee who agreed to oversee marine protection issues and raise awareness at local, regional and national levels. They established a local umbrella organisation known as SHIRIKISHO. Community representatives progressed a community-produced video statement through tiers of government ending with a presentation to the President. Action was taken and the government sent in the navy to the region for a period of two years to arrest those who were taking part in the practice. This was controversial but it successfully reduced dynamite fishing in the two regions to almost zero. According to villagers involved at the time, the initiative was so successful because of collaboration between the local community and the government, with funding and technical support from RIPS. However the success was short-lived and was not sustained. After the project, the collaboration between the local community and government slowly started to weaken and SHIRIKISHO fragmented into small district based organisations with no support from the government. Gradually there has been a resurfacing of dynamiting to an extent where the small organisations are no longer able to contain it.

The Tanga Coastal Zone Conservation and Development Project (TZCDP) established in 1994, strived to curb dynamite fishing in Tanga region. Through funding from Irish Aid and technical support from IUCN, this programme was initiated following the observed deterioration of marine resources. Under this programme, the local community was intended to be the key group in managing the marine environment. Village committees were formed to deal with fisheries related issues especially the enforcement of regulations with committees for patrol and defence and security. These committees became the focal points for planning and implementation of agreed actions. District personnel and programme staff provided technical assistance to the village committees.

TCZCDP was less successful than RIPS in addressing illegal fishing practises. Over its 12 years of operation, it apparently never stopped dynamite fishing completely as had been accomplished in the South, but achieved a certain reduction over a number of years. The reasons for the relative success were again based on the collaboration of community, government and the provision of technical support from the project. The communities being key, the programme focused on building their capacity in governance through the establishment of management structures both at village and division levels. All these measures achieved marginal reduction in dynamite fishing, but the navy was finally also enlisted in Tanga region and together with TCZCDP helped to reduce blasting to lower levels between 1997 and 2000.

For reasons that are not fully understood, the navy was suddenly withdrawn. The village management committee and patrol structures that were created soon became ineffective after TCZCDP's last phase, during which the project was decentralised. The project management authority and donor funds were transferred from regional to district government level, which then had other priorities and discontinued financial and technical support to the village committees.

More recent initiatives include the 'Friends of Maziwe'. Maziwe Island is a Marine Reserve located close to Pangani. Although originally forested (apparently as recently as the 1970s) it is now a sandbank surrounded by coral reefs, and is a major attraction for tourists from Ushongo who visit the area for diving and snorkelling. As a famous sea turtle breeding site, the government gazetted the island in 1975. During TCZCDP in 1994, Maziwe Island Marine Reserve was incorporated into one of the Collaborative Management Area Plans. Like other reef areas, the island had become the focus of dynamiters, and a significant portion of the reef area has been damaged and reduced to rubble (example shown in Fig. 4 and 5). Realising the threat to Maziwe Island and its

socioeconomic importance, the responsibility of managing the area was vested in the local communities of Pangani East and Ushongo. This did not apparently succeed in stopping the dynamite fishing, however.

In 2005, Friends of Maziwe (FoM) was founded by long term residents and hotel owners along the coast of Ushongo. The goal of FoM was a protection system for Maziwe Marine Reserve and it worked with two local groups of fishermen from Pangani and Ushongo to conduct daily patrols by local fishers. A fee collected by the hotels from each guest was given to the groups for their efforts. According to local fishers in the group, dynamite fishing in the area was controlled to the extent that notorious dynamiters moved away from the area. Unfortunately, according to local investors, the patrol project stopped a year later because the fishermen ceased to patrol and in fact started fishing themselves within the reserve. About two years ago FoM and the Marine Protected Area and Reserves Unit (MPRU) joined together and launched a new patrol project on a daily basis working with a patrol team of 5 villagers from Ushongo, all official Honorary Wardens of MPRU. The situation today on Maziwe has improved. Revenue generated by the reserve goes predominantly to MPRU but a small fee is charged to each guest which helps fund the project. The explosions have apparently declined around the reefs of Maziwe but according to local fishers other productive fishing grounds in Pangani are under intensive dynamite fishing of a magnitude never observed before.

Mkuburu Village is located within the Mnazi Bay Ruvuma Estuary Marine Park (MBREMP) and demonstrates a community-based initiative that has successfully contained local dynamite fishing. The community in this village, after realising that their fish stock had declined drastically (to the extent that women-fishers could not get enough fish to feed their family), jointly convened a village assembly meeting where a resolution was passed to fight against dynamite fishing in the village. They started with prohibiting village members in engaging in the practise and a group of young fishers volunteered to conduct patrols to deter dynamite fishers from other villages. In response to the negligence of the police and the judiciary whereby culprits were regularly released, the village decided to “finish the case” within the village. Any dynamite fisher found or caught is punished as dictated by the village, and the fishing vessel and all associated gear are destroyed on the spot. The dynamiters often take revenge by destroying the fishing gear of the volunteer patrol group. When this happens an emergency village meeting is convened and all the villagers take the responsibility for compensating the group with new gear. The village has had some support from MBREMP (they have been given a patrol boat), but otherwise it is among the few, if not the only village, where, for three years it has managed to reduce the use of dynamite fishing to almost zero.

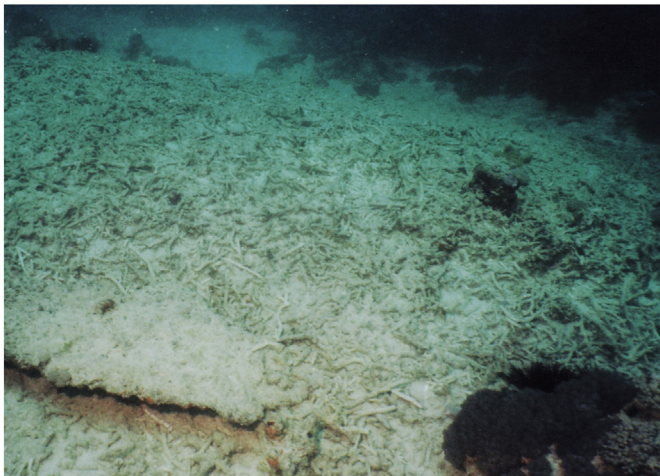


Fig. 4. Picture showing reef damage from blast fishing.

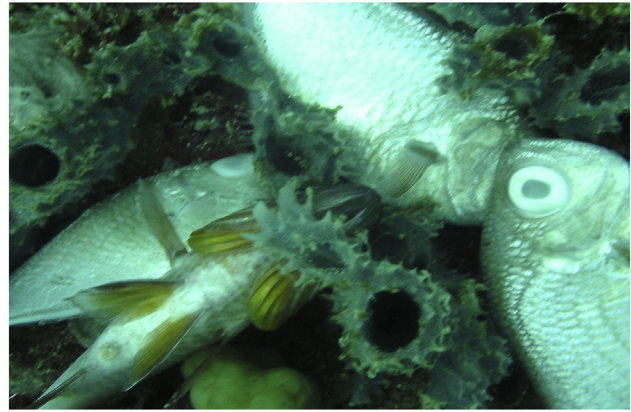


Fig. 5. Picture of dead reef fish as a result of blast fishing.

Key enabling factors for the current continued operation of fishing using explosives along the majority of the Tanzanian coast include:

- easy availability of cheap materials for making explosive devices,
- well-connected businessmen who finance the operation and market the fish,
- lack of local marine resource ‘ownership’ i.e. inoperational BMUs,
- ineffective law-enforcement at the district level as a result of corruption of local magistrates and a lack of perception as to the seriousness of the crime, and
- a lack of political will at all levels.

In addition there is an understandable lack of willingness in the Fisheries Development Division to address such a serious security issue on their own without backing from other law enforcement bodies; there is confusion and denial with regard to enforcement roles, there is also lack of clarity as to which laws should be used for prosecution and the suggestion of corruption at high levels of government.

“Dynamite is not a fishing gear, it is a weapon just like a grenade and other weapons of war. Fisheries officers are trained in resource management and have no experience in weaponry. Eventually the bombs will come to our houses.” *Government Officer Dar es Salaam.*

Enabling factors that allow blast fishing to operate are summarised in the following diagram, showing factors both at sea and at the landing site, but also at market (Fig. 6).

Urgent short-term solutions identified by those consulted during the study include:

- tracing the supply chain of bomb-making materials, in particular, explosive gel and detonator caps (Recent press reports a consignment of explosive gel being transported by bus from Arusha to Dar es Salaam; apparently originating from upcountry or Kenya. ‘Huge consignment of explosives found in bus BY YAKOBE CHIWAMBO, 12th January 2015’, <http://www.ippmedia.com/frontend/index.php?l=76214>)
- awareness raising and lobbying of decision-makers at the national level including the leaders of political parties
- prosecution of key ringleaders in the dynamite fishing networks
- clarification and enforcement of legal procedures i.e. which laws and penalties apply and who should enforce them. Haule (2013) lists nine pieces of legislation that have provisions and penalties applicable to the illegal use of explosives including dynamite, namely the Fisheries Act No. 22 of 2003, Fisheries (Amendment) Regulations, 2009, Marine Parks and Reserves Act 1994, Explosive Act No. 56 of 1963, Penal Code Chapter 16 of Laws (Revised) (Principal Legislation), Environmental Management Act, 2004, Arms and Ammunition Act No.2 of 1991 No. 19 of 2007, Prevention of Terrorism Act, 2002 as well as the Economic and Organized Crime Control Act, 1984. Penalties for different offences related to explosives within the different legislations range from one year to twenty years.

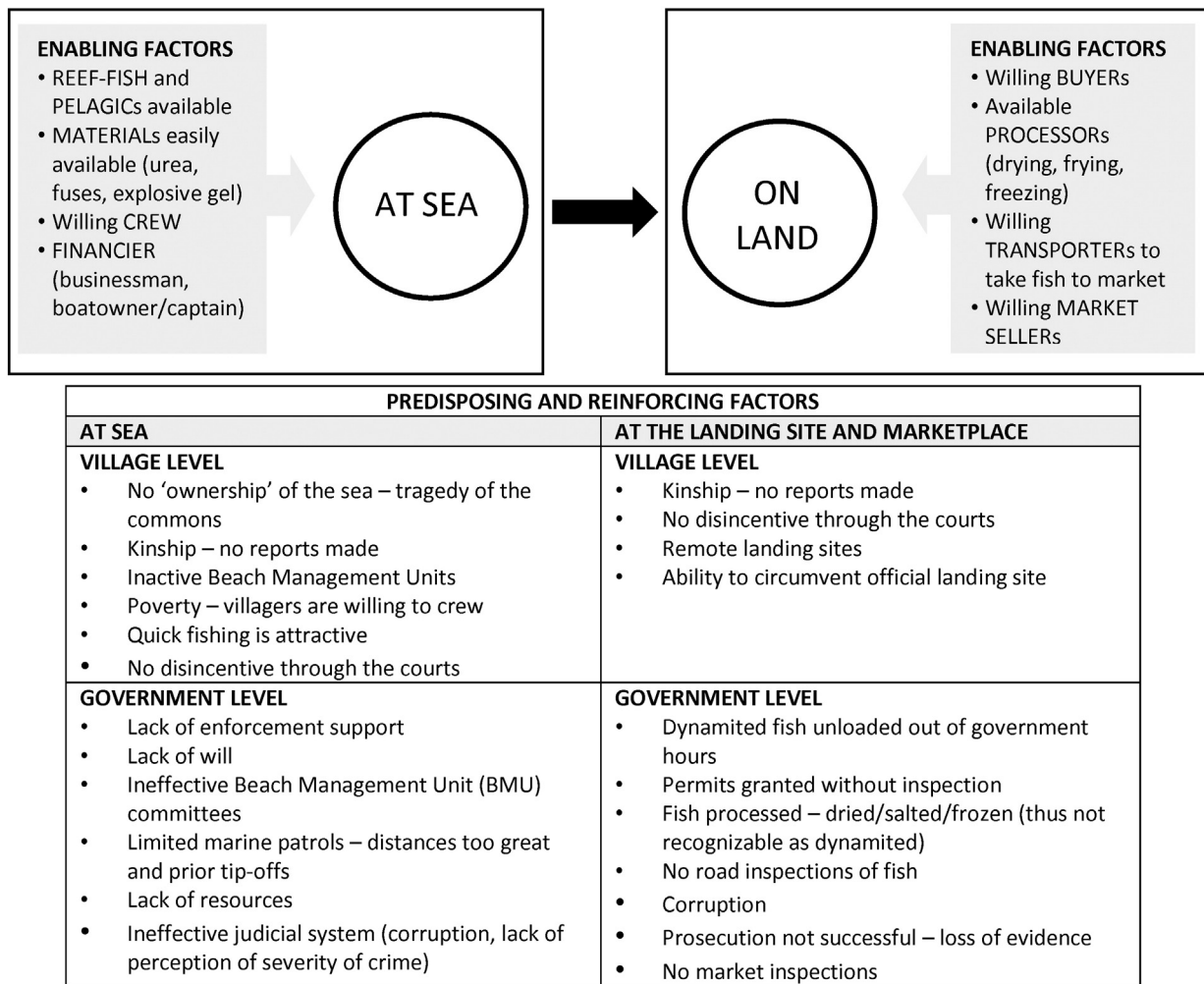


Fig. 6. Enabling, predisposing and reinforcing factors for blast fishing on the Tanzanian coast.

- translation of relevant legislation into Kiswahili, and wide distribution to stakeholders via the media
- re-activation of private sector led Tanzania Dynamite Fishing Monitoring Network

It is important to note that many solutions to dynamite fishing also serve to address other forms of destructive fishing. In addition to those mentioned above, longer term but equally important solutions have been identified as:

- review of legislation to eliminate ambiguities and increase penalties
- magistrate, enforcement and inspection officer training
- BMU and VLC capacity building to allow local control and decision-making
- promotion of good practice at village level
- promotion of multiple inspection points in each coastal district
- systematic involvement of stakeholders, private sector and local communities

A healthy, safe and prosperous coastal environment with an active business climate and without destructive fishing, relies on political will at all levels, upholding of the law through a non-corrupt enforcement and judicial system, timely and appropriate punishment of offenders, and a clear idea of roles and responsibilities for monitoring and surveillance. This is not a 'quick fix' however. This consultation has shown that while the government needs to be working towards

this, there are alternative intermediate solutions which may be effective in certain circumstances. Firstly, a long-term project based scenario which builds local capacity for marine governance (e.g. through Beach Management Units), working hand in hand with the fisheries department can be locally effective; this is not guaranteed to continue beyond project closure however. Secondly determined villagers can take matters into their own hands by forming a cohesive 'non-dynamite tolerant' unit; this is most likely to be successful with the backing and support of authorities such as those of a marine park. Thirdly private-public partnerships can work and have great potential, but this will only be feasible where there is a tourism or other viable enterprise.

In recent months there has been a move to create local anti-dynamite community networks and the effectiveness of this initiative remains to be seen. Unfortunately without tackling the key enabling factors, fishing using explosives will continue to flourish in Tanzania's coastal waters to the detriment of its people, its environment, its economy, its tourism industry and its reputation as a safe destination.

"The situation will resolve itself – there will be nothing left." *Dive Club member Dar Yacht Club.*

Acknowledgement

Mwambao Coastal Community Network is a not-for-profit organisation working on the Tanzanian Coast. It uses Participatory Video as one methodology when working with coastal communities. A link to a short

community film about dynamite fishing 'The Sea is our Life' can be found here: <http://vimeo.com/61793439>

Photographs courtesy of Alexander Riefer, Sea Breeze Dive Centre and were taken offshore of Dar es Salaam.

The work was funded by BEST-AC Tanzania, IUCN-ESARO and Lighthouse Foundation.

References

- Guard, M., Masaiganah, M., 1997. Dynamite fishing in southern Tanzania, geographical variation, intensity of use and possible solutions. *Mar. Pollut. Bull.* 34, 758–762.
- Haule, W., 2013. Review of Issues surrounding Investigation and prosecution of fishing with explosives in Tanzania. Draft report for WWF Tanzania Country Office.
- Horrill, J.C., 1996. Coral Reef Survey: Summary Report. Tanga Coastal Zone Conservation and Development Program (TCZCDP), Tanga, Tanzania.
- Samoilys, M.A., Kanyange, N.W., 2008. Natural Resource Dependence, Livelihoods and Development: Perceptions from Tanga, Tanzania. IUCN ESARO.
- Wagner, G.M., 2004. Coral reefs and their management in Tanzania. *West. Indian Ocean J. Mar. Sci.* 3 (2), 227–243.
- Wells, S., 2009. Dynamite fishing in northern Tanzania—pervasive, problematic and yet preventable. *Mar. Pollut. Bull.* 58, 20–23.