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THE ROLE OF INTEGRATED COASTAL MANAGEMENT APPROACH IN THE PROTECTION OF COASTAL AND MARINE RESOURCES IN THE EASTERN COAST OF TANZANIA

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ABSTRACT

This scientific paper examines the role of Integrated Coastal Management (ICM) approach in the protection of coastal and marine resources in Tanzania. It engages coastal resource users and practitioners in focus group discussions and interviews, and complements the data obtained with documented sources. A modified version of the Benefit Analysis Framework is adopted from Wenger et al. (2011) to analyze the extent to which ICM yields a wide range of benefits that may potentially promote the protection of coastal ecosystem and enhance the commitment of communities that live adjacent to the coastal strip to manage mangroves, fisheries, coral reefs, and coastal land in a sustainable manner.

RÉSUMÉ: Le rôle de la gestion intégrée des zones côtières dans la protection des ressources côtières et marines de la côte orientale de la Tanzanie.

Cet article examine le rôle de l'approche de gestion intégrée des zones côtières (GIZC) dans la protection des ressources côtières et marines en Tanzanie. Il fait participer les utilisateurs (des ressources côtières) et les praticiens à des discussions de groupe et à des entretiens, et complète les données obtenues par des sources documentées. Une version modifiée du cadre d'analyse des avantages est tirée de Wenger et al. (2011) pour analyser dans quelle mesure la GIZC offre un large éventail d'avantages susceptibles de promouvoir la protection de l'écosystème des côtes et de renforcer l'engagement des communautés vivant à proximité de la bande côtière pour gérer les mangroves, les pêcheries, les récifs coralliens et les terres côtières de façon durable.

REZUMAT: Rolul abordării managementului integrat de coastă pentru protecția resurselor de coastă și marine pe coasta de est a Tanzaniei.

Această lucrare examinează rolul abordării managementului integrat de coastă (MIC) în protecția resurselor de coastă și marine din Tanzania. Acesta implică utilizatorii și practicienii resurselor de coastă în discuții și interviuri focusate pe grup și completează datele obținute cu surse documentate. O versiune modificată a cadrului de analiză a beneficiilor este adoptată după Wenger et al. (2011) pentru a analiza măsura în care MIC oferă o gamă largă de beneficii care ar putea promova protecția ecosistemului de coastă și pot spori angajamentul comunităților care trăiesc adiacent de fâșia de coastă pentru a gestiona mangrovele, pescuitul, recifele de corali și terenurile de coastă într-o manieră durabilă.

INTRODUCTION

Aquatic ecosystems and resources are under a high natural and anthropogenical stress around the world (Niinemets et al., 2017; Bănăduc et al., 2022, 2023a, b). The Tanzanian coastal ecosystems are not at all an exception in this respect (Sabai and Sisitka, 2013; Sabai, 2017; Schuijt et al., 2021).

The world has witnessed the adoption of integrated approaches across continents for a wide range of reasons. The approaches are either adopted or developed in terrestrial and coastal contexts in order to harmonise prevailing natural resource use conflicts, discourage overlapping institutional mandates and promote sustainable use of natural resources (Campuzano et al., 2013; Stori et al., 2023). Some of the common integrated approaches preferred in terrestrial ecosystems include Integrated Forest Management (Kulshreshtha, 2014), Integrated Natural Resource Management (Wang et al., 2021), Integrated Land Use Planning (FAO, 2020), and Integrated Water Resource Management (Nagata et al., 2022).

The Integrated Coastal Management (ICM) approach is widely preferred and applied in coastal areas due to its benefits in terms of attracting active community participation and harmonizing local resource use challenges (Sabai, 2021). In Asia, particulary in the coastal states, the specified approach is called Integrated Coastal Zone Management (ICZM). This approach is also common among countries that are located on the Indian Ocean, including Madagascar, Seychelles, Mozambique, Kenya, Tanzania, and South Africa (WIOMSA, 2020).

In the Black Sea region, a very dynamic area affected by the human impact along its history (Bănăduc et al., 2016, 2020, 2023), ICM was adopted as a means for mobilising and promoting coherent use of coastal resources (Bat et al., 2012). The specified approach has also been adopted in other contexts on sustainability grounds (Saha, 2019). Some researchers have applied the approach in climate change issues, arguing that it has the potential of drawing lessons and offering significant contributions that may deduce experiences for addressing climate change concerns in coastal contexts (Ojwang et. al., 2017). It is quite clear that some countries have adopted the approach due to its potential to resolve emerging and prevailing challenges in coastal areas (Khelil et al., 2019).

In Tanzania, the ICM approach was adopted and applied in the mid-90s as an initiative for promoting sustainable management of coastal and marine resources, particularly mangroves, fisheries, and coral reefs and discouraging mismanagement practices such as overfishing, mangrove clearance, and dynamite fishing (TCMP, 1999a, NICMS, 2003). Despite the challenges experienced in the initial stages of adopting the ICM approach (Sabai, 2021), a wide range of benefits have been identified as a result of its adoption in the coastal regions of Tanzania such as Dar es Salaam, Tanga, Pwani, Mtwara, and Lindi (KICAMP, 2004, 2005; TCMP, 1999b, TCZCD, 2004).

This journal article seeks to describe the extent to which the ICM approach has contributed to the protection of coastal and marine resources in the eastern coast of Tanzania. It creates a platform for describing what the ICM approach may potentially offer when adopted in coastal and marine contexts. The article also serves as an eye opener to coastal practitioners and local communities that there are many benefits that may be accrued from ICM than some negative challenges that are reported in a body of coastal literature.

MATERIAL AND METHODS

Context of the study

Data for this article were captured from two coastal sites namely Kijiru and Moa in Tanga region (Fig. 3), where 26 coastal resource users (selected intentionally on the grounds of their long term experience in coastal resource use) were engaged in face-to-face interviews. The same target group was involved in three Focus Group Discussion sessions as a means of verifying data that had been previously generated from interview sessions. Captured data were later analyzed qualitatively and complemented with documented coastal and marine literature sources to yield insights that depicted the potential role of the ICM approach.

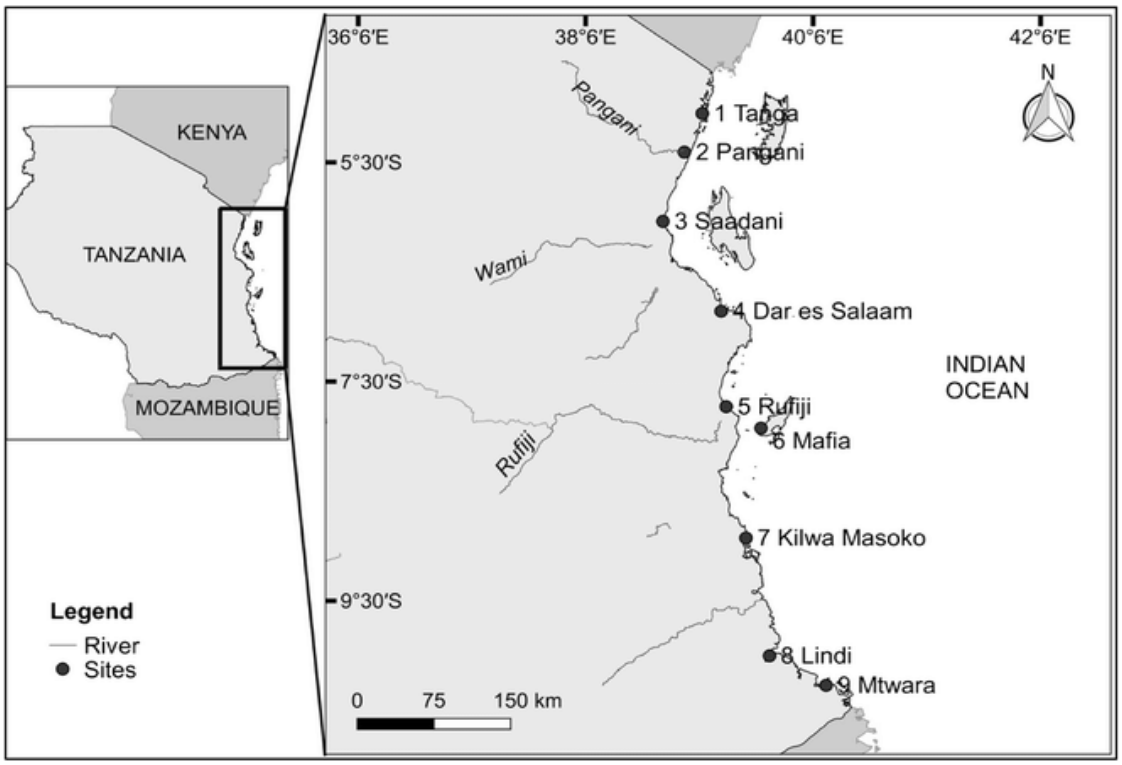

Figure 3: ICM sites (1-9) in the Eastern Coast of Tanzania; Researchgate.net.

Theoretical framework

This article adopts the Benefits Analysis Framework (Wenger et al., 2011; Fig. 4) in setting the theoretical background. The framework offers analytical, explanatory, and methodological support for uncovering potential benefits that may be realised in contexts where ICM approach is adopted. It also offers the language of description and serves as a content descriptive tool.

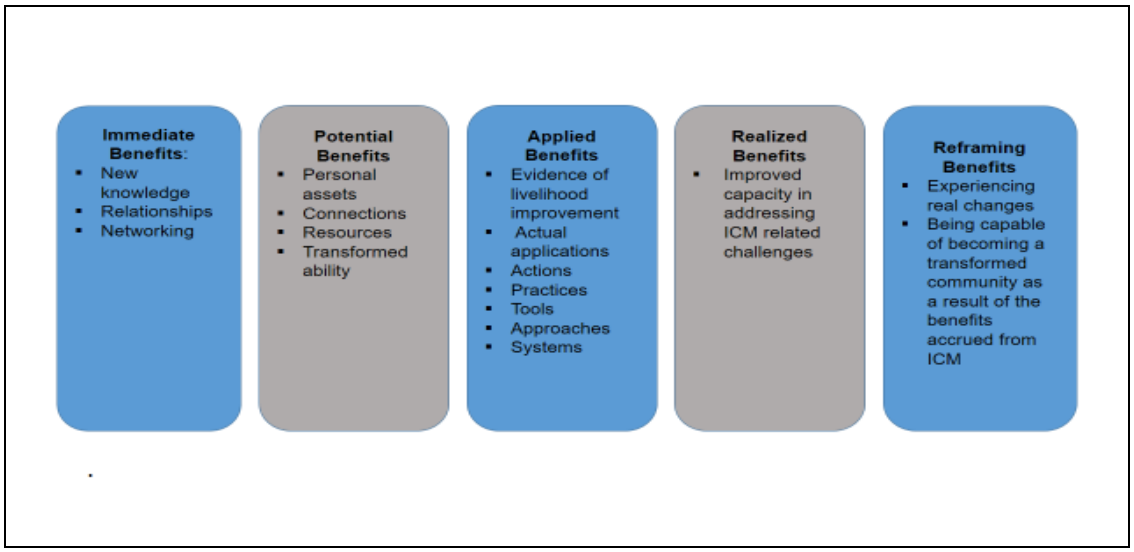

Figure 4: Benefit Analysis Framework;
Wenger et al., 2011-modified.

According to the framework, *immediate benefits* are realized when target costal communities gain new knowledge such as preparation of nursery plots, planting of mangrove seeds in the plots, transplanting and installation of eco-friendly facilities for instance beekeeping. They are also realized when relationships and networks are established.

Potential benefits are realized when local communities engage in income generation activities as an alternative to overreliance on coastal and marine resources. Such benefits also extend to creation of connections between one community of practice and adjacent coastal communities and it is facilitated by activities such as study tours, experience sharing and resource sharing (TCZCD, 2004). Under *potential benefits*, people may benefit from sustainable practices and eventually develop transformed capabilities.

Applied benefits are accrued when there is evidence on ground that the livelihoods of coastal communities have improved. Under such benefits, target local communities also start involving themselves in actual application of gained knowledge and skills such monitoring of coastal and marine resources, mangrove transplanting and community patrols. It is under this level that various tools and systems are created to aid practices such as implementation of conservation and restorative initiatives.

Realized benefits are revealed when there is improved community capacity in addressing emerging and prevailing social, ecological, and economic challenges that occur in the coastal and marine ecosystem.

Reframing benefits are realized when target coastal communities experience real changes, being capable of becoming a transformed community as a result of the benefits accrued from ICM.

RESULTS AND DISCUSSION

The results suggest that ICM may potentially attract sustainable fishing in the study sites, build capacity for transplanting mangrove species, expose coastal communities to monitoring of coastal and marine resources, yield knowledge of the creation of nurseries for mangrove species, promote learning by doing, create opportunities for income generation, protect mangrove resources and avail opportunities for women to participate in mangrove restorative activities. Moreover, the approach has the potential to protect coastal land by encouraging land use planning. These results are analyzed hereafter, and discussed with the aid of the Benefits Analysis Framework presented in figure 4, in five categories of benefits namely immediate, potential, applied, realized, and reframing benefits.

Attraction of sustainable fishing practices

The Integrated Coastal Management (ICM) approach provides a space for promoting the protection of fish breeding grounds such as coral reefs and mangrove sites. It also encourages the use of acceptable fishing gear such as large-meshed nets and discourages the use of small-meshed nets, illegal fishing, dynamite fishing, and the use of different poisons. There is also evidence that some fishers pluck off live corals and place them on top of traditional fishing gears commonly known as *madema* to prevent them from being pushed away by turbulence and thus keep them in their original position. Captured insights from the study sites describe various attempts that have been previously made by the Tanga Coastal Zone Conservation and Development (TCZCD) Program to promote sustainable fishing practices in the target sites (TCZCDP, 2004). When local fishers refrain from destructive activities and adopt the use of sustainable fishing practices, they illustrate a form of transformation which results from experiencing real changes. In other words, when such a situation is realized, they have obtained *reframing benefits* (Fig. 4; Tab. 1, no. 1).

Builds capacity in mangrove transplanting

It is also evident that ICM exposes coastal communities to mangrove transplanting activities, including training on how to prepare nurseries for raising mangrove seeds. This suggests that they are being enabled to engage directly in practices that will attract *applied benefits* (Fig. 4; Tab. 1, no. 2). Applied benefits are realised when target communities apply gained knowledge. This category of benefits is revealed in a form of actions, practices or actual application of what had been introduced or delivered by facilitators in hands-on training sessions. Analysed documented sources reveal that mangrove restorers in Kijiru and Boma sites were initially trained by coastal and marine experts on the manner of preparing nursery plots and transplating mangrove seedlings and acquired transplanting techiques that were later shared in other coastal localities (Sabai, 2014). The new knowledge that is acquired by coastal communities through participating in transplanting activities falls under *immediate benefits* (Fig. 4; Tab. 1, no .4). Mangrove transplanting may potentially improve coastal forests, hydrological cycle and carbon sinks (Hu et al., 2018).

Builds the capacity to monitor coastal resources

In contexts where ICM had been adopted as the main approach, community monitoring of coastal and marine resources had been encouraged. This practice has many ecological benefits. It aids in the identification of changes, threats, trends, and condition of resources and thus helps community groups to understand well the status of the target ecology and make proper intervention for the identified gaps (KIMP, 2005).

The practice also allows local resource users to share monitoring experiences with facilitating teams. Gained knowledge is later spread to other parts of the coastal strip and attracts the protection of coastal and marine resources. Ecological monitoring also falls under *applied benefits* (Fig. 4; Tab. 1, no. 3).

Table 1: Perceived role of the ICM in the study sites.

SN	ICM role	Context	Beneficiaries	Benefit category
1.	Attracts sustainable fishing	Fishing	Fishers	Reframing benefits
2.	Generates knowledge on tree nursery creation and mangrove transplanting	Mangroves	Mangrove restorers and mangrove-based fishers	Immediate and applied benefits
3.	Builds capacity to monitor coastal resources	Mangroves, fisheries, coral reefs, seagrass and coastal land	Coastal resource users	Applied benefits
4.	Promotes learning by doing	Coastal area	Coastal resource users	Realised benefits
5.	Protects mangrove resources	Mangroves	Coastal resource users	Applied benefits
6.	Attracts participation of women in conservation	Coastal area	Coastal women	Reframing benefits
7.	Creates a space for income generation	Coastal area	Coastal resource users	Potential benefits
8.	Promotes greening in schools	Coastal schools	Schools in the coastal area	Applied benefits
9.	Protects coastal land	Coastal strip	Coastal communities	Applied benefits
10.	Promotes knowledge sharing	Coastal area	Coastal communities	Immediate benefits

Promotes learning by doing

ICM encourages coastal communities to participate fully in a wide range of activities under the facilitation of coastal experts. This causes mangrove restorers, fishers and other social groups to learn as they participate actively in the management of coastal resources and eventually attain *realised benefits* (Fig. 4; Tab. 1, no. 4)

Protects mangrove resources

The implementation of ICM-oriented activities provides a space for village councils to formulate and approve by-laws that protect mangrove forests and other coastal and marine resources from being mismanaged. Programmes that are being implemented under the ICM approach also ecourage local communities to initiate patrols in the mangrove forests. Patrol activities are evident in the study area and other ICM sites in the eastern coast of Tanzania. These kinds of practices cause them to obtain *applied benefits* (Fig. 4; Tab. 1, no. 5).

Creates opportunities for women to participate fully in the management of coastal and marine resources

Analyzed data suggest that women were initially being excluded in the management of coastal and marine resources (KICAMP, 2000, 2001). Their main role was to collect sea cucumber during low sea tides and assume minor roles in fish selling. The adoption of the ICM approach opened up opportunities for them to play various roles in the management of all coastal resources. Currently, women assume a leading role in guiding ecological restoration activities that aim at protecting the coastal ecosystem. A study carried out by Sabai (2019) indicated that they are also assuming leadership positions in groups, CBOs and NGOs that are directly involved in the management of coastal and marine resources. These kinds of transformatiomation indicate that they have attained *reframing benefits* (Fig. 4; Tab. 1, no. 6).

Creates alternative sources of income generation

Implementation of the ICM strategy encouraged the development and initiation of alternative sources of income in the coastal area to reduce pressure on the use of coastal fisheries, mangroves, and other coastal and marine resources. It was envisaged that if local communities who are mostly involved in the mismanagement practices will be exposed to alternatives sources of income, they will reduce their total reliance on coastal and marine resources and the affected ecosystem will thus rejuvenate and regenerate. In Pangani (Tanga), a crab fattening project was introduced to encourage mariculture. In other coastal areas such as Dar es Salaam, beehives were installed in the mangrove forests to attract double benefits. Mangroves that are located near beehives are normally not disturbed by people for fear of being attacked by swams of bees (Sabai, 2014). Bees also contribute to the pollination of mangrove species.

In Dar es Salaam, revolving fund schemes were introduced between 2002 and 2005. These accommodated different income generating activities such as poultry farming, urban vegetable growing, petty trade businesses and food selling. Seed money came from the Swedish Development Agency (Sida) in collaboration with the Government of Tanzania. Under this scheme, borrowers were supposed to recover their loans on weekly bases at agreed affordable rate (KICAMP, 2004). This suggest that they are continuing to realize *potential benefits* (Fig. 4; Tab. 1, no. 7).

Promotes greening programs in schools

The ICM promoted and encouraged the introduction of greening programmes in local schools particularly primary and secondary schools in the coastal regions. These witnessed the integration of environmental aspects in the school curriculum. The first initiatives were carried out by the Tanga Coastal Development Programme in the late 1990s. School greening programmes have since then been initiated in other parts of the coastal area to orient students in the protection of environment. Under the Benefit Analysis Framework (Fig. 4), greening of schools may be regarded as falling under *realised benefits* since it is being practiced to improve schools capacity in addressing environmental challenges (Fig. 4; Tab. 1, no. 8).

Helps in the development of land use plans which prioritise the protection of coastal and marine resources

The adoption of the ICM strategy and policy has also necessitated the development of coastal land use plans. In 2005, Kinondoni Integrated Coastal Area Management (KICAMP) facilitated the development of a draft land use plan for Mbweni, Kunduchi, and Ununio localities (Fig. 4, no. 4) in collaboration with Kinondoni Municipal Council. The plan generally protected the coastal land and forests from human induced encroachment. It was later approved by the relevant organs and became operative (KICAMP, 2007).

Promotes knowledge sharing in the coastal area

It was found that in places where ICM was adopted, most of the initiatives prioritized study tours to other ICM sites prior to commencement of planned activities. Tanga Coastal Zone Conservation and Development (TCZCD) programme facilited a study tour for selected representatives to visit Mombasa (Kenya) to learn from cummunities that had experience in coastal and marine management. In Dar es Salaam, representatives from the newly established ICM programme KICAMP visited the TCZCD to learn before preparing its coastal management plans. This suggests that knowledge sharing is a key aspect in effective implementation of the ICM approach. It is evident that knowledge exchange continued in the life time of the specified ICM programmes (KICAMP, 2004).

Contributes to development of ICM policy and strategy

The adoption of the ICM approach influenced the development of the policy in Tanzania in 1999 (TCMP, 1999a, 1999b; NICMS, 2003). Four years later (2003), the strategy was developed and implemented. The ICM policy provided general guidance on how coastal and marine resources should be managed and governed, and specified the actors and strategies for implementation of ICM-oriented activities in the country.

CONCLUSIONS

The Integrated Coastal Management approach (ICM) may potentially contribute to the protection of coastal and marine resources by providing a space for yielding ecological, economic, and socio-economic benefits; a situation which causes coastal communities to reduce pressure on coastal and marine resources. The adoption of ICM in similar coastal contexts is likely to be successful, if necessary procedures and conditions are considered prior to their implementation. Knowledge exchange and experience sharing emerge to be key aspects that ignite successful implementation of ICM.

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