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Delivering Blue Economy and Nature Recovery in Coastal Communities—A Diverse Economies Perspective

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Abstract

The blue economy aims to bring prosperity to coastal communities whilst also protecting natural ocean resources for future generations. But how can this vision be put into practice, especially in communities in which dependancy on natural resources is high and food and livelihood security are key concerns? This paper examines two cases of community-led nature based enterprise in Kenya in a search for solutions to this challenge. I use a 'diverse economies' perspective to delve into the heterogeneous relations at work and in search of insights that can be applied in multiple contexts. The analysis reveals a complex assemblage of institutions, knowledges, technologies and practices within which enterprises operate. Whilst the enterprises featured are still relatively new and developing, they suggest a direction of travel for a community-led *sustainable* blue economy which both supports and benefits from nature recovery. The insights gained from this diverse economies analysis lead us to appreciate a sustainable blue economy as a rediscovered and reinvigorated relationship of reciprocity between society and nature. One that nurtures place-based nature-based livelihoods and nature recovery, together, and which embodies a set of values and ethics shared by government, communities, and business.

Keywords: diverse economies; blue economy; ocean governance; community enterprise; nature recovery

1. Introduction

This paper aims to shed light on the role of community-led, nature-based enterprise in blue economy (BE) implementation. A core aim of BE is the conservation of natural resources, to protect biodiversity, contribute to climate change mitigation, and to enhance food and livelihood security [1]. How do 'communities' engage with the BE? It is in many cases, I argue, through forms of enterprise even though this may not be explicitly recognised. Enterprise in nature conservation provides a self-sustaining financial model that offers a range of socio-economic and environmental benefits, primarily by creating economic incentives for local communities to protect natural resources. The 'diverse economies' framework helps us to understand economy, and therefore enterprise, from a broader persective than traditional ideas of the 'the firm' or 'innovation' which in turn should help us to understand how a sustainable blue economy (SBE) can be promoted successfully at the community level. In this paper I focus on community-led nature-based enterprise aiming to promote nature recovery and meeting human development needs at the same time, which reflects the core tenets of the BE – conserving nature whilst exploiting it sustainably for economic growth (and the implied benefits thereof to nations and populations).

The literature on nature recovery and small scale enterprise is nascent and fragmented. I use the term community-led nature-based enterprise to refer to the cases from Kenya that feature in this paper. They have more in common with literature on 'conservation enterprise' [2] and less on the

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small body of recent literature on 'nature based enterprise' [3] which focuses on business models in the global north designed to deliver nature based solutions (NbS). Conservation enterprise describes an approach to nature conservation that has been practiced in sub-saharan Africa since the late 1990's, promoted particularly by the African Wildlife Foundation [4] and elsewhere by USAID [2], as a commercial activity that generates economic benefits in a way that supports a conservation objective. It involves promoting alternative livelihood approaches in order to lessen pressure on threatened natural resources including through overexploitation and damaging harvesting practices. Boshoven et al [2] describe the theory of change pertaining to conservation enterprise: 1. [donor] support for conservation enterprises leads to their establishment and sustainability over time; 2. enterprises provide benefits to stakeholders; 3. enterprise benefits motivate and enable stakeholders to change their attitudes and behaviors toward conservation; 4. stakeholders' behaviors contribute to a reduction in threats to biodiversity; 5. reducing threats improves the conservation status of biodiversity focal interests. Studies have questioned whether they do in fact deliver the intended benefits for nature [5], finding evaluation data inadequate in most cases to draw firm conclusions. Conversely researchers have asked whether nature based interventions deliver development outcomes [6], concluding that there is much empirical evidence that they do, but evidence gaps exist relating to distributional benefits, effects on poverty alleviation, and the comparative benefits compared to other forms of intervention. Development benefits are measured in broad categories such as food security, improved health, empowerment – benefits experienced by people indirectly as a result of, for example, soil improvements, better diet, skills training etc. Thise experiences are valuable for community-based BE development.

The Blue Economy, a recent development paradigm, represents a new arena for the development of enterprise. As the BE has become practiced since its inception in 2012, weaknesses have emerged in its delivery of social and environmental justice and calls have strengthened for a sustainable BE (SBE) which places an increasing emphasis on balancing economic development with ecological integrity, social equity and robust governance frameworks [7]. This is important if the BE is to make a significant contribution to meeting SDGs, especially in least developed coastal states and SIDS for which BE is seen as an important mechanism [8]. An SBE is seen as comprising multi-stakeholder partnerships, participatory decision-making processes, and ensuring equitable benefit-sharing in marine resource development. Marine resources should be used responsibly, paying attention to biodiversity conservation and ecosystem based management, and environmental justice (e.g. [9–12]).

Community-Led Nature-Based Economies on the Kenya Coast

The coast of Kenya hosts important marine ecosystems comprising interrelated habitats of mangrove forest, seagrass meadows and coral reefs. Oceanic waters off Kenya are rich in biodiversity and support important migratory and demersal fish stocks. The BE is a national priority for Kenya [13] featuring in the nation's Agenda 2030. Many people, especially in the northern county of Lamu depend, directly or indirectly, upon ocean and coastal resources for their livelihoods. However, mangrove forest is being degraded and lost due to a range of factors, such as harvesting of fuel wood, land claim, and pollution. The National Mangrove Ecosystem Management Plan 2017-2027 identifies three key issues underpinning mangrove ecosystem degradation and loss: weak governance; poverty, and economic development; inadequate knowledge and awareness. Lamu County hosts about 60% of Kenya's mangrove resource and has become a focus for community development work aiming to address these failings. National research institutes have promoted new practices, for example for seaweed and crab aquaculture, promoted traditional practices such as mangrove honey production, and alternative crops such as cassava to improve food security.

The mangrove ecosystems of Lamu County have attracted the attention of a number of international and local NGOs given their importance in Kenya and the wider Western Indian Ocean region. They have worked with communities to understand the pressures leading to mangrove degradation and loss, worked alongside government to understand the nature of the resource (extent, condition, pressures etc), and influenced policy and action in support of its conservation. Recently,

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external donor-funded programmes (KEMFSED ; GoBlue) have provided additional support towards these aims. In particular, they have focused on: fisheries reform: spatial planning: mangrove forest conservation and 'blue carbon' project development: and the promotion of more sustainable livelihoods. Independently, a range of conservation activities have been initiated locally regarding marine conservation and eco-tourism. Separately, large development projects (Lamu Port; proposed coal power plant) have given rise to local resistance (Save Lamu coalition) and led to legal challenges (regarding: due process; land claims), and compensation for loss and damage to natural resources.

2. Materials and Methods

I take a relational approach in this study, drawing on the diverse economies framework, a body of scholarship emerging from poststructuralist, feminist, and anti-essentialist critiques of mainstream economics and political economy (see: [14–16]). I augment the diverse economies six themes with an additional focus on spatio-material dimensions, using a spatialised governmentality framework [17].

Introducing the Diverse Economies Framework

The diverse economies perspective emerged from critiques of perceived inadequacies of the capitalist economic model to explain the sum of economic activity, in particular its blindness to non-waged and care work (eg subsistence farming; childcare) in explanations of how economies sustain life. Instead of treating capitalism as inevitable, Katherine Gibson and Julie Graham (writing as Gibson-Graham) highlighted economic difference, hybridity, and possibility, opening space to imagine and enact alternatives. An international programme to map diverse economic practices led to the "community economies" approach, which recognises local, often hidden, economic practices (cooperatives, mutual aid, subsistence production) as central rather than marginal.

In their landmark book The End of Capitalism (As We Knew It) [14], Gibson-Graham introduced the metaphor of the economic iceberg, above the waterline - visible capitalist practices (wage labour, market exchange, private firms); below the waterline - the much larger field of economic activities (unpaid work, cooperatives, bartering, state redistribution, commons) usually ignored. This visual metaphor became foundational for the diverse economies framework. This describes the economy as a set of ethical negotiations across six themes:

1. Enterprise – how organisations are owned, managed, and for what purpose.
2. Labour – how work is performed, valued, and rewarded.
3. Transactions – how goods/services are exchanged or shared.
4. Property – how resources are owned, accessed, and cared for.
5. Finance – how surplus is mobilised and distributed.
6. Subjectivity – how economic subjects are shaped by multiple roles, responsibilities, and identities, embedded in communities and ecologies.

Each theme highlights diverse forms, not just the capitalist or mainstream versions. Key features emerging through these themes are:

- Pluralism: Recognises multiple economic forms beyond capitalism.
- Relationality: Economies are socially and ecologically embedded.
- Ethics: Economic decisions are always ethical decisions (about inclusion, fairness, sustainability, care).

According to its proponents, the Diverse Economies perspective demonstrates a politics of possibility: by showing that alternatives already exist, it helps communities imagine and enact more just and sustainable futures [18].

Cases and Stakeholders

The cases featured focus on a) access to new markets to facilitate fisheries reform and b) a blue carbon credit programme as a driver for mangrove forest recovery and community development. Both are linked, arising from efforts to improve and diversify livelihoods in support of mangrove, seagrass and coral conservation. These have been led by The Nature Conservancy (TNC) and

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Northern Rangelands Trust (NRT) with support from WWF and Flora and Fauna International. Various government services have necessarily been involved, notably Kenya Marine and Fisheries research Institute (KMFRI), Kenya Wildlife Service (KWS), Kenya Forest Research Institute (KeFRI), Kenya Forest Service (KFS), and County governments. Taking a community development approach these organisations have invested in community capacity building, raising awareness, and social research to understand the drivers for environmental degradation, and environmental research (working with government research centres and the forest, fisheries and wildlife services) to understand status and trends of key habitats and species. Separately, research centres have undertaken long term research programmes in support of alternative or modified livelihoods, such as crab and seaweed aquaculture.

Data Collection

Data was collected in the form of interviews of key informants, and took place in February and March 2025. Data from earlier fieldwork in the same location between October 2021 and March 2022 has also been incorporated into the analysis. In total XX interviews of government officials, NGO staff, business leaders, community leaders, and fishers were undertaken (Table 1) representing a cross-section of key actors. Ethics approval was secured from the University of Oxford and The Open University, UK.

Table 1. Roles of interviewees.

Role	number interviewed	roles	date of interviews	Code (where referenced in text)
International Donor	1	Programme manager	13/12/2021	
Government officials	2 2	County government - natural resource management Senior civil servants – blue economy policy KEMFSED project	08/03/25 04/11/21 17/11/21 16.03.22	County Government official
Government service	3	Natural resource management LAPSETT Development programme Research Kenya Wildlife Service	03/03/25 16/03/22 25/10/21 30/12/22	Government Service 1
NGO staff	7	Community engagement / conservation initiatives BE Programme management	28/02/25 09/03/25 07/03/25 (GoBlue project)	NGO1 NGO2

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		Legal advocacy Community advocacy	21/12/21 (NGO3) 24/12/21	Save Lamu
Business / enterprise leaders	6	Natural resource based enterprises Kumbatia Seafood Community enterprises	 26/02/25 & 12/03/25 06/03/25 31.10.21 30.10.21	 KS1 KS2 Women's group
Community leaders	3	Formal and informal community association establishment and management	02/03/25 02/03/25 08/03/25 18/12/21 (BMU)	Save Lamu CFA
Fishers	1 group 1	Resource harvesters Quality control & fishing coordination	10/03/25 10/03/25	Kiwayu fishers Kumbatia Agent

Analysis

Interviews were audio recorded then transcribed using an online AI transcription tool (www.cockatoo.com). The text was then checked manually against the recording to ensure accuracy. Text was summarised using a mind mapping tool (SimpleMindsPro), which allows for easy re-organisation of nodes, then categorised using the six diverse economies themes plus a spatial and material factors theme. Sub-categories were created inductively. A narrative summary of each theme was created.

3. Results

In this section I provide an overview of the cases, followed by a thematic analysis which presents a diverse economies understanding of them. This is followed by the presentation of a number of insights arising from the analysis, to inform the following discussion.

Case 1. Kumbatia Seafood, Northern Rangelands Trust and the Kiunga Gear Exchange

In the Kiunga Marine Reserve in the north of Lamu archipelago, near the Somali border, a persistent problem has been use of illegal fishing gear – the beach seine net. These long nets are operated by up to 30 fishers. Their weighted bottom edge causes damage to seagrass and coral habitats as they are dragged through the shallow waters. The nets typically have a small mesh size and so catch a large number of juvenile fish (68% of catch in surveys, NGO2), for which there is a steady market as they are cheaper than larger fish and there is some cultural preference amongst consumers in this region. In the Kiunga area 11 nets were identified, along with the 11 owners and 165 associated fishers who depend upon them for their livelihoods.

Over a period of three years NGOs worked with communities to gather information and evidence. This included the training of data collectors in the community with the aim of establishing trends in fish catches, and building trust within the communities regarding this information. This action facilitated discussions regarding future scenarios such as the possible disappearance of fish

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stocks, and awareness raising regarding the impacts of various fishing gears, leading to the proposal for a gear exchange programme and discussion of its implications. This gear exchange programme was co-designed with the communities. A formal (voluntary) application process was put in place – a contract in effect – in which the terms of the gear exchange were negotiated with each net owner and countersigned by crew members, the BMU, KWS and community leaders to ensure transparency. A critical element to the success of the exchange was to take action to ensure that the new fishing methods adopted are themselves successful to incentivise compliance. "They are just people who are trying to earn a living. So the method could be a bad method, but what they are looking at is 'can I survive'?" (Government service 1). This involved not only providing new equipment (boats, engines, pole and line etc) and infrastructure (eg cold storage) but also creating new market relations (better access; more equitable relations between traders and fishers; etc). Kumbatia Seafood emerged from this latter element. After initial trials by NRT, a private partner was sought to develop new routes to market and more favourable trading conditions for fishers involved in the gear exchange. This involved fisher training and new cold chaining arrangements to improve fish quality, enabling improved incomes. A unique incentive for this remote region was the creation of a scholarship programme for fisher family members which pays for secondary and university education, creating new opportunities for young people, in return for 100% compliance with gear exchange conditions. Now Kumbatia Seafood continues to operate in the region, making regular purchasing expeditions, paying above the general market rate in return for adherence to simple quality standards (bleeding fish immediately upon catching them; keeping flesh temperature close to freezing), employing local agents for coordination and quality control, supplying subsidised inputs (fuel, hooks etc), and transporting high quality fish, sustainably caught, to Mombasa and beyond. This regularity, and coordination regarding market demands and fisher activity (village agents act as go-between so fishers know when expeditions are due) limits oversupply and associated slumps in prices which was a common feature of the system in the past leading to waste and low incomes. "Before Kumbatia came in they used to …. sell to the nearby village of Kizingitini. There are some individual dealers there. They used to buy but one difference is that it was not that reliable. ….The dealer might buy [one day], but tomorrow is not there. But for Kumbatia, it has [brought] about a sustainable market. …. That's the difference" (Kiwayu fishers group, via translator).

Case 2. Mangrove Blue Carbon

Kenya has been a test-bed for new approaches to mangrove forest use and management. Notably, in the south the Gazi and Vanga projects have pioneered the generation of alternative finance for conservation and human development through the creation of carbon credits for mangrove forest conservation. Elsewhere, eco-tourism enterprises have emerged to fund mangrove forest conservation work and to improve livelihoods for local people.

These experiences are informing a comprehensive strategy in Lamu in which communities are being supported to replicate and further develop these ideas, and on a much larger scale. Community forest associations have so far been formed to manage two of the three administrative areas of mangrove forest in Lamu County, requiring scientific assessment of forest condition and extent, participatory management planning involving community, government and other stakeholders, and negotiation of formal agreements with Kenya Forest Service. Whilst the aims are broader than the creation of carbon credits, for the community these offer a regular source of revenue to finance conservation and to support new community-based enterprises to improve food and livelihood security.

As in Kiunga, a community development approach has been taken to understand the factors driving mangrove forest degradation and loss, and to develop alternative practices and livelihoods. However, in this case Participatory Forest Management Plans, which are the formal mechanism for co-management, provide the framework for understanding community needs, environmental trends, and for negotiating alternative futures. They involve a complex and costly process for which communities need additional support: awareness raising, training, capacity building, specialist

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expertise, administrative support. "After having management plan, then you apply for forest management agreement. Because there are a lot of workshops, a lot of meetings, public participation, those experts you hire are from Nairobi, KFS officials come from Nairobi, book a ticket, hotels, a lot of things" (CFA). This process has led to proposals for a variety of enterprises: mangrove tree nurseries; boardwalks and restaurant bandas (platforms); honey production; making seaweed and honey/wax based cosmetics; crab fattening and farming; and more.

Whilst carbon credits are not yet being produced in Lamu, the process is advanced. The Community Forest Associations, now they are registered with government, can act as the beneficiary/client for the verification and certification process. Baseline mangrove forest assessments have been completed, by government scientists, NGO experts and others. A PIN (project idea note) has been submitted to initiate the project assessment process with the certification body Plan Vivo. Communities are more aware about how mangrove forest recovery is undertaken and have developed expertise in propagule collection, nurturing, and transplanting. In anticipation of new user rights (conferred in the Community Forest Agreement) and revenues (from carbon credits) they are planning new community-led enterprises.

Diverse Economies Analysis

The diverse economies analysis undertaken helps to shed light on some key elements of these cases which will help in their future development and in the design of future programmes. The discussion below is organised according to the six diverse economies framework themes of enterprise, labour, transactions, property, finance, subjectivity, plus spatial and material factors. These are summarised in Table 2 at the end of this section.

Enterprise exists in many forms, ranging from the traditional business, to NGOs and government in their roles promoting sustainable livelihoods, poverty reduction and environmental stewardship. What is striking is how they are interconnected – part of a complex system that cannot be reduced to individual components. Those connected to nature-based enterprise range from fishing, to eco-tourism, to hospitality, to cosmetics, to mangrove propagation, to environmental monitoring, to mechanical engineering, and more. Organisational structures include the formal (company; regulated community associations – CFAs, BMUs etc; project-based partnerships – eg GoBlue); social enterprise; and the informal (Mtangawanga women's self help group; Crab Shack informal cooperative; .....).

Administrative barriers are significant because enterprises must comply with regulated processes. Forming community associations requires participatory resource management plans that are costly and often depend on external expertise and funding. Overlapping management bodies (government ministries and services - KWS, KFS, KeFS; BMUs; Community Conservancies etc) and zones (marine park, marine reserve, LMMAs, Joint Community Management Area (CMA) etc) complicate negotiation and decision-making. Limited financial resources create competition between communities and government for new revenues, including future carbon credit income. Remoteness and underdeveloped infrastructure constrain enterprise development, especially in fisheries, where fish spoil quickly and require specialised post-harvest handling (gutting and bleeding; packing in ice) and cold-chain systems to reach higher-value markets. Fishing livelihoods are also threatened by weak international management of migratory tuna stocks.

Knowledge barriers exist too, some new enterprises requiring new knowledges and new thinking. Carbon credits are intangible abstractions of value arising from non-extractive forest management and sometimes difficult to understand. "The local community, they are used to harvest [mangrove timber]. And that's the only livelihood they know. So when you try to introduce the concept of carbon, blue carbon, it's actually reluctant to agree just at first. So you have to do the community sensitization, the engagement. They have to see it as a benefit or as an alternative to harvesting." (Government official).

Labour, in a diverse economies understanding, encompasses the full range of activities required to sustain human and ecological life, unwaged as well as waged. It is shaped by and embedded in

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households, communities, cultures, and ecologies and its nature is therefore tied closely to distinct places and their communities. In the informal economy of Kenya, especially in the remote Lamu archipelago, little waged labour is in evidence. Instead share fishing is perhaps the most common form of labour amongst men. For women labour is more diverse. Child-care and household tasks are traditional, but increasingly women are being empowered, through leadership training organised by NGOs, to play a wider economic role. Related microfinance schemes (currently $250,000 invested) enable women to trade goods, buy equipment (eg sewing machines for tailoring), produce honey and cosmetics, and engage in collective enterprises such as mangrove conservation, sustainable fishing (eg octopus), and boardwalk construction for eco-tourism and hospitality. The formation and management of Community Associations involves much volunteer time – unwaged labour – from the community, representing an investment in anticipated future benefits. Similarly, mangrove forest restoration, involving the hard labour of transplanting young trees into the glutinous mud, is in anticipation of future benefits (eg improved crab catches; eco-tourism enterprise opportunities). Each example represents a form of skilled labour in the new blue economy. Thus:

- knowledge is required to select the right propagules for transplanting, requiring training, At the start, "we collected propagules, but we were not having that knowledge of which one is matured and which one is not. We collected 10,000 propagules. When they sorted them only 500 were matured." (Women's group);
- immediate post-harvest handling of fish requires specific tasks to be undertaken. "That training has really impacted them in terms of knowing what actually they should be doing when they get this fish to avoid [it] getting spoiled (Kiwayu fishers, through translator);
- leadership skills are required to run associations and prepare resource management plans;
- data collectors (fish catches; mangrove condition) require knowledge of species and recording systems;

Whilst there is little waged labour yet, examples point towards a future where more formal waged labour is available to support livelihoods: the CFA employs a coordinator to liaise with the community and to guide it through regulated processes. The conservation sector (government; NGOs) offers a small number of high quality jobs employing graduates with expertise in environment. Conservancy rangers provide security and are part of a large network of trained security staff across the conservancies of northern Kenya.

In a similar vein to that of labour, **Transactions** go beyond simple monetary exchanges in a diverse economy. In this case we see people giving their time in return for an expected benefit to the wider community in the future (eg CFA formation) "Community will say, no, no, no, no, we are benefiting more from harvesting [mangrove wood] …….. Because …. at the end, they want to take bread to the table. They want to pay school fees for the children. If your conservation doesn't pay that, it will leave us" (CFA). Benefit sharing arrangements regarding carbon credit revenues represent a future transaction between brokers, the community, and government. These transactions are effected through verification processes enacted through exchange of data for fungible credits. Incentives and their design have been important transactions in Lamu. The Kiunga gear exchange represents a complex example in which fishers have been both recompensed for loss (of a means of livelihood – the illegal beach seine net) and incentivised to transition to new practices (e.g. provision of pole and line fishing gears) that allow nature recovery as well as supporting livelihoods. Improved community benefit is a clear motivational force for transition, and another form of transaction. A former trader, now a quality control agent, sees the bigger picture, "he has preferred to continue working with Kumbatia for the benefit of community because it is like it [the benefit] touches every corner of the community…..now." Kumbatia Agent, through translator

Knowledge exchange is a fundamental transaction in transitions to more sustainable practices. New knowledge allowed successful management of mangrove forest nurseries and transplanting young trees. Peer to peer learning (eg group visits to octopus closures in Madagascar; visits to the Crab Shack on Mida Creek to the south) demonstrated sustainable fish stock management, and integrated crab fattening, education, eco-tourism and hospitality activities that could be replicated.

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Grant funding has played an important role in this economy, funds provided on condition of prescribed activities being undertaken (eg Go Blue project contracts in which detailed work plans and deliverables were negotiated with individual parties). Legal challenges (e.g. Lamu port fisher compensation; Lamu coal power plant; various land title challenges by Save Lamu) associated with government-led development projects are a form of transaction in which a request is made and considered and responded to, have led to affirmation of user rights and land ownership, enabling the continuation of traditional livelihood practices.

Property encompasses multiple forms: private, collective, state, commons and open access. It is relational and dynamic and therefore holds potential for different futures. The most important non-private property in this region are the mangrove forest and fish resources, which are historically state owned or open access, but transitioning to commons (co-managed mangrove forest; restricted access inshore fisheries). New property futures are most obviously being realised in Lamu with the negotiation of Community Forest Agreements which confer formal user rights on communities. For some activities it is a confirmation of traditional uses, but the rights provide protection from incursion by others. Importantly, new uses are being approved such as for aquaculture (crab fattening) or eco-tourism (boardwalks and restaurants). Communities are receiving ownership of new infrastructure such as solar powered freezers for the fishing sector, or boats for BMUs to manage and raise income towards small local fleets of community owned (rather than private) fishing boats, enabling a share of fishery revenues to be captured by communities to fund resource management (administration; data collection; equipment repairs and renewals). Government is also investing in property – fixed infrastructure to support value chains such as quays and jetties, market buildings, new highways – often funded by international donors to support wider human development and resource conservation objectives. Illegal property is also evident – primarily illegal fishing gears. Land is an important resource, which has been subject to competing land claims arising from speculation following the approval of long-term urban and industrial development plans for the mainland of Lamu County, associated with the development of Lamu Port.

Finance is essential to enable new activities and takes many forms. Kumbatia Seafood (KS) is a private company in receipt of conventional investment finance. But with its social purpose (better management of fish resources; more stable and higher incomes for fishers and their communities) it also benefits from close working with NGOs which bring additional finance to support wider objectives. KS is a financier itself, financing bulk purchases of supplies (hooks etc) which are then sold at a small profit to fishers but at a lower price than through other channels (benefitting from economies of scale) afforded through concessional (ie below market rate) short-term loans between KS and fishers. This helps to overcome exclusion from access to finance through systemic factors such as lack of creditworthyness and collateral, lack of sharia-compliant finace options. Micro-finance, unsecured loans from a circular fund provided by NGOs, has been important in enabling women in particular to establish small enterprises, try out ideas, and expand those that work for them. Some groups have established their own micro-finance schemes in which members pay into a common pool which is loaned to members in turn (e.g. women's self help group).

Establishing new governance mechanisms for natural resource use is costly, complex, and a significant constraint on development. "You have to have a PFMP, Participatory Forest Management Plan. ….. It has to involve the experts to do the management plan. So we don't have the money at that time [in 2018]. So we stay dormant until 2022. In 2022 we get support from TNC and NRT. They support us to have PFMP. … So now we are active and we are doing well" (CFA).

Two key aspects of finance evident in this case are how value is created and how surplus is redistributed. Many nature-based enterprises are extractive, so reduction of waste and improved efficiency are crucial to secure the most benefit for the least impact. In fisheries we see sophisticated cold chaining as a way to reduce waste and maximise product quality, support less impactful fishing methods, and generate more stable incomes for fishers. Efficient administration and use of data inform management decisions to maximise efficiency. In mangrove forests, new enterprises create new value. Crab fattening integrated with a restaurant and eco-tourism activities in Mida Creek

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provides funds for mangrove conservation work as well as employment for ~50 people. Communities in Lamu plan to replicate this model. Carbon credits for mangrove conservation will generate new forms of value, yielding monetary revenues to finance a range of community enterprises.

Surplus is being redistributed through a variety of fees and levies, and through benefit sharing formulae. A new law to protect 40% of benefit from carbon credit programmes for communities has left open much space for negotiation over the remaining 60%. Government argues that its activities in support of mangrove forest management need to be financed, whist communities want sufficient funds to invest in new enterprises as well as to cover administrative costs. How should their respective contributions be valued and allocations be decided? An NGO officer comments, "What the communities are doing is environmental conservation. They are conserving the environment not only for themselves, but also for everybody." (NGO1). Benefits of their stewardship extend to clean waters to swim in, carbon sequestered to enable polluting activity elsewhere, making the case for external support (finance; expertise) to communities.

Economic subjects are recognised in diverse economies as ethical decision-makers: they make choices about how to share, consume, or distribute resources in ways that reflect values (justice, sustainability, reciprocity). Non-human subjects - animals, ecosystems, and technologies – are also active participants in economies, since they shape and sustain livelihoods. The formation of economic subjects is guided by ethics and relations of care and responsibility (reciprocity, community benefit). In a diverse economies setting economic subjects are broad and varied extending far beyond the rational consumer of traditional economics. As we have seen, transactions are diverse and include many non-monetary exchanges – of knowledge, of care, of time and skills, of access and use rights etc. This is mirrored in the diversity of economic subjects which includes policymakers and other non-market practitioners such as academics and NGOs, community members dependent upon nature based resources for their livelihood, providers of supportive services such as carbon verification schemes, capacity building and training programmes, setting and enforcement of regulations etc. Thus, economic actors in this case include the community associations (CFA's, BMU's, Conservancies) and their volunteers and paid employees who do their work; government officers and workers who set and enact policy; the legal system in which claims of user rights are considered and those, such as Save Lamu and other NGOs, who facilitate those processes. For example, in the case of carbon credit programme its anticipated benefits extend far beyond those directly involved. "We have what we call Community Development Agreement Committee. So this is a committee which will oversee the community benefits .....It is a multidisciplinary team, representing the women, the men, the people from the county and the community forest association, they all sit in one sitting. You're not just benefiting to the CFA alone, so you can benefit the Lamu community at large" (County Government official). This wider understanding of economic actors is evident in practice: regarding NGOs as economic partners, "So they're a nice intermediary that really has the interest of the community at heart, but understands kind of what we need as well and how we need to be successful in order for everyone to be successful" (Kumbatia Seafood); On mangrove recovery: "So you find you have a team from KWS, from KMFRI, Kenya Fisheries Research Institute. You have KeFRI, Kenya Forest Service ..... We find a number of NGOs working here..... So you find all these, because all of them, they work in the mangrove and they have a stake. " (Government Service 1).

Benefit sharing negotiations also demonstrate the wider reach of economy, with government actors claiming a share of benefits on the basis of contributions to forest protection and restoration (law making and enforcement; resources survey and monitoring; management planning) – their role in co-management. The valuation of such roles is problematic – is it worth 20% or 40% or 60% share of credit revenues? How should it be valued against the communities own management?

The natural environment itself must not be forgotten as an economic actor. It is nature's productivity that lies at the foundation of this economy. The Save Lamu coalition of indigenous community groups compiled a Biocultural Community Protocol detailing their longstanding cultural relationships with nature, and its fundamental importance for their livelihoods. Largescale

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development proposals have triggered new concerns for the environment and awareness of the importance of environmental stewardship.

Spatial and material factors place constraints upon economic actors and shape the nature of the economy. Fundamentally, the natural resources are material elements and their spatiality - distribution, accessibility, scale etc – define key economic challenges.

Fish migrate seasonally and higher value species such as tuna may be unpredictable in their availability. They need care in catching, and rapid and specialist attention to keep the flesh in top condition and so prevent loss of value. Fishers require training in new techniques, new roles are required (eg quality control agents), and sophisticated and reliable cold chaining is essential, itself requiring specialist equipment and training. Yet the best fishing grounds are farthest from markets.

Mangrove forests comprise nine species of tree, each having different propagation needs, requiring new knowledges for communities to establish and run nurseries. Public curiosity regarding inaccessible forest has made boardwalks popular, enabling better access, and generate new enterprise opportunities as demonstrated by Crab Shack's restaurant Bandas (platforms raised above sea level at the seaward edge of the forest) which many plan to replicate (eg women's self help group; CFA).

Government interventions also have spatial elements with meaningful consequences. Protected areas have two levels - the marine park which is no-take, and the marine reserve where fishing is allowed but more closely managed than non-protected areas. The different management regimes can have big implications on habitat quality.

Table 2. Summary of diverse economy and spatio-material relations.

Enterprise	• Diverse governance formats: company; thematic Community Associations (forest, fish, wildlife); Conservancies; informal cooperative; self-help groups • An interconnected system of institutions • Associations and Conservancies must comply with formal procedures laid out in law • Co-management enterprise activities are led by a government-approved participatory management plan • Many overlapping management bodies and zones complicate negotiation and decision making • Small and micro-enterprises can have a significant social impact in a community, and scaling successful models holds great potential
Labour	• There is little waged labour • Women are beginning to play a wider economic role beyond household management and child care • Volunteer time is needed to establish Community Associations • Forest restoration labour is unpaid and anticipates future returns • New knowledge and skills are needed, for mangrove propagation; fish handling; plastics sorting; etc • New professional roles are emerging, eg community association coordinator; rangers; conservancy managers; quality control agents
Transactions	• Individual time donated in anticipation of community and individual benefits • Negotiations over benefit sharing formulae for carbon credit revenues

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	• Carbon credit verification processes (evidence submitted in return for credits) • Design of incentives for transition to new practices (eg Kiunga gear exchange) • Knowledge exchange eg peer to peer learning visits to Madagascar; training in mangrove propagation. • Grant funding in exchange for specific services • Legal challenges, requesting confirmation of traditional tenure rights
Property	• Multiple forms: private, collective, state, commons, open access • Historically state owned or open access resources transitioning to commons (co-managed mangrove forest; restricted access inshore fisheries) • Community Forest Agreements confer use rights on communities and enable new enterprises • New infrastructure being given to communities to support transition (eg solar powered freezers for fish; new fishing boats) • New property requires new community ownership arrangements and management responsibilities, which are not yet fully developed • Larger infrastructures funded and owned by government • Illegal property is evident (eg illegal fishing gears) • Land ownership is sometimes contested by development speculators
Finance	• Conventional investment finance is restricted to formal companies with growth prospects • Subsidised supplies benefit communities and incentivise engagement in new practices • NGOs bring additional finance to the system for activities not provided by markets, supporting communities and private company efforts to transition to sustainable practices • Finance, in the form of short-term loans for fishing supplies and fees, has trapped many in poverty • Micro-finance, provided through NGOs has enabled women to test and establish small-scale enterprises • New market relations in fisheries is enabling new funds to circulate within communities (fees and levies, steady sales revenues, commissions) • New value is being created by new enterprises (eg through cold-chaining to retain fish quality; data collection and analysis for management; crab fattening; carbon credits) • Surplus is being redistributed through a variety of fees and levies, and through benefit sharing formulae

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	• Benefit sharing requires negotiation in which differential power dynamics could create inequalities
Subjectivity	• A broad diversity of economic subjects, including community volunteers, government workers, legal workers and community rights advocates as well as those engaged in more direct market economy actions such as selling fish • Nature has a role as an economic subject, its productivity being the foundation of nature-based economies • Stewardship of nature is an economic activity • Different actors play different roles - how should these be valued to guide the allocation of surplus?
Spatial and material	• Nature-based economies are fundamentally spatial and material • Nature-based enterprises are shaped by the spatial and material characteristics of the natural resources upon which they depend and hence experience inherent constraints not experienced by many enterprises • Remoteness from major population centres is a major factor shaping enterprise • Better understanding of spatial and material factors is opening new livelihood possibilities (eg mangrove propagation nurseries; carbon sequestration revenues)

Insights

This analysis helps us to understand factors that may facilitate a just, nature-based SBE development, and point the way towards an enabling policy environment. Thus:

Economic Activity

- Economic actors are many and varied, extending beyond normal understandings of such, to include policy-makers, NGO's and community members not involved in monetary transactions. Volunteer time, given in anticipation of future benefits features prominently. Also, a sense of community benefit is seen to drive the motivations of some of the individuals interviewed – to volunteer, to work in ways that maximise community benefit over or alongside individual benefit - implying an understanding of livelihood and community trade-offs.
- A diverse economy offers new types of enterprise delivering new forms of value, some of which enable access to new forms of finance, delivering benefits to communities and to individuals. New understandings of environmental processes and human / environment relations create opportunities for introduction of new technologies and practices and new livelihoods leading to greater livelihood security. Working with government in formal and informal co-management arrangements, supported by NGOs, enables communities to meet new standards of environmental stewardship in support of nature recovery and in doing so secure reciprocal benefits (use rights enhancing food and livelihood security; access to new markets; new equipment; education / scholarships; community infrastructure; access to finance; more equitable economic relations; more productive natural resources…..) that are valuable inputs to communities existing at or near subsistence level.
- Enterprises involve many and diverse stakeholders spanning government, NGOs, community, business, and the natural environment itself. Many of these are essential partners to community-led transformation, providing enabling services (legal, administrative, training and capacity-building, technical expertise) or constraints (legal, procedural, financial). A variety of mechanisms facilitate dialogue and joint working but require specific capacities to organise successfully. New enterprises

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and adaptive practices create both new opportunities and make redundant some capacities (eg village fish traders). New roles and responsibilities are created, needing training, capacity building and other incentives to sustain. The consequences of change (eg loss of livelihood) must be adequately addressed for durable (long lasting) adaptation.

- Reciprocity features in many transactions. Principally, environmental stewardship is a reciprocal transaction between people and nature in which nature recovery and environmental protection are undertaken often voluntarily in anticipation of future benefits to individuals and the wider community (more enterprise opportunities; better food and livelihood security; resilience against climate related hazards). It is implicit in transactions involving benefit sharing – the allocation of surplus amongst various stakeholders. Under co-management communities receive use rights which entitles them to shares of, for example, carbon credit revenues in return for certain management actions. However, at the same time government agencies see their role (designing management policy; survey and monitoring; enforcement etc) as also deserving of reciprocal benefit, i.e. a share of revenues. How should these competing claims be assessed? New laws mandate at least 40% for communities, but what of the remainder?

Governance

- Governance for nature recovery necessarily involves a complex mix of organisations, tools, technologies, knowledges, and people working towards a common purpose - in this case the recovery of coastal ecosystems, habitats and species, and secure livelihoods. Organisations each have differing roles and agendas, and extensive dialogue is needed to identify common ground and agree coordinated actions. Communities represent a fulcrum, being the users of the resources. Understanding their needs is essential, but also awareness raising (making use of science) to illustrate status and trends in ecosystem health and alternative approaches to resource management. "So we started with establishing community institutions and supporting them to enhance their management [and governance] capacity and ……. supporting them with capacity and skills for managing these resources - fisheries, wildlife, as well as forest. " (NGO1). A diverse web of uses (fisheries, logging, charcoal making, tourism, etc) has led to multiple management institutions (laws, governmental organisations, designated areas etc) and active coordination is needed to prevent conflict between management measures. Transition to more sustainable livelihoods is effected through co-management, by which confirmation of user rights (specifying specific uses, such as crab farming, limits on timber harvesting etc) is achieved, and management agreements negotiated with government. Such agreements should be consistent with county and national strategies and policies. They must also deliver community benefit, to incentivise change. "They have to see benefits accruing to the communities. And that also increases their adaptive capacity to be able to change their behaviour and practices to more sustainable ones." (NGO1).
- Co-management is an enabling mechanism for communities in protected areas and sensitive ecosystems, providing a framework for negotiation and consent regarding approved activities and their scale. Whilst it is seen as beneficial (by those interviewed) achieving the necessary agreements is complex and expensive. Legislation requires the establishment of community associations (for forests, marine wildlife areas) and the development of participatory natural resource management plans (which must themselves be based upon extensive resource survey work) before agreements can be signed. In Kenya, communities must pay all these costs if they are to receive a co-management agreement, including travel and subsistence for government officers to engage with the process. NGOs and international donors play an important role therefore in supporting the initial steps of capacity building and consultation with communities, and financing natural resource baseline surveys. Management plan development necessitates liaison and negotiation with other management institutions (eg BMUs, LMMAs, Conservancies). Community members must volunteer their time to support the process. The case for multiple funding sources is well made by (NGO1) "what the communities are doing is environmental conservation. They are conserving the environment not only for themselves, but also for everybody."

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- A holistic community development perspective is taken when aiming to change specific practices such as using illegal fishing gears or illegal mangrove logging. This recognises the complex systemic factors that act together to perpetuate certain practices. Actions must involve raising awareness, using data to demonstrate status and trends in natural resources and society, training to introduce new practices, and providing alternative livelihood options. "...for some of these projects, there's a lot of dynamics. and I think it also requires great understanding of the community context - both social, cultural - because we don't come in and impose, you need to understand, you stay with them, you understand why they do the things they do. If they're using illegal gears, why are they using them, how they're attached to them, if you remove them what will happen, will they be able to adapt?" NGO1
- Designing incentives for change involves a holistic understanding of the system. In Kiunga, fishers needed new skills and equipment (gears, boats, engines) to facilitate a move away from using illegal and damaging beach seine nets. More than that, better access to markets (consistent demand; stable prices) was needed to improve incomes and livelihoods - provided by Kumbatia Seafood - which itself involved investments in cold chain and logistics, and training in post-harvest fish handling to introduce new quality control regimes. New roles are needed to support this infrastructure, providing new opportunities but requiring (micro-) finance and training. Similarly in mangrove conservation, new livelihood opportunities enabled through co-management and supported by training and micro-finance incentives changed practices (e.g. in logging; construction; cooking - efficient stoves and a move away from charcoal). However, awareness and demonstration is needed to change beliefs and attitudes.

Spatiality

- Spatial and material factors exert considerable influence over what is possible for enterprises. A defining feature of Lamu archipelago is its remoteness and distance from markets, services, government, and large centres of population. The logistics of fish transport, of tourism, of expertise, of plastic waste is a systemic challenge for enterprise. So too is the nature of these materials - fish decay rapidly and efficient cold chaining is needed to maintain quality and therefore value. Tourism potential is constrained by transport, boats being needed to travel to and from most places, and sometimes for longer distances - the nearest landing on Pate Island for example is about 40 minutes in an open speedboat from Lamu town. Laws regarding natural resource use and management are difficult to police.

These findings and insights present the BE as a complex assemblage of institutions, knowledges, technologies and practices within which enterprises operate. Whilst the enterprises featured are still relatively new and developing, they suggest a direction of travel for a community-led SBE which supports nature recovery.

4. Discussion

The blue economy discourse recognises a range of threats to ocean sustainability, but also many opportunities through sustainable development to contribute to delivery of SDGs ([1,8,19]). However, the ability of the BE concept to draw attention to new frontiers for development raises concerns that the scale of growth in ocean-based development will outweigh any benefits resulting from improvements in technologies and practices that reduce environmental harms. Thus, this new focus on ocean development may lead to more environmental degradation and greater social inequality [20].

Many studies have critiqued the BE from a social justice perspective, questioning who wins and who loses (eg [11,17,21–23]) and calling for 'blue justice' (e.g. [20,24,25]) and for a sustainable BE ([7,26,27]). How a sustainable blue economy should be implemented, or operationalised, remains an

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active debate (e.g. Petruzzelli, 2024[1]; Nazurally, 2025[2]; Meerwissen[3]; [28]). This author, along with others (e.g. [29–31]), advocates place-based approaches which demand the co-production with communities of solutions routed in local contexts (natural resource base, governance, economic, socio-cultural). However, *ad hoc* blue economy planning at local levels will fail to deliver the pace and scale of change needed to achieve the 2030 targets in the SDGs, or current climate change and biodiversity goals. A strategic and coordinated approach is required to deliver economic activity that is regenerative of natural and social systems (see [28]) and prosperity-enhancing. This means, I argue, going beyond the co-production of policy to the creation of new community-led enterprises. As this analysis has demonstrated, enterprises generate benefits and so motivate people to change behaviours. Their benefits have positive effects beyond the immediate participants, being valued by the wider community. Even if these wider benefits are very small, communities (in this study) understood that they contributed to resilience. Enterprises, in creating value, are likely to be sustained well into the future, beyond any initial public support. Interviewees in this study demonstrated high levels of commitment towards enterprise creation, volunteering time and other resources to support their development, in the expectation of future benefits for the community as well as individually. These benefits include (in this study) new employment and livelihood opportunities, better managed fisheries, access to education, access to finance, access to self-help groups, community resilience and food and livelihood security, improved community infrastructure (water supply; community-owned fishing boats and freezers). New forms of value are being created as the foundation for these enterprises. Carbon credits generated from measurement and monitoring activities, new practices and infrastructure creating higher value fish products for distant markets and reducing waste, fattening crabs to enhance weight and availability for the restaurant trade. This would appear to be an important principle for the development of SBE – the creation of new value – which is little studied to date in a blue economy context (but see [32]).

Co-management, which is the underlying governance framework for most of the enterprises examined here, is a reciprocal relationship involving multiple transactions between different actors in the system – government departments, NGOs, private companies, community institutions (CFAs, BMUs etc), communities, individuals, and nature itself. Transactions include exchanges of knowledge, volunteering time, negotiation of user rights, use of incentives, gear exchanges, benefit sharing etc. Reciprocity is recognised as a foundational principle in many indigenous cultures, many of which regard society and nature as inextricably linked through reciprocal interactions. Reviewing the literature on reciprocity in the context of nature-society relations [33]: 923 encapsulates reciprocity as "asking for permission, taking only what is needed, sharing what is taken and giving thanks or giving back, be it through ritual or material practices". In contrast to unidirectional flows of contributions, services or benefits from nature to people, indigenous cultures variously view themselves as needing to remain in alignment with spititual forces, landscapes and ecosystems to ensure health and wellbeing and security. Their social, spiritual and political structures evolve over æons to reflect these relations ([34,35]) and lead to a co-production of landscapes and seascapes alongside a multitude of other beings [36]. [37]: 953, calling for greater acknowledgement of reciprocity in international policy propose that people-nature reciprocity should be recognised

[1] https://www.orfonline.org/expert-speak/regenerative-blue-economy-a-strategic-framework-for-global-ocean-governance#:~:text=The%20regenerative%20blue%20economy%20strengthens,regenerative%20economies%20on%20marine%20ecosystems.

[2] https://www.orfonline.org/expert-speak/sustainable-ocean-futures-a-framework-for-community-led-ocean-economies#:~:text=Here%20are%20some%20creative%20approaches%20to%20community%2Dled,navigation%20*%20Artisanal%20boat%2Dbuilding%20*%20Oral%20histories

[3] https://meerwissen.org/themes/sustainable-blue-economy/#:~:text=(SDG)%2014.-,The%20Importance%20of%20an%20Inclusive%20and%20Equitable%20Economy,%2C%20development%2C%20and%20biodiversity%20goals.

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alongside ecosystem services to inform sustainability transformations as 'reciprocal contributions', these being "positive contributions and feedback loops that accrue to both—directly and indirectly—across different dimensions and levels". Elements of reciprocity were evident in the systems studied – women's groups raising seedlings and replanting mangrove forest without aid, in the expectation of future benefits; Kiwayu island fishers willingly paying levies on their catch to the BMU understanding that these contributions circulate in the community to the greater good; the Kiunga gear exchange emboding recipriocity in the design of incentives for transition to new fishing practices.

The diverse economies framework, as an analytical tool, reveals a complex assemblage of actors, institutions (laws, organisations, cultural norms, etc), technologies, knowledges, and practices underpinning the enterprises examined herein. The analysis here confirms the importance of government policy, enablers (such as NGOs, research institutes), capacity building, finance, and appropriate markets which all work together to enable transition to more sustainable activities. It reveals a clear business model emerging for mangrove conservation involving carbon credits, eco-tourism, and small-scale food production (e.g. crab fattening, mangrove honey) which could be widely replicated in the WIO. Similarly, fisheries reform is underway in many WIO countries. A vertically integrated business model built around coldchaining high value fish to provide better access to markets, and training of artisanal fishers in post harvest handling should be replicable throughout much of the region. These conservation practices are diffusing through the region through peer exchange and informal communication channels. This is a slow process and more could and needs to be done by governments, working through the Nairobi Convention or regional economic commissions, to accelerate the scaling up of these activities, creating programmes to put in place the enabling infrastructure (policy, expertise, finance, capacities).

5. Conclusions

The insights gained from a diverse economies analysis lead us to see a sustainable blue economy as more than poorly connected sector growth and nature conservation efforts, but as a rediscovered and reinvigorated relationship of reciprocity between society and nature. One that nurtures place-based nature-based livelihoods and nature recovery, together, and which embodies a set of values and ethics shared by government, communities, and business.

From the cases themselves we see emerging enterprise models which could be replicated widely throughout the WIO Region. What are the enabling conditions that will allow these enerprises to deliver blue economy at scale whilst remaining embedded within communities? This is a question for researchers and policy makers alike, and much work remains to elucidate answers.

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