Pilot Project Report:

-Ghana Future Visions-

A transdisciplinary pilot process of co-developing transformative future visions for Ghana's ocean, coast and coastal communities

Nina Rivers, Bernadette Snow, Mia Strand and Meredith Fernandes

UKRI GCRF One Ocean Hub

The One Ocean Hub is an international programme of research for sustainable development, working to promote fair and inclusive decision-making for a healthy ocean whereby people and planet flourish. The Hub is funded by UK Research and Innovation (UKRI) through the Global Challenges Research Fund (GCRF), a key component in delivering the UK AID strategy to tackle the Sustainable Development Goals. It addresses the challenges and opportunities of South Africa, Namibia, Ghana, and shares knowledge at regional (South Pacific, Africa, and Caribbean) and international levels. The One Ocean Hub is led by the University of Strathclyde, UK and gathers 126 researchers, 21 research partners, and 19 project partner organisations, including United Nations bodies and programmes under one umbrella.

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Executive summary

This document reports on a pilot process for reimagining a future vision for Ghana's ocean, coast and coastal communities.

There is a global call to identify visions and pathways towards sustainable and equitable futures, emphasising the urgent need for relevant scenarios that can serve as simplified yet coherent depictions of potential futures.

To help vision setting in this pilot process, three cross-cutting themes or threats in Ghana were identified: climate vulnerability, plastics pollution and resource overuse, in terms of overfishing. More threats exist but these three overlap within a social-ecological framing and speak to all of the Ocean Decade Challenges. The aim of this work was to co-develop transformative future scenarios along with pathways to impact for climate change, plastics pollution and resource overuse (specifically with regards to overfishing but also in terms of overharvesting of marine resources such as mangrove forests and sand) that support more inclusive and integrated marine and coastal governance approaches.

We used the Three Horizons Approach (Sharpe et al. 2016), an accessible way to work across disciplines and with stakeholders. It provides a simple framework of three lines representing a system or pattern in the way things are done in the present (1st horizon), the future (3rd horizon) and pathways to get there (2nd horizon). The approach provides a simple way to work with complexity and much interest exists in how this approach has been applied to ocean governance in a Ghanaian context.

Global perspectives on future visions and scenarios often oversimplify complex realities. The Horizons approach offers a way to develop scenarios that are grounded in reality by identifying successful practices and innovations, or 'seeds'. These seeds or prototype solutions facilitate an understanding of processes that foster the emergence and expansion of initiatives capable of fundamentally transforming human-environment relationships. These seeds have the potential to be developed into pathways to impact in order to catalyse action towards more desirable futures, in the form of papers, policy briefs and funding proposals.

A holistic picture of the present state, future vision and pathways for Ghana's ocean and coast emerged. Horizon three identified broad visions that responded to the challenges identified in horizon one. These included that Ghana has functioning ecosystems; sustainable and equitable integrated coastal co-management; political will and capacity; transdisciplinary research, appropriate nature-based solutions and regional and international collaboration; increased dialogue and stewardship between government and civil society; more ocean and coastal literacy; improved compliance of regulations and bottom-up approaches; just and co-developed supplementary livelihoods and improved food security; and protected tangible and intangible cultural heritage. This process broadened our ability to actively engage with complexity across different knowledge systems and with diverse knowledge holders.

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1. Introduction

Ghana, as one of the partner countries in the One Ocean Hub, has been where inter and transdisciplinary research has been undertaken, addressing pressing issues and challenges that undermine fair and inclusive ocean governance. However much work still needs to be done to fully capture learning across the county's Hub research and map a way forward. Two approaches have been piloted in Ghana, the first was focused on pulling information together to develop a Social Ecological Impact Assessment Tool (see report Bell et al 2023), and the second was a transdisciplinary pilot process of co-developing transformative and future visions for Ghana's ocean, coast and coastal communities. This pilot was carried out with Ghanaian Hub co-Is represented by several disciplines including ecology, geography, anthropology, law, sociology, economics and climate change experts as well as community, government, NGO and civil society representatives. It was a process to pilot a framework to not only integrate knowledge across researchers and non academic knowledge holders, but to also identify knowledge gaps and opportunities to chart a way forward that ultimately leads to inclusive and transformative ocean governance for Ghana. This process provided an opportunity to broaden our understanding of ocean governance challenges in Ghana, as well as provided a heuristic process to actively engage further with social-ecological complexity.

2. Context: Triple threats to Ghana's ocean and coast

In October 2023 (1st-8th), researchers came together at an in-person workshop in the Volta Region in Ghana, where key research themes and challenges for Ghana were identified. At this workshop, three overarching themes or threats emerged around climate change, plastic pollution and overfishing that were later refined for the future visioning pilot process(Figure 1).

Globally, climate change, biodiversity loss and pollution are the primary threats to our planet (Hellweg et al 2023). Ghana's coastal areas are particularly vulnerable to the impacts of climate change, with rising sea levels and extreme weather events posing significant threats (Harrod et al. 2024). Coastal erosion, intensified by climate change, is already displacing communities and eroding valuable land. The warming of ocean waters affects marine biodiversity and the livelihoods of those dependent on coastal ecosystems. Both the coastal and inland regions of Ghana are also grappling with the pervasive issue of plastics pollution (Kwadzo et al. 2022; Gbogbo et al. 2023). Improper disposal of plastic waste, both on land and at sea, has led to the contamination of beaches and marine environments. This pollution not only harms marine life but also poses health and livelihood risks to humans, as toxins from decomposing plastics enter the food chain and disrupt subsistence practices. Resource overuse, specifically with regards to overfishing as well as overharvesting of mangrove forests and sand mining, is also evident across multiple fronts. The small pelagic fishery in Ghana (mostly round sardine, anchovy and Atlantic chub mackerel) supply both national and international markets and are an important source of local food and nutritional security (Asiedu et al. 2021). This fishery is under serious threat however by artisanal canoes, inshore fleets, industrial fleets and from imports due to destructive fishing practices, illegal, unreported and

unregulated fishing (IUU), overcapacity of fishing fleets, population growth and climate change which is depleting fish stocks and disrupting the balance of marine ecosystems (Asiedu et al. 2021). Analysis also suggests that the demersal fishery in Ghana which includes largely bigeye grunt (Brachydeuterus auritus), sea breams (Dentex spp), threadfin (Galeoides decadactylus), red Pandora (Pagellus bellottii) and croakers (Pseudolithus spp), are at high risk of stock collapse at current (2016) rates of fishing (Cook et al. 2021). The rate of increase in fishing power by Ghanaian and Benin industrial trawl fleet fishing for seabreams and red Pandora have increased as well as a smaller increase in the fishing power of the Ghanaian artisanal hook and line fleet (Cook et al. 2021). These three, and interconnected issues, pose a significant threat to the sustainability of Ghana's coastal and marine resources. In addition legal and customary rights to a healthy environment highlighted key governance challenges and capacity needs (Boateng et al. 2024; Ansah et al. 2022).

Figure 1: The triple threats to Ghana's oceans and coasts: climate vulnerability, resource overuse (overfishing) and plastics pollution.

Co-developing a transformative vision for Ghana's ocean and coast

What is futures work and how do we facilitate it?

Over the years there has been a global call to identify visions, future scenarios and pathways that can help humanity navigate away from undesirable futures and towards more sustainable and equitable ones (Bennett et al., 2016; Peterson et al., 2018). New types of globally relevant scenarios and futures are therefore urgently needed but there has been limited work showing how to do this future work and how to facilitate it in practice.

Along with the need for transformative change is the need for new capacities such as approaches that can help facilitate transformative change, knowing how to work with intractable problems, being able to reimagine futures, encouraging dialogue among diverse actors and providing a sense of agency and hope in an era where current global challenges seem overwhelming (Sharpe et al. 2016; Kläy et al. 2015).

We employed the Three Horizons Approach (Sharpe et al. 2016) which is a framework that helps participants work with complex and intractable problems and uncertain futures. It offers an accessible way to work across disciplines as well as with stakeholders beyond academia. The Three Horizons provides a simple framework for structured and guided dialogue around different patterns of change. Sharpe et al. (2016:6) describe it as a practice that "involves a facilitated process with a diverse group of stakeholders to map out how different patterns change over time". More than a theory, it is a practice for facilitating transformative change and is increasingly being used in a variety of different contexts to help navigate complexity. This pilot has already piqued many people's interest to understand how this approach has been applied in the ocean governance context in Ghana.

In an attempt to respond to the co-identified triple threats of climate change, plastics pollution and resource overuse in Ghana, we piloted a process to co-develop future visions focussed around these threats and then combined them to create a holistic transformative vision for Ghana's ocean and coastal future.

Objectives and aims of futures work

The objectives of this futures work were two-fold. The first was to bridge the disconnections between different knowledge systems across the OOH work generated in Ghana. The second was to co-develop future visions around climate change, plastics pollution and resource overuse and integrate the lessons learned from previous integration work into a future vision (with pathways to impact or research) that can influence more inclusive and integrated marine and coastal governance approaches in Ghana.

Outcomes of the pilot process included:

•Co-developed future visions and pathways for Ghana's ocean and coast from the knowledge and lessons we already had from previous knowledge integration work carried out with Ghanaian colleagues

•Future pathways designed with scale in mind (local to national)

•In-country stakeholders co-developed visions and seeds (see Section 3.1.3)

•A Three Horizons map depicting the current state of Ghana, a future aspiration for Ghana and several pathways to obtain this future (combined from 3 'smaller' maps from climate change, resource overuse and plastics pollution)

If we had to have a research question for this process, it would be: *How can a future visioning approach assist in developing pathways and mechanisms toward more inclusive and integrated ocean governance approaches and future scenarios for Ghana?*

3. Methodology:

3.1 Frameworks

3.1.1 Three Horizons Approach

The Three Horizons approach is a simple, graphical and collaborative approach based on a structured and guided dialogue. The approach uses a simple framework which includes three lines (see Figure 2 below), with each line representing a system or pattern in the way things are done in a particular area of interest, in our case it was ocean governance challenges in Ghana (see Figure 3). The horizontal axis represents time stretching into the future from the present to the near future and far future. The vertical axis indicates the prevalence of each pattern in a relative way. The first horizon represents the current challenges or a business as usual way of how things are done now; the second horizon represents the necessary actions to move from the present to the desired future; and the third horizon represents emerging paradigms, ideas and innovations for a desirable future (Sharpe, 2013; Sharpe et al., 2016).
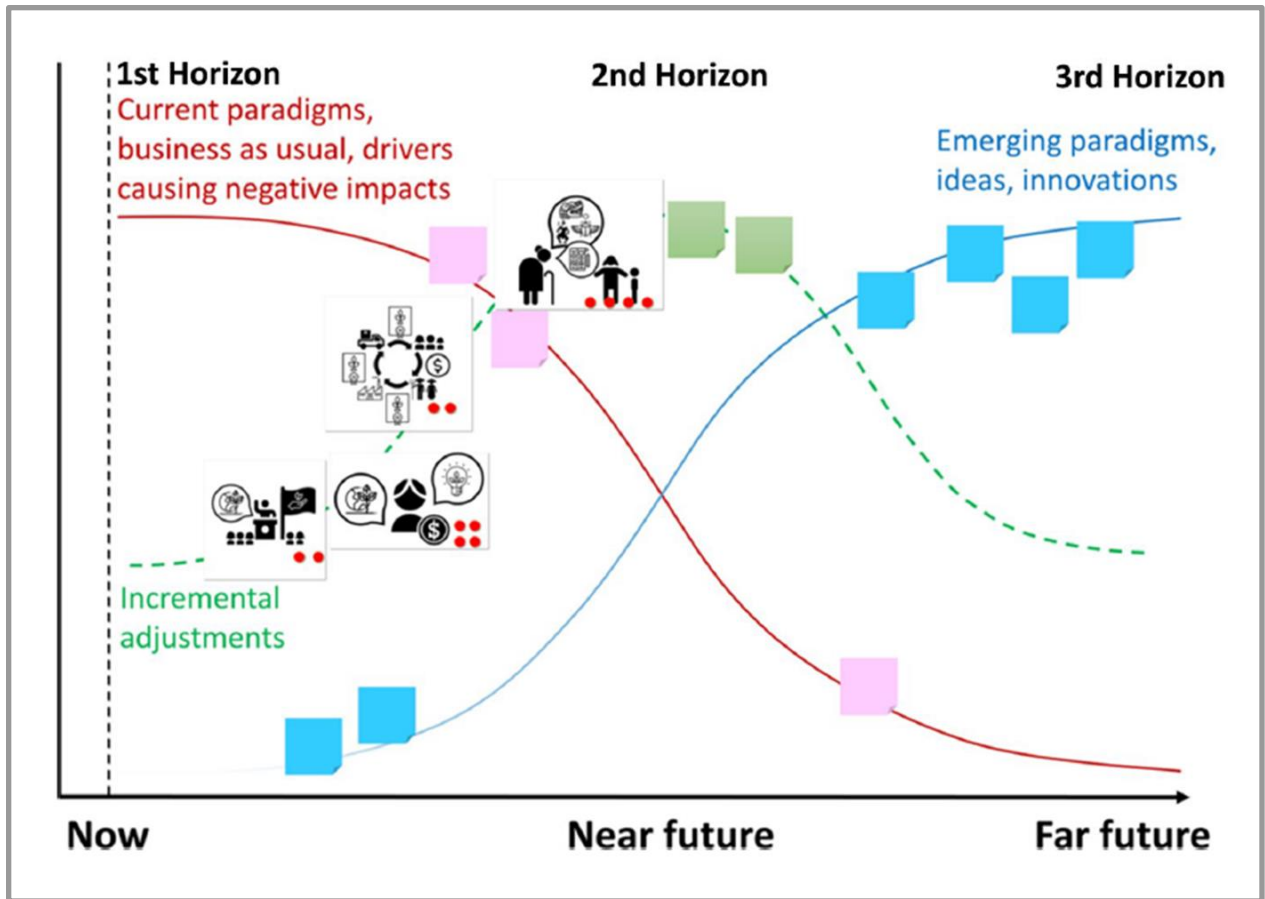
Figure 2: The Three Horizons Approach showing the movement over time from the 1st Horizon in the present (now) to the 3rd Horizon in the far future by way of incremental adjustments along the 2nd Horizon in the present and near future (Pereira et al. 2020:1184).
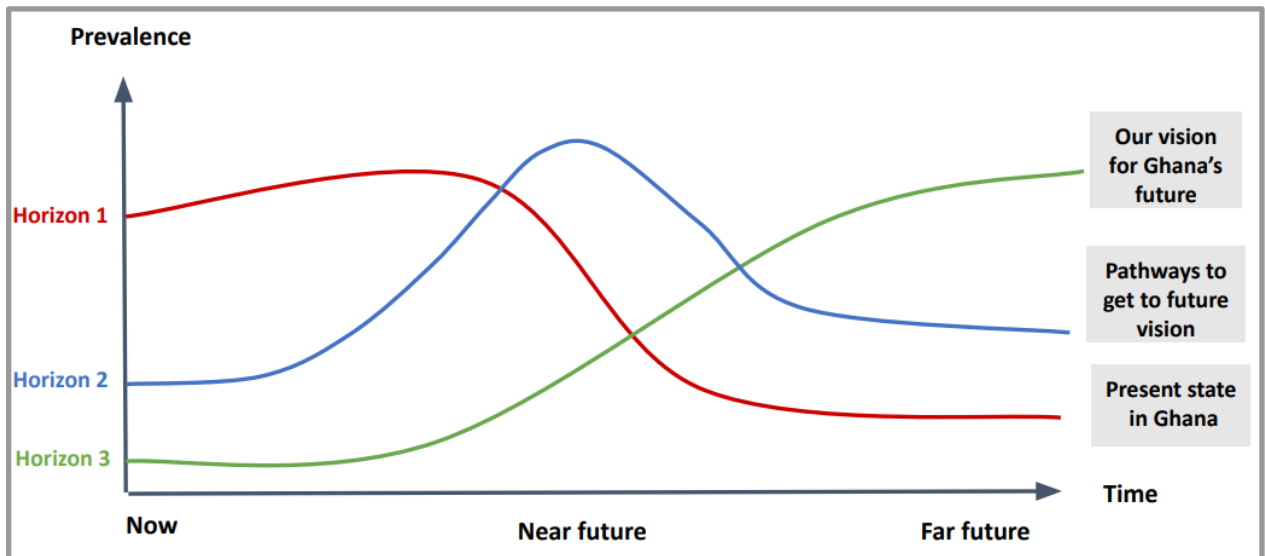
Figure 3: The Three Horizons Approach adapted to the ocean governance context in Ghana (adapted from Sharpe et al. 2016)

This approach was not only selected for its pragmatic and simple approach in working with complexity but also because we found synergy between the Hub Code of Practice principles (especially the principle of transdisciplinarity) and those of the Three Horizon core principles:

1. **Co-production**: Enables the harnessing of multiple viewpoints and creates buy-in to a process

2. **Interactive iteration**: Dynamic interaction between stakeholders and scientists that iterates over time, allowing for learning and readjustments

3. **Pluralism**: A plurality of perspectives is core to any knowledge co-production (Sharpe et al. 2016).

3.1.2 Storyboarding

We adopted and adapted storyboarding as a tool from design-led thinking methods (see Hasso Plattner d-school Afrika, University of Cape Town) to further help participants to visualise their future visions. As part of the Three Horizons Approach, participants flesh out the narratives of their visions and explore possible pathways to achieve these. By using a storyboarding technique, participants in our workshops could not only visualise their future visions but also had the opportunity to think at a more granular level of the impact (ecological, social, economic and cultural) of their challenge (climate change, plastics pollution or resources overuse) and what kind of actors and institutions (policy makers, national government, civil society etc.) they needed to involve in their visions in order to achieve them (see Figure 4 below).
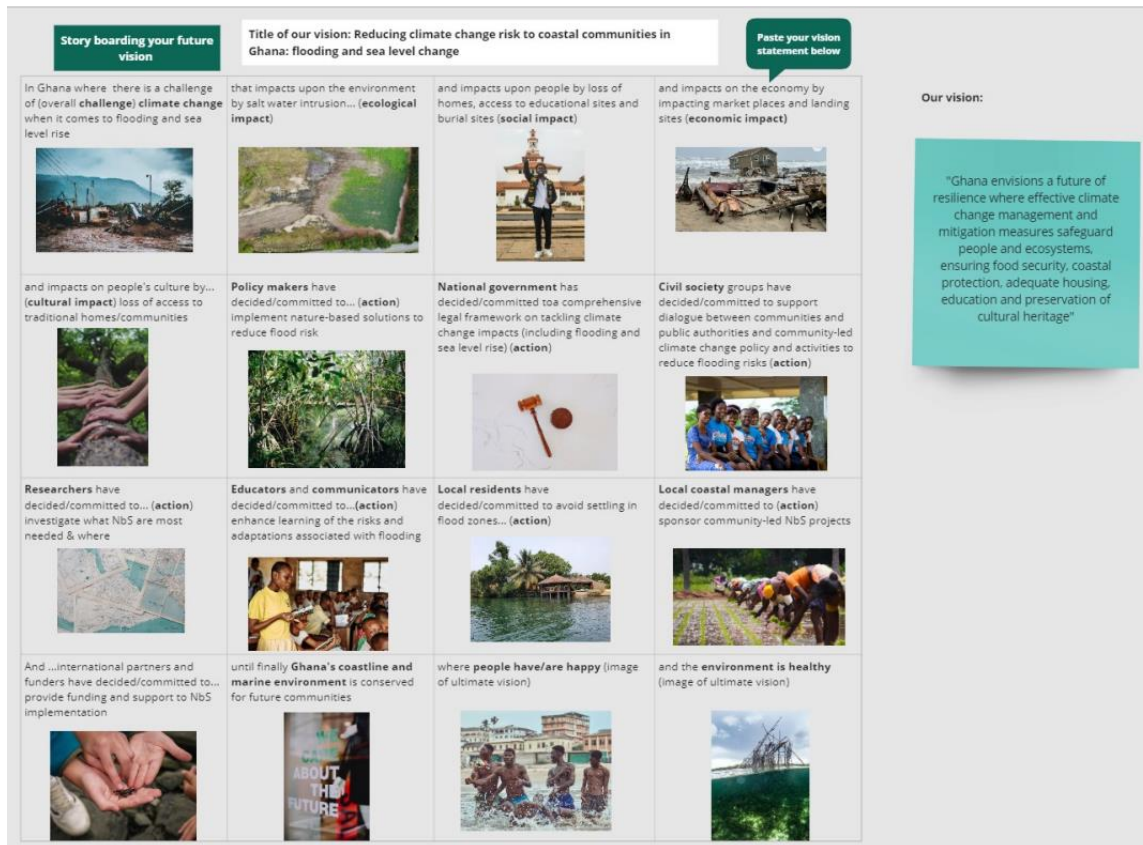
Figure 4: Vision statement and vision board for climate change in Ghana (Group 1).

3.1.3 Seeds

'Seeds' are "initiatives (social, technological, economic, or social–ecological ways of thinking or doing) that exist, at least in prototype form, and that represent a diversity of worldviews, values, and regions, but are not currently dominant or prominent in the world" (Benett et al. 2016: 442). Examples of seeds include; novel technologyWorkshopTh and design that could reduce ecological footprints; organisations working to improve resource management and biodiversity conservation; efforts to increase the sustainability of food production and improve equitable access to resources, education, and power; movements focused on sustainability and democracy; cutting-edge research or novel educational formats for transforming worldviews; and specific methods for addressing environmental, social, or economic sustainability issues, to name but a few (Benett et al. 2016).

Why do we use 'Seeds'?

Current global scenarios of possible futures are often based on oversimplified worldviews driven by just a few forces and are therefore less nuanced than the real world tends to be. It is possible to enhance and diversify these scenarios by integrating contemporary examples of effective practices, innovations, and experiments. These initiatives, often referred to as "seeds of a good Anthropocene," can help us understand the various elements of a desired future and identify the processes that foster the

development and expansion of initiatives that significantly alter human-environmental interactions (Benett et al. 2016). In short, these seeds can contribute to a better future for Ghana that has the potential to reverse the negative trends in the groups' respective themes. As a result, a large part of this work was also to co-identify 'seeds' with Ghanian co-Is and stakeholders that could help towards a transformative future path for the country. In order to make the pilot process more concrete within the context, several of these seeds were then further developed by Ghanaian co-Is into pathways to impact in order to catalyse action towards these more desirable futures, in the form of papers, policy briefs and funding proposals.
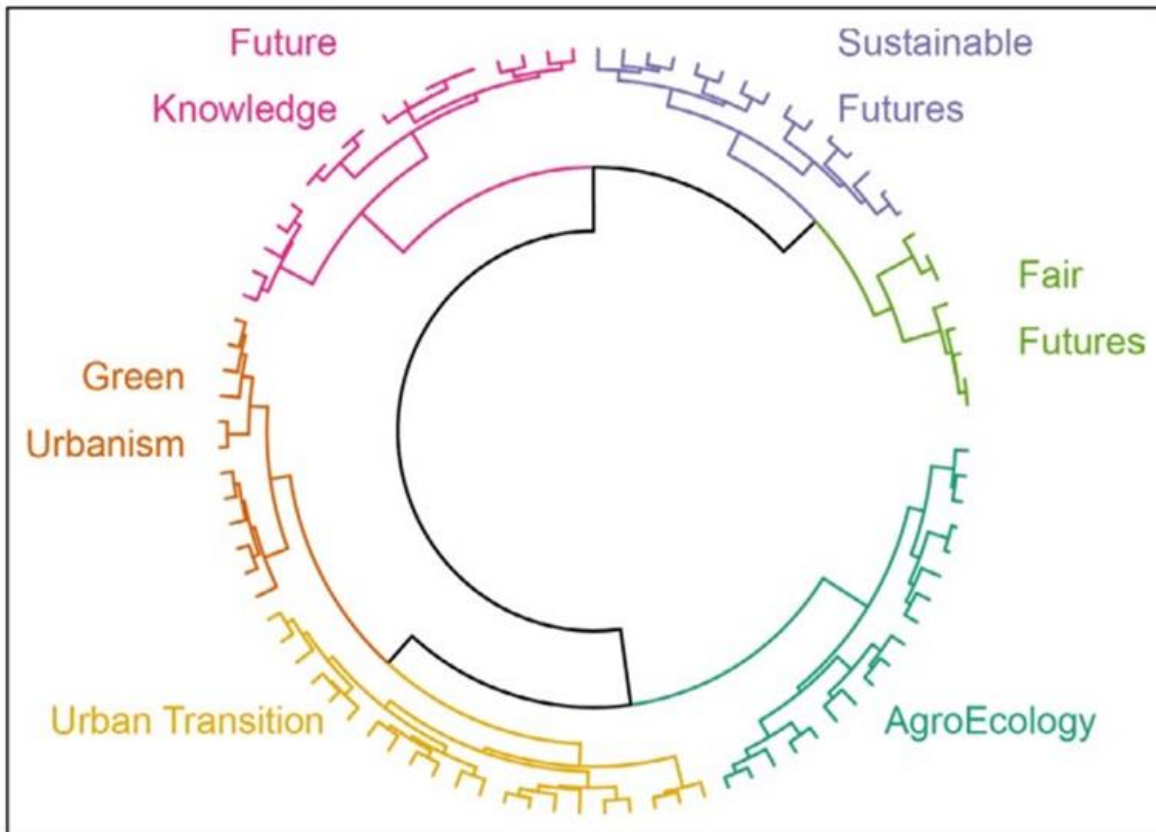
Figure 5: Seed clusters that adopt different approaches (expanded in Box 1). Clusters of seeds represent traits that define 'social domain', 'anthrome', 'anthropocene challenge's, and 'social- ecological' (Bennett et al. 2016: 446).

Box X: Seed characteristics (from XXX):

(1) Agroecology seeds generally adopt social–ecological approaches to the enhancement of food producing landscapes

(2) Green Urbanism seeds focus on improving the livability of urban areas. E.g. New York City's High Line Park has made native species, art, education, and recreation opportunities accessible to all citizens by reinvigorating abandoned urban infrastructure;

(3) Future Knowledge seeds are fostering new knowledge and education that can be used to transform societies. Eg.The Buckminster Fuller Challenge, for instance, addresses global threats with contemporary methodologies, such as the use of science fiction to imagine better futures;

(4) Urban Transformation seeds work to create new types of urban social–ecological space. E.g. The Sukhomajri experiment in India involves bottom-up (ie led by local people), sustainable solutions to prevent the silting of Sukhna Lake, the only water source for the city of Chandigarh; (5) Fair Futures seeds are creating more equitable opportunities for decision making, such as the use of multi-actor dialogues that enable decision processes that are more thorough, open, and fair;

(6) Sustainable Futures seeds emphasise social movements to building more just and sustainable futures. E.g. The divestment movement, actively attempts to morally stigmatize investment in fossil fuels by arguing that it is environmentally, socially, and financially irresponsible.

Box 1: Seed characteristics adopted from Bennett et al. (2016: 444).

3.1.4 Futures visioning process

The pilot was facilitated through a series of three virtual workshops and a second in person workshop (in Keta 1-8 October 2023), that were carefully crafted to allow for maximum input from knowledge holders (period August - November 2023). To ensure access and inclusivity, we used Miro, an online whiteboard that allows multiple contributors to share their ideas, thoughts, and opinions using simulated "post-it" notes. The triple threats to Ghana, plastics pollution, climate change and resource overuse, were co-identified from previous integration work. Figure 6 below describes the process undertaken to collaboratively develop a future vision for the best outcome for people and the ocean (nature) in Ghana, together with tangible and applicable pathways to achieve the best outcome over time.

Steps:

1. Identifying the threats to people and ocean in Ghana (Challenges)

Ghanaian colleagues have since the inception of the Hub, been undertaking research using multiple approaches, including disciplinary, interdisciplinary and transdisciplinary approaches and tools. These research problems were self identified by colleagues and partners (e.g. CEFAS). An opportunity for further integration was identified and how this could consolidate knowledges, provide opportunities for transformation, cement new and existing partnerships with government and civil society and identify research opportunities for the future. We embarked on the journey together to firstly identify the key challenges for Ghana's ocean at an in person workshop in the Volta Region (April-June 2023), engaging with research outputs and knowledge generation for the Social Ecological Impact Assessment (SEIA) tool (see Bell et al. 2023). Using a thematic analysis approach, three threats were identified: plastics pollution, climate change and resource overuse. Workshop 1 focussed on identifying and validating ocean

governance challenges in Ghana (Horizon 1). Importantly, workshop 1 extended an invitation to three knowledge holders from different sectors in Ghana (national government and civil society), which allowed academic knowledge holders to engage with context specific challenges and approaches as experienced by the practitioners. However, at this stage most of this process was still interdisciplinary (keeping in mind that some of the knowledge had been co-created that the academics were bringing to the discussion).

2. Visioning Horizon 3 (Visions)

Workshop 2 focussed on visioning and Horizon 3, using storytelling on a storyboard (see Appendix A for all storyboards).

3. Stakeholder input and identifying SEEDS (Initiatives)

Workshop 3 was in person and focussed on the co-creation of Horizon 2 and developing pathways to achieve the vision (Horizon 3) which included knowledge holders from NGOs, community fisher groups, government and academia (represented by Ghana Co-Is, CEFAS, University of Strathclyde, Scottish Association for Marine Science - all Hub partners). In this workshop we identified SEEDS of opportunity as well as practised developing some of these into pathways to impact (see section above describing the process). The final workshop was online, to consolidate the process into a vision for Ghana, pathways to achieve the vision and addressing the triple threats in a fair and equitable manner, inclusive of plural views and knowledges. In addition, this workshop provided an opportunity to identify knowledge gaps and research opportunities for legacy outputs in the future.
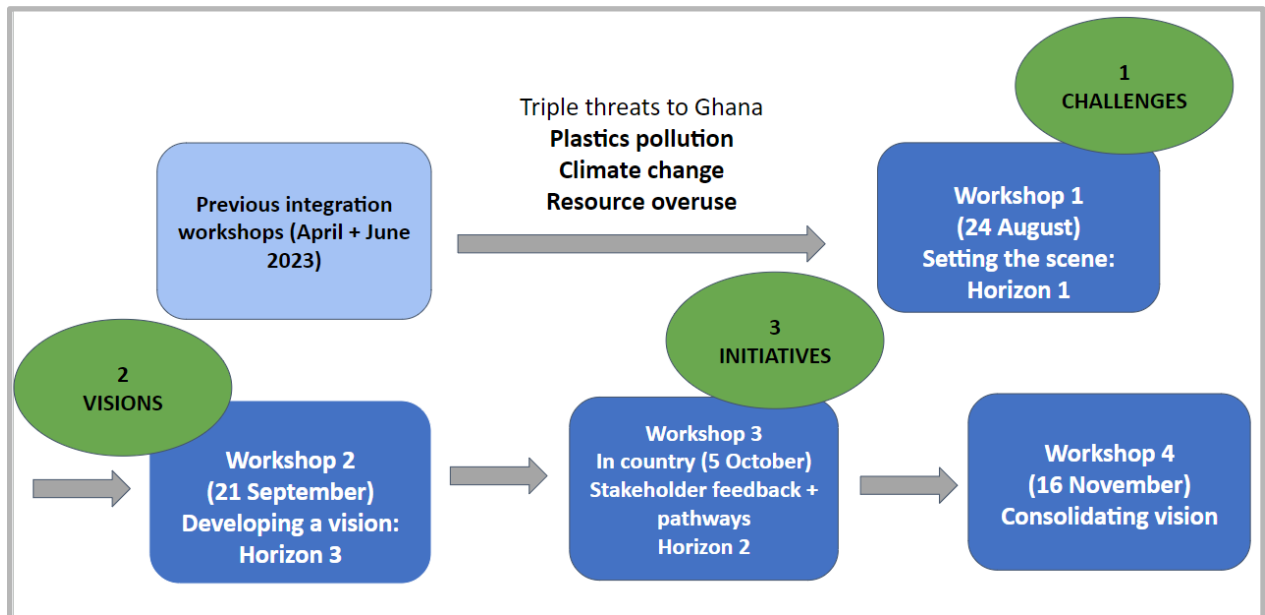
Figure 6: Three Horizons pilot process with Ghana OOH Co-Is (August-November 2023).

4. Process as Findings

Below we describe in detail the progression of building a picture of an imagined future for Ghana by Ghanaian co-Is and stakeholders.

Workshop 1: Identifying challenges and the current state of Ghana: Describing Horizon One

A three-horizon conversation starts by examining current challenges and concerns and explaining how the current way of doing things fails to align with new conditions. The first workshop aimed to describe the first horizon (H1) or the way things are done now, generally called "business as usual." The starting point of a three horizon conversation is the recognition that the first horizon pattern is losing its fit with emerging conditions.

Session 1:Setting the scene and theme selection

The first session was aimed at understanding and reviewing the present challenges in Ghana as pertaining to the triple threats of climate change, resource overuse (overfishing, overharvesting of mangroves and sand etc.) and plastics pollution. Three OOH Co-Is from Ghana presented on each threat and covered the socio-cultural, ecological, economic, and political challenges posed by each threat. Dr Sulley Ibrahim and Dr Harry Kwame Golo presented on climate change threats as pertaining to local coastal communities in Ketu South, Ghana, highlighting heavy rainfalls leading to floods and landslides, as well as sea level rise, displacement of populations and loss of socio-cultural and socio-economic rights (as cultural artefacts are destroyed and people are displaced from their livelihoods and homes), to name a few (see Appendix B for PPP). Prof Joseph Aggrey-Fynn presented on overfishing and resource collapse as pertaining to Ghanaian fish stocks. In brief, threats include habitat loss (mangrove deforestation), overcapacity in fishing effort (too many people fishing too hard) as well as destructive fishing practices, climate change and marine pollution (see appendix C for PPP). Sister Philomena Aboagye-Danso presented on the socioeconomic effects of coastal plastic pollution on fishermen in the central coastline of Ghana. Ecological threats include destruction of nesting grounds and habitats of marine life such as turtles, cetaceans, seabirds and crustaceans. Social identity, value and pride is degraded as the ecological habitat is degraded as well as negative economic impacts due to livelihoods linked to fishing, tourism and recreation (see appendix D for PPP). While listening to presentations workshop participants were asked to think about what the main challenges were, posed by these threats and how they all connect and impact on each other.

Session 2 and 3: Interviewing practitioners and populating Horizon 1

Continuing to build a picture of the present challenges posed by climate change, plastics pollution and resource overuse in Ghana, workshop participants were split up into three separate groups (Group 1-climate change, Group 2-resource overuse and Group 3-plastics pollution) in order to interview an expert about the context of their group theme. Group 1 (facilitated by Mia Strand) interviewed Mr Ebenezer Ntsiful, a physical planner with an interest in MSP working for the Land Use and Spatial Planning Authority Head-Office in Accra. Group 2 (facilitated by Meredith Fernandes) interviewed Dr. Godfred Ameyaw

Asiedu a Fisheries Policy and Enforcement advisor and one of the the lead people for Marine Protected Areas (MPAs) management in Ghana. Group 3 (facilitated by Nina Rivers) interviewed a community engagement officer, Ms Antoinette Nweakoa Allou from Hen Mpoano NGO based in Takoradi, Cape Coast, Ghana (permission to use real names was obtained from all experts). See Figures 7-15 for each group interview questions, answers and reflections on these answers from interviewees.

The purpose of these interviews were to ground our thinking in reality and get a sense of the daily challenges posed by these threats, how they impact upon and are impacted by local governance issues as well as to network and hear from knowledge holders outside of academia. This exercise definitely pushed some of the Hub researchers out of their comfort zones by engaging with practitioners and listening to their accounts.

Capture your findings...

We met...

Eben (interviewee)

Senior GIS officer with international experience

CC is major threat in MSP due to the many pressures on the coast. Is impacting the coasts, hence the need arising to adapt. CC is key, key priority. Most of our proposals for development are geared towards this.

Especially areas below sea level affected by litter. Long sea line: makes it hard to erect a long sea defence wall. Efforts are being initiated to address the issue We hope that soon we will be in a better position at protecting communities and lives

Would have wished to find out about where the national government are now when it comes to addressing challenges from climate change

Most pressing challenge due to CC is... Two: (1) plastic waste being disposed into the water; (2) deposit of seaweed (sargasso) at the shores of Ghana, especially in the west. Most pressing, because SSF are affected which are very important for coastal communities. Plastics really affect them. Sometimes they just harvest plastics rather than fish. - Sargasso erupt with some regularity and it is impacting the cast, and it is expensive to clear it.
Also (3) sea erosion - especially Keta I eastern Ghana. Former communities locations have been washed away - are now in the sea. Coastal defences do not necessarily help - they may rather shift currents, and make communities to be worse of.

They told us...

Yes, challenges. Marine - quite limited data compared to land. Nevertheless, we have made progress with respect to how sealine is protected and therefore coatsl communtieis

Q: plastics what would be worst case if situation with plastics becomes worse? - EPA are doing project on how we can leverage on plastics, and re-use them. How to take advantage. Plastics at our coasts are not local-sourced but are land-derived (via drains etc.) So not just marine institutions would work on this, but also 9especially) on land. Improve waste collection throughout the country. But what the fishermen are facing, is going to worsen.

sea erosion affecting coastal communities

In Ghana context, layman's perspective: long-term effect of human activities on land adversely affecting natural courses affecting human activities. Impact on environment. Most communities have local knowledge on CC.

Eben has personal experience of what the coastal communities are experiencing of flooding and coastal erosion

A lot of attention to plastic pollution - not emphasised as linked that much in the UK

getting more data on where the shoreline used to be - see the impact climate change is causing communities

plastic pollution

Clean Ghana campaign could be an opportunity

We wish we had asked...

Are the seawalls the best solution?

A highly positive opportunity arising is...

Where they are in responding to climate change challenges

Wish we had enough time to dicsuss local CC knowledge, because research on this has been scanty and also emerging

What about other solutions to coastal erosion such as mangrove restoration? Or coral protection?

Likewise, how can we utilise sargasso weed? So that it would not cost government money to clear beaches, but that income could be generated.

Interesting to see connectivity about sargasso from examples in Mexico and latin america

all msp proposals and strategies consider climate change

More focus on livelihoods

There is often a disconnect between what we see on the coast and coastal communities - but also inland communities

Is temperature rise a minor or major aspect of CC for Ghanaian coastal communities?

Would want to know more about challenge 2

Have to work on land as well, as this impacts what happens on the coast (particularly plastic pollution)

John asking - are there opportunities for plastics too? looking into 50 years ahead - what would happen if this situation goes unchecked - and what about positive opportunities?

Major obstacle policy *implementation*. How can we make implementation happen? - Problem is primarily: (1) resources; and (2) political interest. If in interest of politicians, and they see people will buy in, then yes. But some topics - like CC - are not as tangible and appealing to the people. Those tend to go around in circles. So yes. political interest a major barrier to implementation.

Credit HPI d-school Afrika

The biggest insight for me was...

Nina Example

It takes 2 days to get to the nearest hospital because people can only use a horse or cart

Likelihood of political actors to trade-off existential threat of CC simply because of winning the next election

political party that is likely to win votes in a CC threatened area could be lobbied more than those not likely to win

That not temperature rise but coastal erosion and flooding is seen as the most major impact of climate change, perhaps followed by sargasso influxes (might need checking if this is generally valid for Ghana or may reflect individual experiences)

greatest lesson learned is the importance of global cooperation and proactive action on climate change

The lack of meaningful participation and transparency in climate change adaptation policies and regulation will lead to maladaptation that will bring harm to communities (e.g. as shown in sea wall case)

the observed impacts experienced by Ghana

That sargasussum is a much bigger problem than realised, for many reasons.

I think this means...

There are poor roads, lack of transportation and no local medical care

...that NBS for coastal resilience, as well as sea defences are worth looking into (and likewise NBS for sargasso)

For Ghana it may be worth looking at Caribbean countries with regards sargasso - where very similar problems exist, and much work/research has been done already

In the future, I have fears for continued high emissions, mitigation and sustainability will become more and more important. This call for technological innovations and social and political changes

There is a need for mechanisms and systems to be put in place to allow communities participation in decision making around climate change adaptation.

Urgency is needed to address these impacts

Will likely need lots of people from different areas of expertise to come up with methods to deal with influxes

They need a way to...

An easier way to access faster medical care

Gain, rather then lose from large-scale sargasso influxes

Enable local communities to know , learn, voice their concern, and contribute to policies and regulations that are being designed/discussed related to climate adaptation that will affect their well being.

Develop capacity of local communities to be able to participate in a meaningful way in climate governance (including in understanding their rights and other stakeholderrs obligations to protect their rights)

To capacitate (funding and legal frameworks, e.g NDCs) collaborative co-design of solutions that are locally implemented.

Dispose of seaweed correctly, or come up with ways to utilise sargassum positively
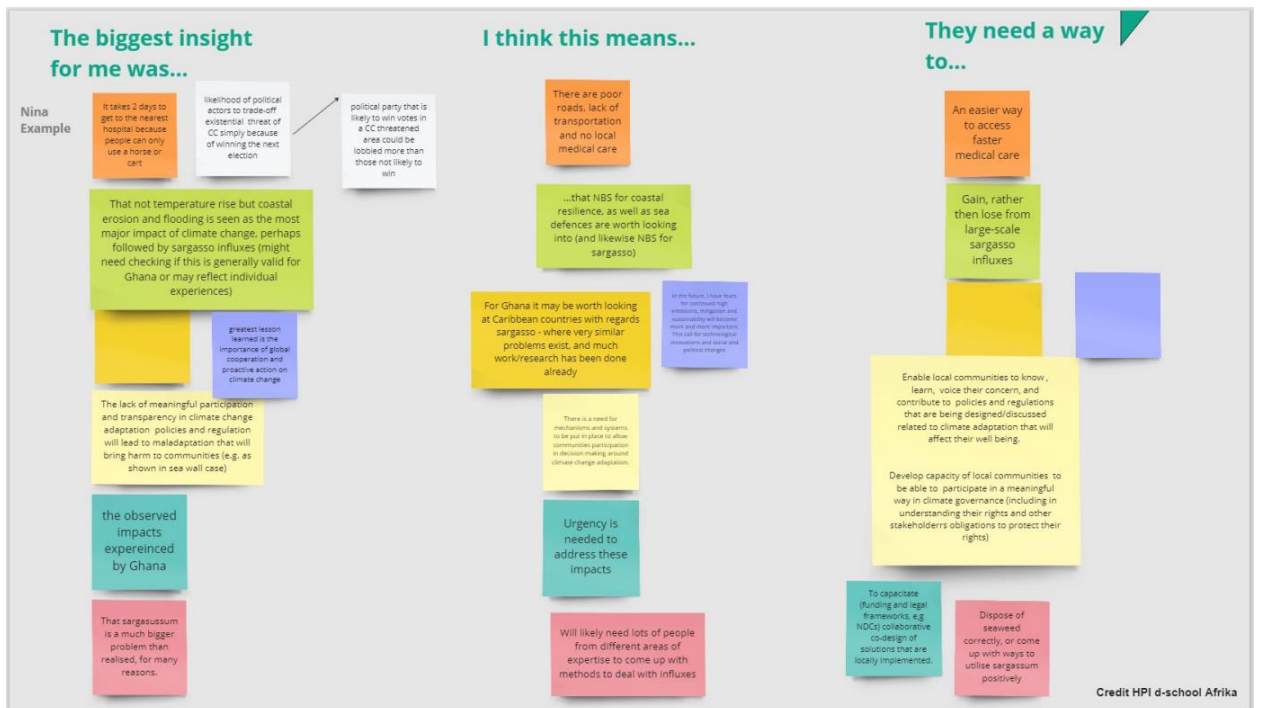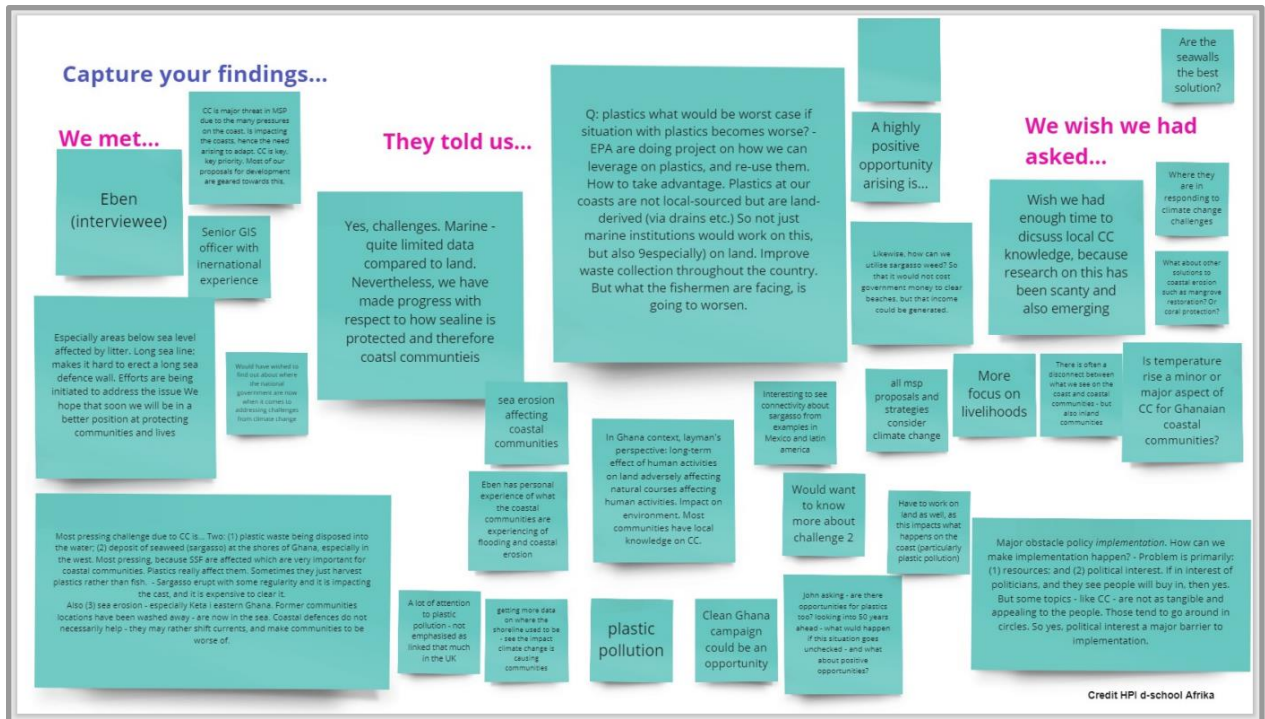
Credit HPI d-school Afrika

Figure 7-9: Climate change group interview questions and answers from Mr Eben Ntsiful, Land Use and Spatial Planning Authority, Accra, Ghana.

TASK # 2: Interview a stakeholder

PREP FOR INTERVIEWS

ROLES

🎤	Interviewer	Joseph
📝	Note Taker	Kofi
👓	Observer	
⏱️	Time keeper	Meredith

QUESTIONS

What is the #1 barrier to implementing effective catch limits?

What is the biggest challenge in Ghana's fisheries?

What do you see as the key threats to fish stock sustainability?

How do we solve this biggest challenge?

How do you think we should addres sthe illegal and unregulated fishing issue?
What measures do you think are required to reduce canoe capacity/ effort?

What evidence gaps prevent effective decision making?

Aims:
- **Understand main threats/challenges from stakeholder point of view**
- **Build empathy**
- **Build richer picture**

EXAMPLES

What are your biggest challenges?

How are you trying to respond to them?

Is this working? why or why not?

Credit HPI d-school Afrika

Capture your findings...

We met...

Godfred

They told us...

There is no programme to regulate fish catch in the small scale fisheries. How is it possible to to implement catch limit in the small-scale fisheries. Industrial fisheries is self reporting

Overcapacity

Data indicates decline in the fish stocks

Implement system of co-management

System is more top down, bottom-up is missing

no observer programme or catch control documentation scheme

Alternative/su pplimentary livelihood livelihood programmes

Unsustianable measures used

Landing beach enforcement Committee

Encourage nested system approach in governance

Build their capacity in alternative livelihood

Governance

encourage voluntary compliance.

We wish we had asked...

threats: not climate change or mangroves, key issue is overexploitation.

Role of SAICO in fish management

Credit HPI d-school Afrika
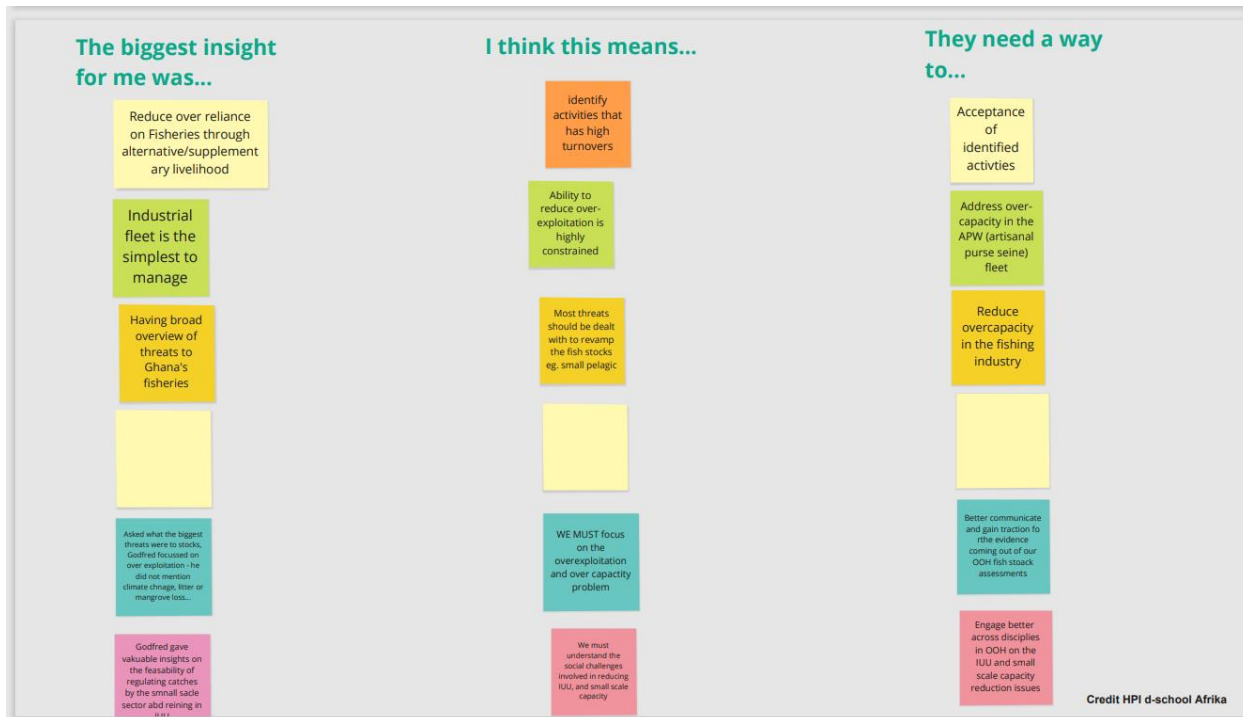
Figure 10-12: Resource overuse group interview questions and answers from Dr Godfred Asiedu, Fisheries Policy and Enforcement advisor, Ghana.
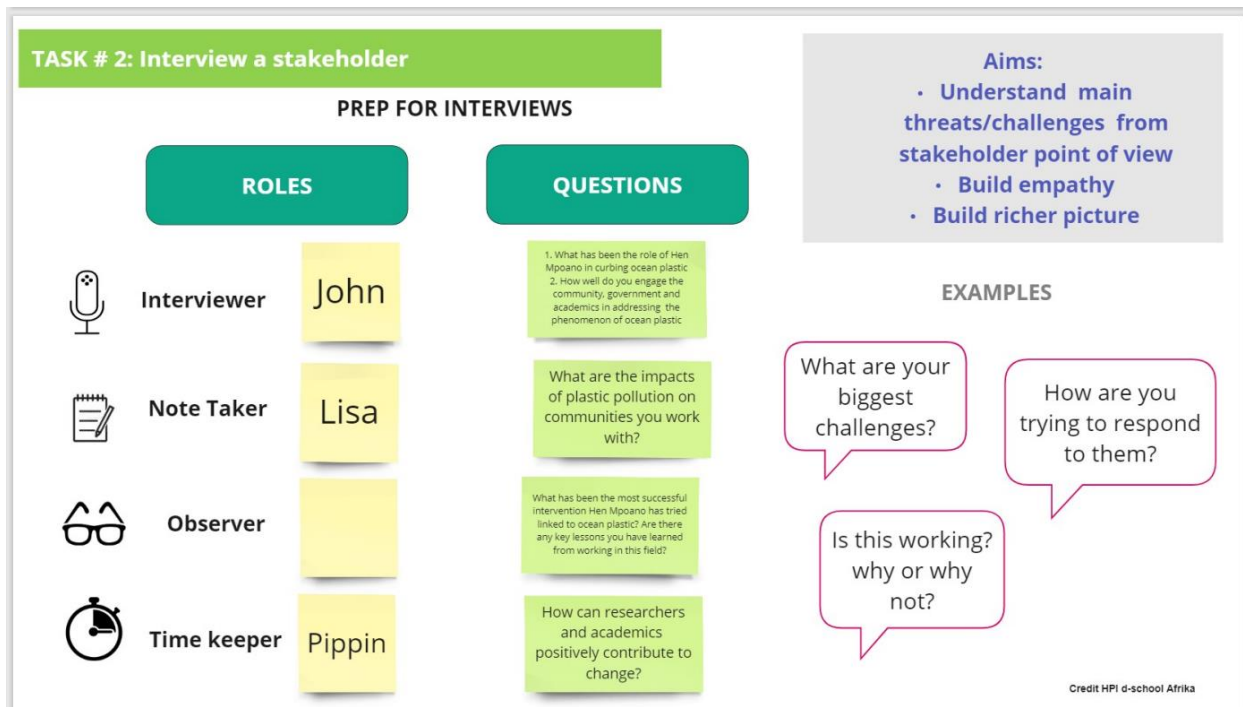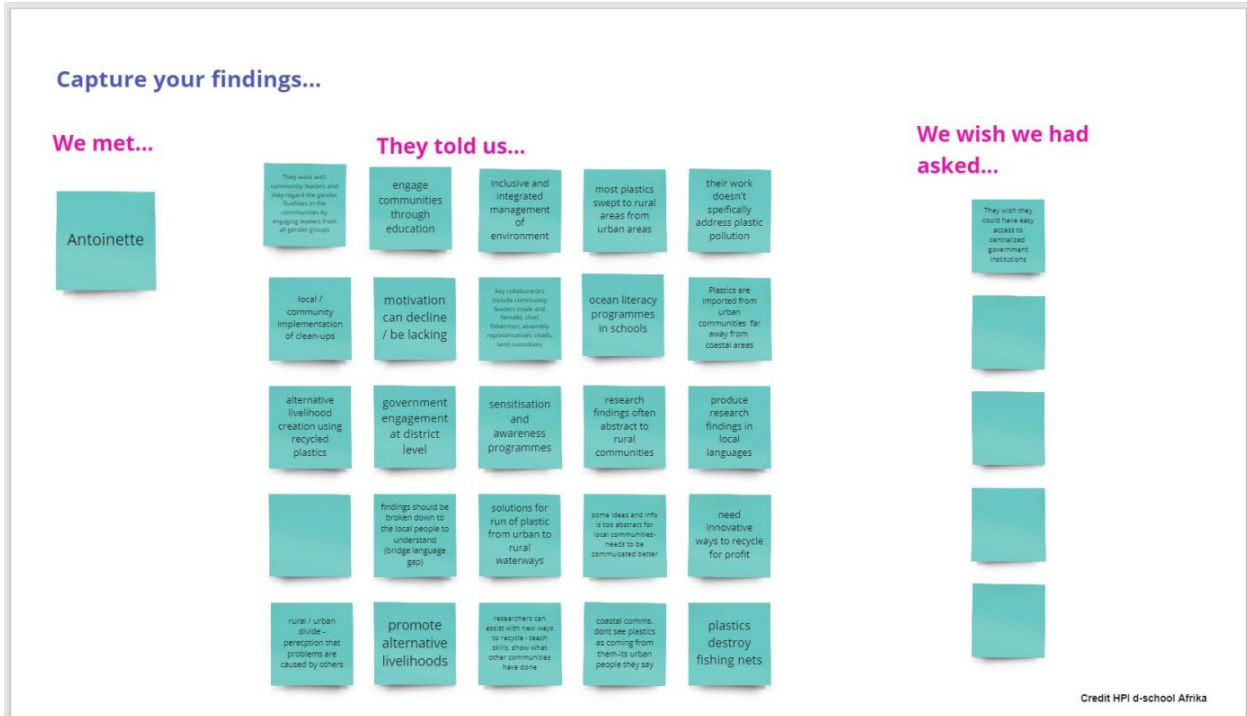
Figure 13-15: Plastics group interview questions and answers from Ms Antoinette Nweakoa Allou, Hen Mpoano NGO, Cape Coast, Ghana.

Session 4: Clustering challenges along Horizon 1

Session 4 encouraged each group to work as a team and reflect on the data they had generated through the Hub researcher presentations as well as the practitioner interviews. With these condensed answers of challenges from the "I think this means" category, participants then populated Horizon 1 (present challenges). Groups collaboratively clustered each challenge' sticky note into themes, discussed the themes and identified any connections between them and then reported back in plenary their main themes.

The primary 'challenge themes' from the climate change group (see Figure 16) included food security, the right to culture, the right to education, the right to the environment, coastal erosion, the right to respect of private and family life and government responsibilities. The primary challenge themes for the resource overuse group (see Figure 17) included compliance, control/management measures, bigger picture challenges and environmental challenges. The primary challenge themes for the plastics pollution group included livelihoods, drivers of the problem/bigger picture, negative environmental impacts, research challenges, communication and education issues, governance challenges, socio-cultural issues and capacity issues (see Figure 18). These models of Horizon 1 then enabled us as a group to develop a picture of Horizon 3, or the future for Ghana.
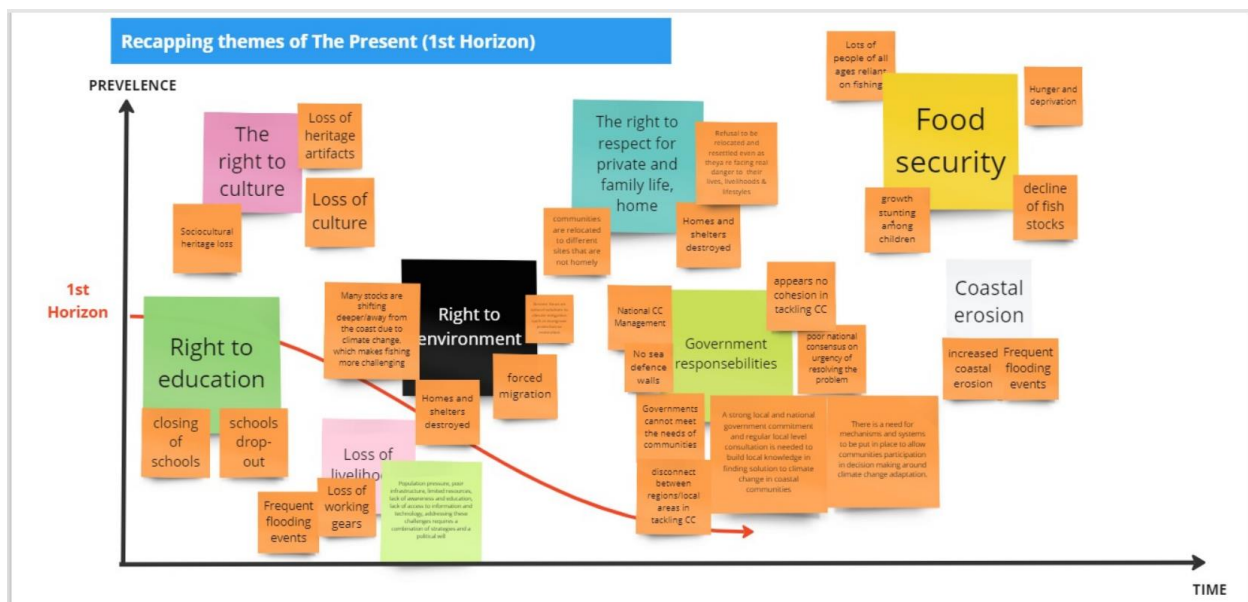
Figure 16: Climate change challenges (Horizon 1)
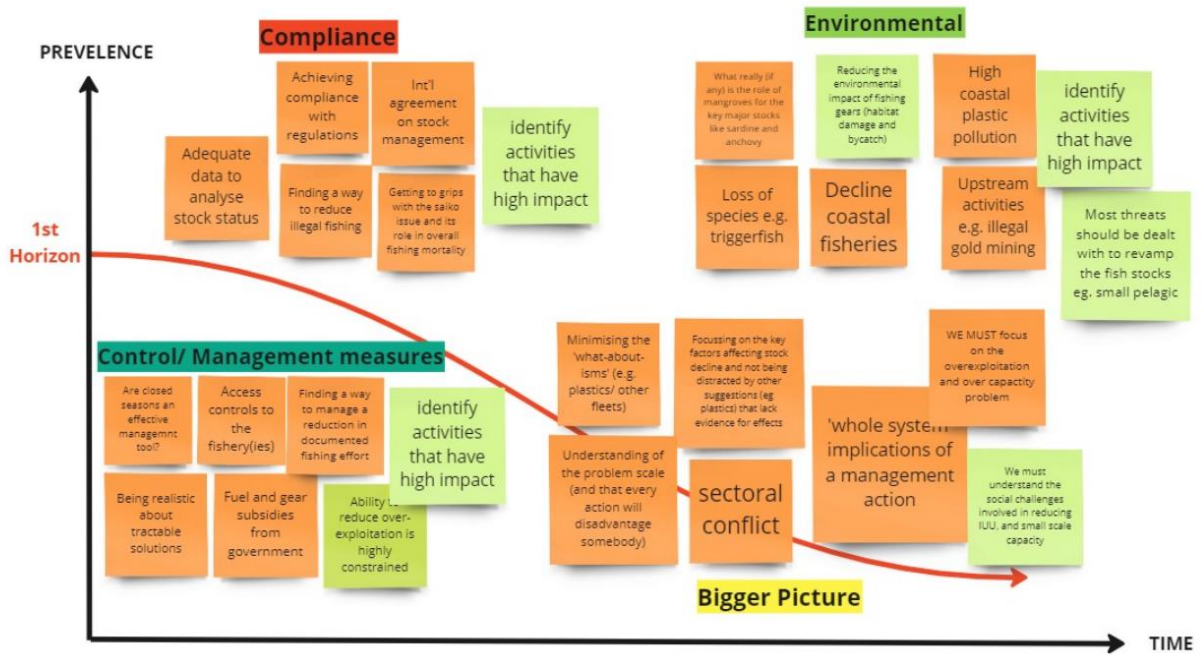
Figure 17: Resource overuse challenges (Horizon 1)
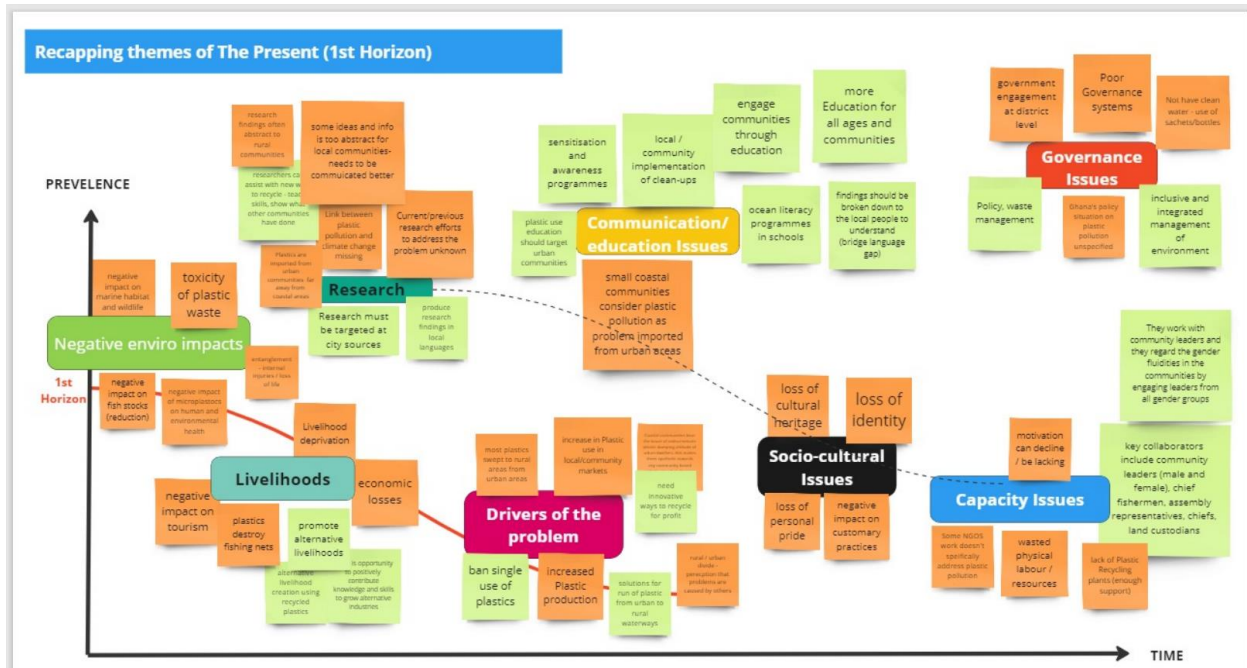
Figure 18: Plastics pollution challenges (Horizon 1)

Workshop 2: Developing a vision for the future: Describing Horizon Three

In Workshop 2 we explored future aspirations by developing Horizon Three. This involves examining the third horizon, where visions, aspirations, and possibilities for the reality that will emerge over time are explored as a replacement of the first horizon. The third horizon (H3) "represents the emerging pattern that will be the long-term successor to the current first horizon. It is appearing and growing on the fringes of the present system, and developing new ways of meeting the emerging conditions and possibilities" (Sharpe et al. 2016: 6). H3 is where visions, aspirations, and possibilities for a future reality in Ghana will emerge over time and are explored as a replacement of Horizon One.

Session 1: Developing a vision statement

In Session 1 each group (Groups 1-3) first developed a vision statement for Ghana as pertaining to their major threat: climate change, resource overuse and plastics pollution. In order to develop a path for the future you first need a future to aspire to. Groups were presented with four different vision statements (developed from inverting the challenge themes from Horizon 1) and then voted and found consensus on a vision statement.

The vision statement for Group 1 (climate change) was: *"Ghana envisions a future of resilience where effective climate change management and mitigation measures safeguard people and ecosystems, ensuring food security, coastal protection, adequate housing, education and preservation of cultural heritage".*

The vision statement for Group 2 (resource overuse) was: *"Ghana's marine resources and biodiversity are managed (exploitation?) sustainably, and provide employment, nutrition, and cultural benefits to coastal communities, with appropriate inclusion of stakeholders, into the long-term".*

The vision statement for Group 3 (plastics pollution) was: *"Tackling plastics pollution by empowering Ghana to collaboratively foster sustainable practices, improve governance and capacity, education, and communication to safeguard our environment and livelihoods for future generations".*

Session 2: Brainstorming responses to challenges and populating Horizon 3

In Session 2, groups brainstormed responses or solutions to each challenge identified in Workshop One under each primary 'challenge theme'. For example, the climate change group (Group 1) brainstormed responses to the challenge of Food Security, among other primary challenges (see Figure 19). Under this theme, solutions/responses were discussed for the current challenges of 'growth stunting among children', 'hunger and deprivation', 'many people reliant on fishing' and 'decline of fish stocks'. These solutions were then translated into a mini vision. Groups then populated Horizon 3 (the future) with these mini visions (Figure 20) in order to create a picture of the future (for Group 2 and 3 visions see Appendix E and F).
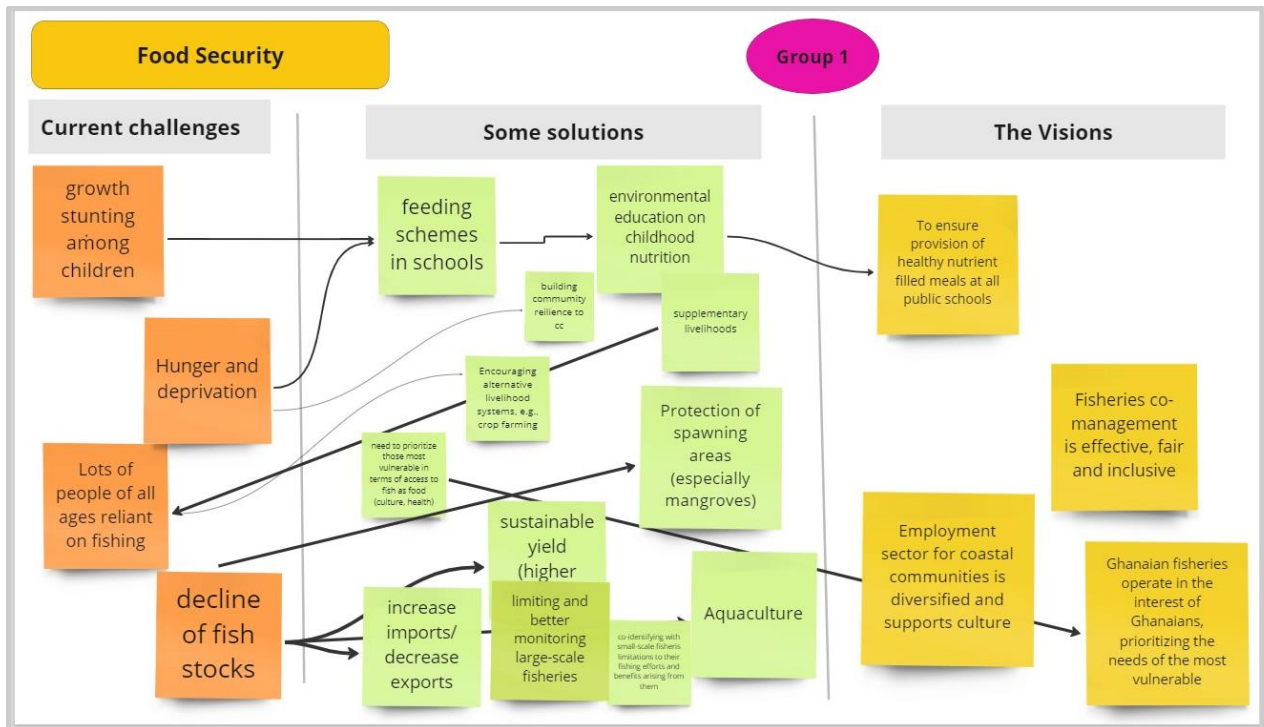
Figure 19: Example of solutions and then visions developed in response to food security challenges caused by climate change (Group 1).
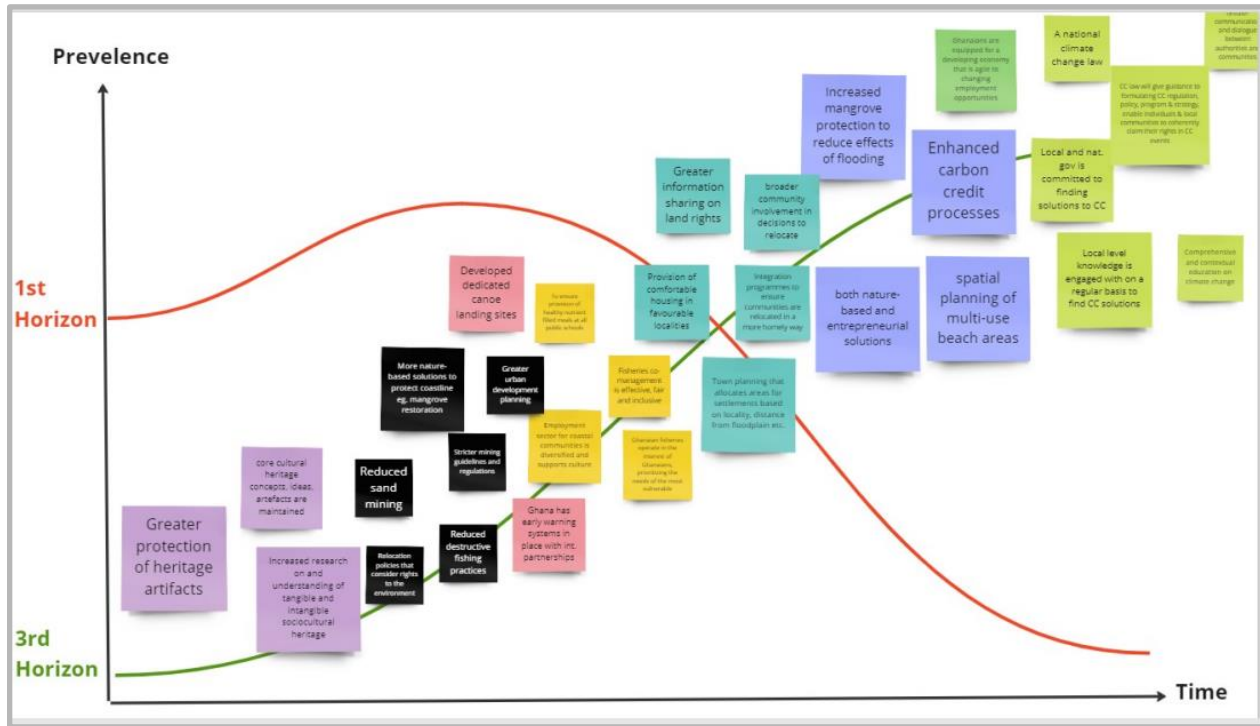
Figure 20: Horizon 3 (the Future) as described as mini visions in response to climate change (Group 1).

Session 3: Vision boarding

The third session adopted a storyboarding methodology adopted from design thinking methodology which uses design-led thinking approaches to create human-centred solutions to complex problems (see HPI d-school Afrika). Vision boarding is a visual way of telling a story about a problem. These boards enabled participants to imagine what the future of Ghana could look like.

The first five quadrants of the vision board required groups to think about their primary challenge (climate change, resource overuse and plastics pollution) by briefly articulating and then visually representing the ecological, social, economic and cultural impact of the problem. The next eight quadrants then required groups to think about the actions required of different societal actors such as policy makers, national government, civil society groups, researchers, educators and communicators, local residents, local coastal managers and international partners/funders in order to obtain an environmentally sustainable and socially equitable future (vision statements from Session 1) (see Figures 21-23).
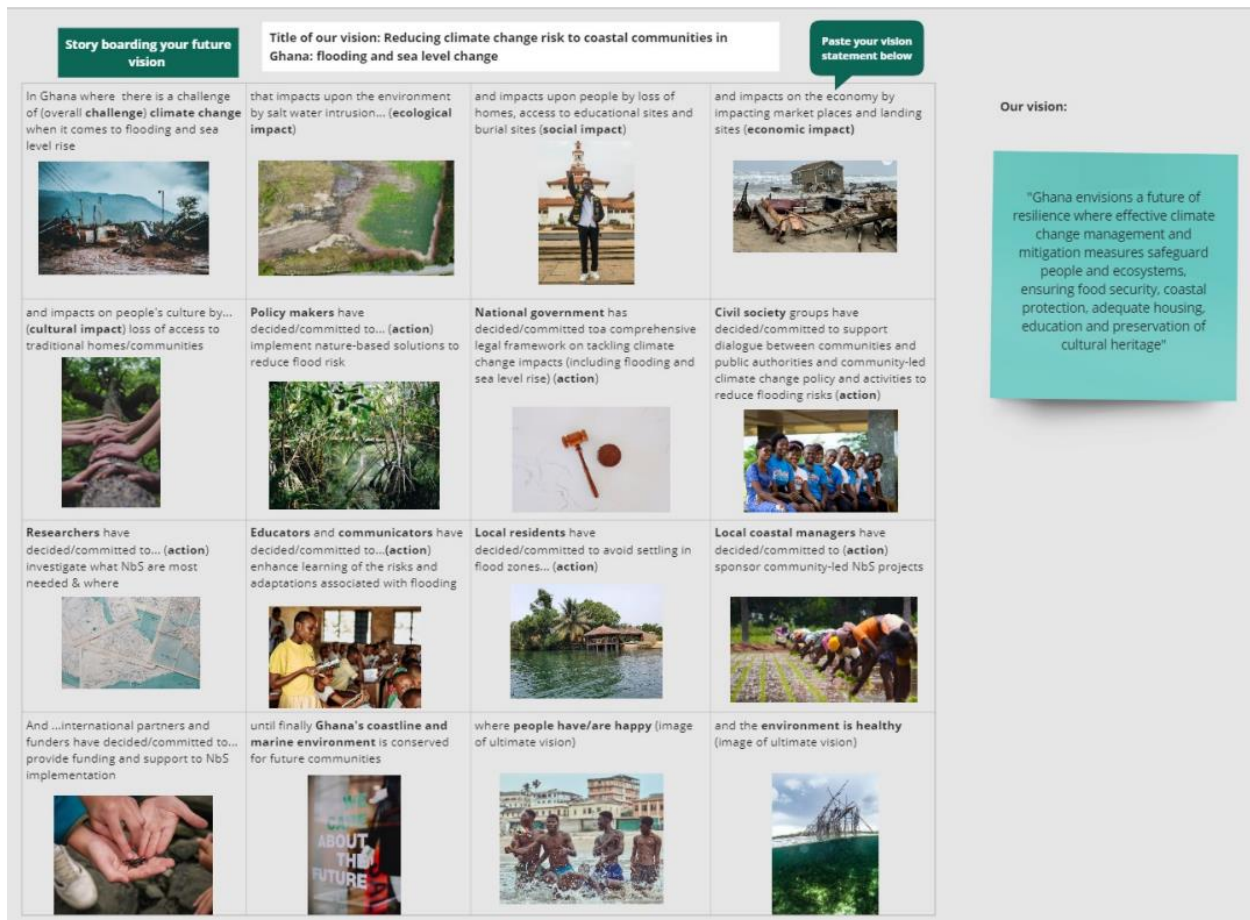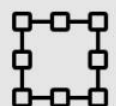
Figure 21: Vision statement and vision board for climate change in Ghana (Group 1).

Story boarding your future vision

Abundant fish and sustainable fisheries

Example: "Healthy ocean, happy communities"

Paste your vision statement below

In Ghana where there is a challenge of (overall **challenge**) **fisheries resource overuse**	that impacts upon the environment by... (**ecological impact**) **damage to biodiversity** (fish stock collapse, marine food webs)	and impacts upon people by... (**social impact**) **human rights by undermining food supply and livelihoods**	and impacts on the economy by... (**economic impact**) **loss of income, increased conflicts**
and impacts on people's culture by... (**cultural impact**) **declines in inshore fishing and traditional practices**	**National government and policy makers** have decided/committed to... (**action**) **rebuild fish stocks to maximum sustainable yield**	**Government agencies** has decided/committed to.... (**action**) **devise policies to balance fishing efforts to sustainable levels**	**Civil society** groups have decided/committed to (**action**) **help with alternative & supplementary livelihood strategies**
Researchers have decided/committed to... (**action**) **support the policies through research and education, co-develop resources with educators**	**Researchers, Educators and trainers** have decided/committed to...(**action**) **improve understanding of effects of over-fishing and potential solutions**	**Local residents** have decided/committed to... (**action**)	**Local coastal managers** have decided/committed to (**action**) Do these exist in Ghana?
Inshore and offshore fishing industry have decided/committed to... (**action**) **work together to implement sustainability policies**	until finally **Ghana's coastline and marine environment** will look like this....(**image of ultimate vision**)	where **people have/are....** (image of ultimate vision)	and the **environment is** (image of ultimate vision)

Our vision:

Ghana's marine resources and biodiversity are managed (exploitation?) sustainably, and provide employment, nutrition, and cultural benefits to coastal communities, with appropriate inclusion of stakeholders, into the long-term

Figure 22: Vision statement and vision board for resources (fisheries) overuse in Ghana (Group 2).

Figure 23: Vision statement and vision board for plastics pollution in Ghana (Group 3).

Workshop 3: Stakeholder feedback on visions and developing pathways to impact: Describing Horizon Two

Workshop Three was an in-person workshop held in Keta, Ghana from 3-10 October 2023. The primary aim of this workshop was to co-develop Horizon Two (H2) with local knowledge holders. Horizon Two "is the turbulent domain of transitional activities and innovations that people are trying out in response to the changing landscape between the first and third horizons. This second horizon is important, as it provides the disruptions for more radical 3H systems to emerge" (Sharpe et al. 2016:6).

The objectives of Workshop Three were twofold. The first was to invite local knowledge holders to review and input into Horizon 1 (current challenges in Ghana regarding climate change, resource overuse and plastics pollution) and Horizon 3 (future vision for Ghana) that were developed in Workshops One and Two. These knowledge holders were local experts and as well as practitioners from the Fisheries Commission, the Land Use and Spatial Planning Agency, Hen Mpoano NGO, and representatives of local Fishers' Associations.

The second objective was to co-identify 'seeds' or 'innovations in play' with local knowledge holders and researchers. These 'seeds' are "current positive and inspiring initiatives that hold potential to shape a more just, prosperous and sustainable future. They can be initiatives (social, technological, economic, or social–ecological ways of thinking or doing) that exist, at least in prototype form, and that represent a diversity of worldviews, values, and regions, but are not currently dominant or prominent in the world" (Bennett et al., 2016). These seeds can contribute to a better future in Ghana that has the potential to reverse or help adapt to the negative trends caused by climate change, plastic pollution or resource overuse. Examples of seeds could be: initiatives, social movements, specific organisations, good practices, new technologies /innovations and cutting-edge research. Horizon Two is viewed as the realm of transition between the first and third horizons, and these seeds or innovations can be seen to be going on in response to the failings of the first horizon and the possibilities of the third (Sharpe et al. 2016: 7).

For this workshop we did not have theme-based groups (climate change, plastics pollution and resource overuse), but deliberately combined disciplines, practitioners and stakeholders in groups in order to elicit multiple views and dialogues. We also invited the same three practitioners we interviewed in Workshop 1 (August 2023) to the in-country workshop in Keta, not only for continuity's sake but because this was good practice in maintaining working relationships with practitioners outside the Hub.

Figure 24: Group picture of some of the participants in Keta, Ghana (October 2023)

Session 1 and 2: Consensus building of Horizon 1 and Horizon 3

In Session One and Two we aimed to gain consensus from stakeholders from Ghana on the current state of Ghana as we had envisioned and developed in Workshops One and Two (Horizons 1 and 3). The question we asked participants was: 'Are there any challenges missing? If yes, please add' and 'Are there any visions missing? If yes, please add' (see Figures 25 below). Most groups either added new challenges that were not represented or added detail to existing challenges. Several new visions were also added by the three groups (see Figure 26 below). In order to do this we grouped smaller challenges under larger thematic categories. For example, for H3 the thematic vision categories included: Environmental; Governance/ Management; Education/Awareness/Communication; Compliance; Drivers of Complexity; and Livelihoods/ Food Security/ Socio-cultural.

Figure 25: A group revising Horizon 1 (current state of challenges in Ghana) (Keta, Ghana, 6 October 2023)
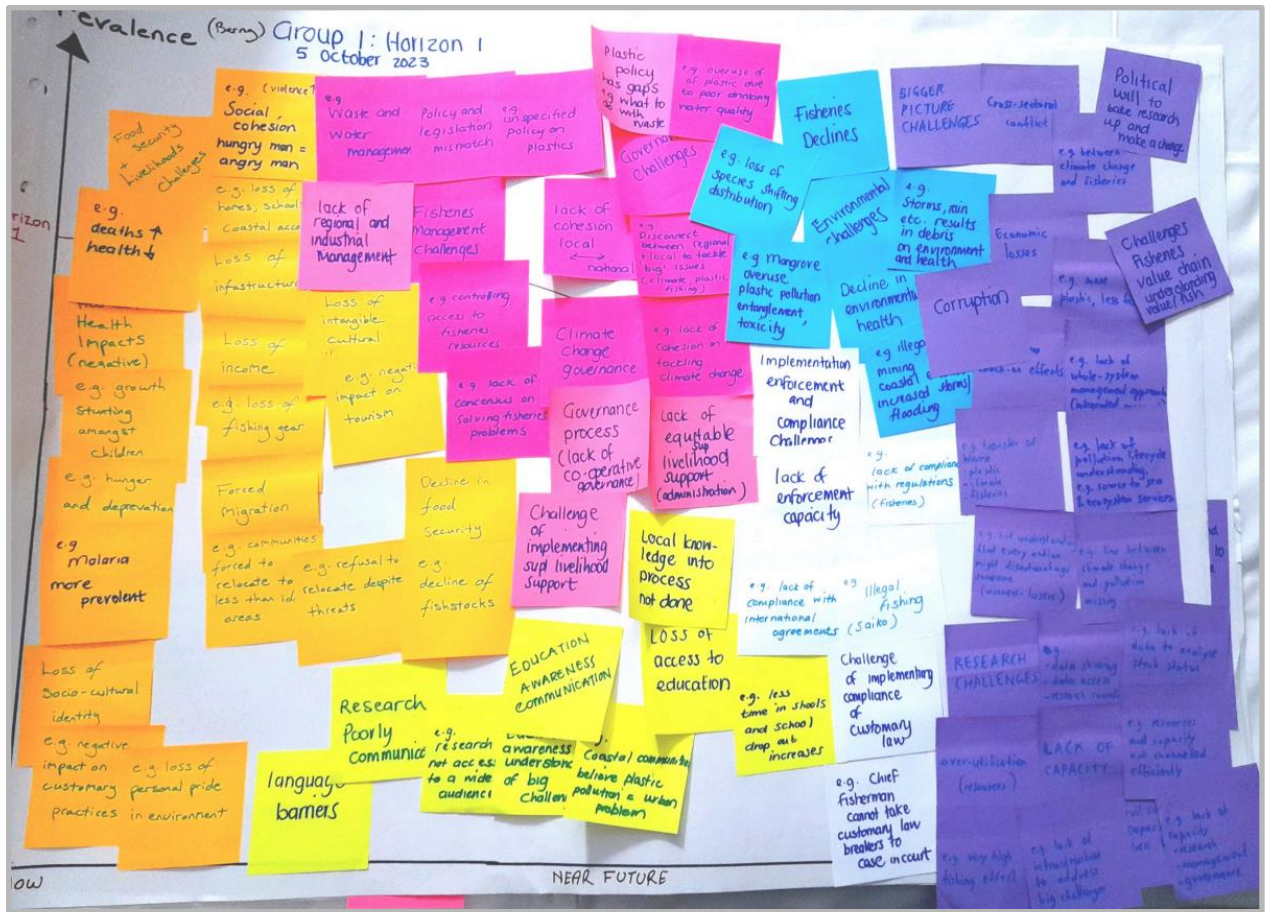
Figure 26: Groups reviewed current challenges (Horizon 1) generated by researchers and the three practitioners from Workshop 1. (Group 1: Review of challenges (Keta, Ghana, 6 October 2023).

Figure 27: Groups reviewed visions for the future (Horizon 3) generated by researchers and the three practitioners from Workshop 1. (Group 2: Review of Horizon 3 (Keta, Ghana, 6 October 2023)

Session 3: Co-developing Horizon 2: Identifying 'seeds'

In the third session, we facilitated a process of co-developing 'seeds' with local knowledge holders who have the contextual knowledge of current initiatives. As noted before, seeds are social, technological, economic, or social–ecological ways of thinking or doing that exist, at least in prototype form (Sharpe et al. 2016). These seeds have the potential to contribute to a better future in Ghana to reverse or help adapt to the negative trends caused by climate change, plastic pollution or resource overuse. Examples of seeds include, initiatives, social movements, specific organisations, good practices, new technologies /innovations or cutting edge research.

In many instances, futures work can be quite abstract and theoretical for stakeholders. The advantage of using the concept of 'seeds' is to position stakeholders in the present and real world, to review and consider current initiatives and practices that have the potential to shape the future. The process was as follows:

Step 1: Identify as many 'seeds'/interventions with your group as possible. In other words, are there any new technologies/designs, social movements or efforts, good practice, innovations,

research/experiments or methods that already exist in Ghana that are aimed at addressing climate change, plastics pollution or resource overuse?

Step 2: Select your top 5-6 seeds/interventions in the now, near future or far future

Step 3: Choose an advocate/seed-sower for the next session

Table 1: Generated 'seeds'/innovations in play by each of the three groups.

Group 1 Seeds	Group 2 Seeds	Group 3 Seeds
Maps at landing sites to reduce conflict between artisanal + industrial fishers (IEZ)	Microcredit schemes (interest-free credit facilities for women and communities)	Ghana Fisheries Recovery Activity (supplementary livelihood support/apprentice schemes)
Materials to support ocean literacy eg. books, radio, extra curricular activities	Effective waterworks to manage lagoon/seawater connectivity	School feeding program E.g. Education Watch (not only in rich schools)
University able to develop curricula that embeds sustainability	Education/training + finances for aquaculture	Green Ghana Project (planting coconut trees for sup livelihoods)
Customary law education	MSP meta-database to inform decisions	Free Compulsory Universal Basic Education (FCUBE) (primary schools targeting deprived areas)
Reviewing the law and legislation amendment and feeding research in an accessible way to inform the changes (learn from terrestrial sector)	Community greening initiatives (gardens)	Gov to help Ghana Fisheries Recovery Activity (GFRA) to set up more LaBECs (Landing Beach Enforcement Committees)
Mangrove afforestation program with national program to enhance carbon credit schemes at community level	Establish ocean stewardship champions	Review/Enforce Fisheries Management Plan of Ghana (2022-2026)
Review and refine EPA waste separation program to have more bins and return scheme	Capacity to write community proposals	Fisheries Enforcement Unit (navy, marine police, observers)
' Waste for cash'/ 'Cash for trash' Incentive scheme to collect ' fished out' waste (relooked at by fisheries commission)	Enviro awareness in faith-based orgs and among community leaders and youth	Artists 'naming and shaming' re climate/resources/pollution issues (singers, political cartoonists etc)
Community based co-management of fisheries (Small Pelagics Co-management Committee-SPCC)	Invest in post-harvest fishery facilities	Senior High School Outreach Programmes (African Centre of Excellence for Coastal Resilience) ACECOR) + Centre for Coastal Management

Enviro courts by gov to engage judiciary with UNEP	Waste disposal programs/return schemes	Harmonising NAFPTA (Nat Association of Fish Processors + Traders) and GNCFC (Ghana Nat Canoe Fishermen Council)
Ministry of Education & Gender school feeding program to be reinstated, providing enriched food	Free and accessible facilities to discourage open defecation	Training journalists on reporting fisheries issues
	Mangrove afforestation programs	Set up MPAs (GFRA; Hen Mpoano)

Session 4: Seed-sower activity

In Session four, each group chose two 'seed sowers'-two people to present and advocate for their top 5-6 seeds. Seed sowers 'pitched/sowed' their top five to six 'seeds' to the other groups where they discussed commonalities and synergies between seeds as well as the potential winners and losers and possible risks of each seed. The seed-sower activity was not originally in the Three Horizons Approach but was added as an important activity to ensure increased integration and co-design of ideas. The 'seed sowing' practically demonstrated pathways to achieve ideal futures.

Figure 28: Seed sowers pitching their seed ideas to other groups and discussing synergies and risks (Keta, Ghana October 2023).

Session 5 and 6: Populating Horizon 2

For session five and six, groups populated Horizon 3 (the future) with their top 5-6 seeds. Seed sowers

went back to their "home" groups and refined their seeds with the feedback from other groups (eg. This is what was accepted. This is already in policy. This is what I learned. Is the seed realistic/ implementable?). Groups were also asked to reflect on what the opportunities and barriers are to their top 5-6 seeds (eg. we don't have the tools/technology/ organisational structure/baseline data). The refined seeds were written on sticky notes and then used to populate Horizon 2, according to where they would fall in time (now, near future or far future (see Figures 29-32 below).
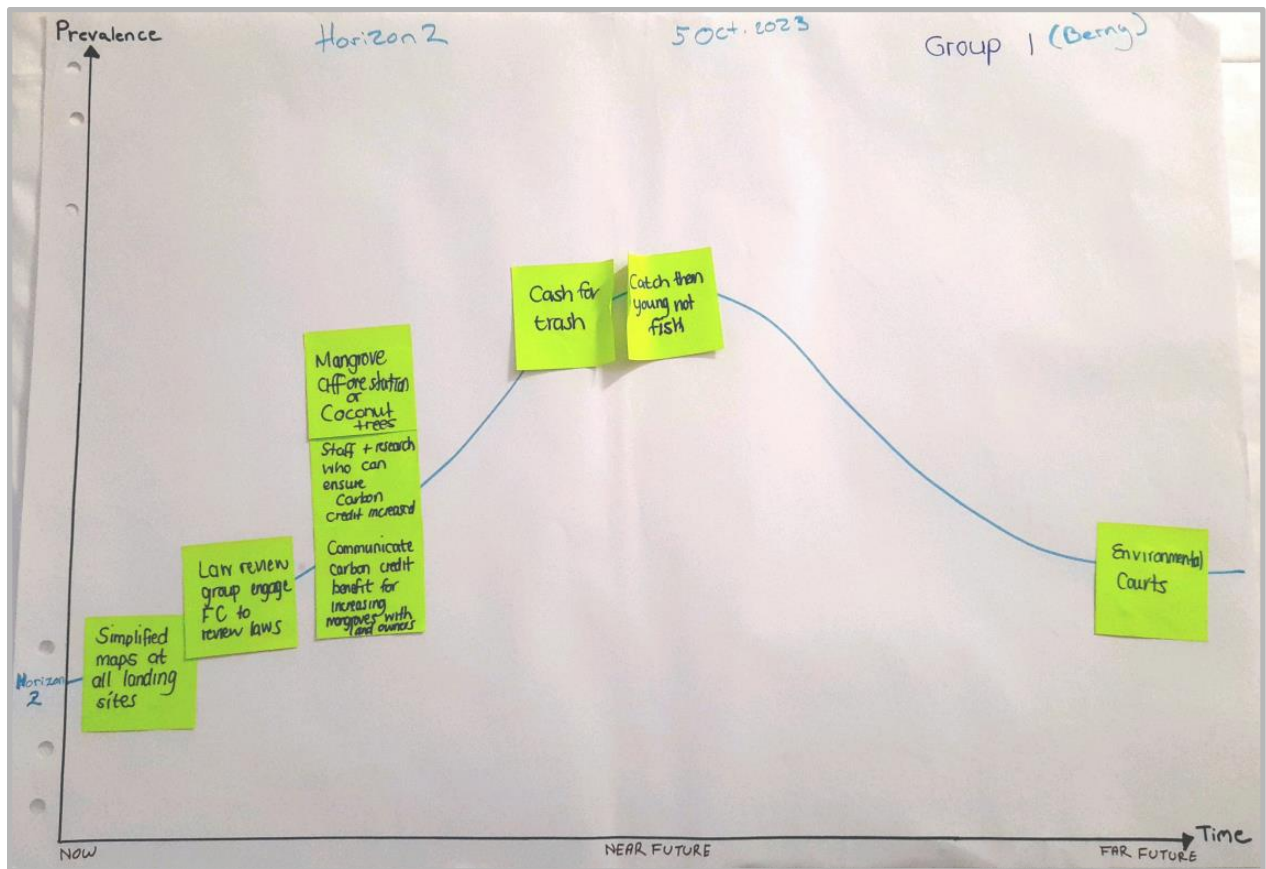
Figure 29: Horizon 2 from Group 1.
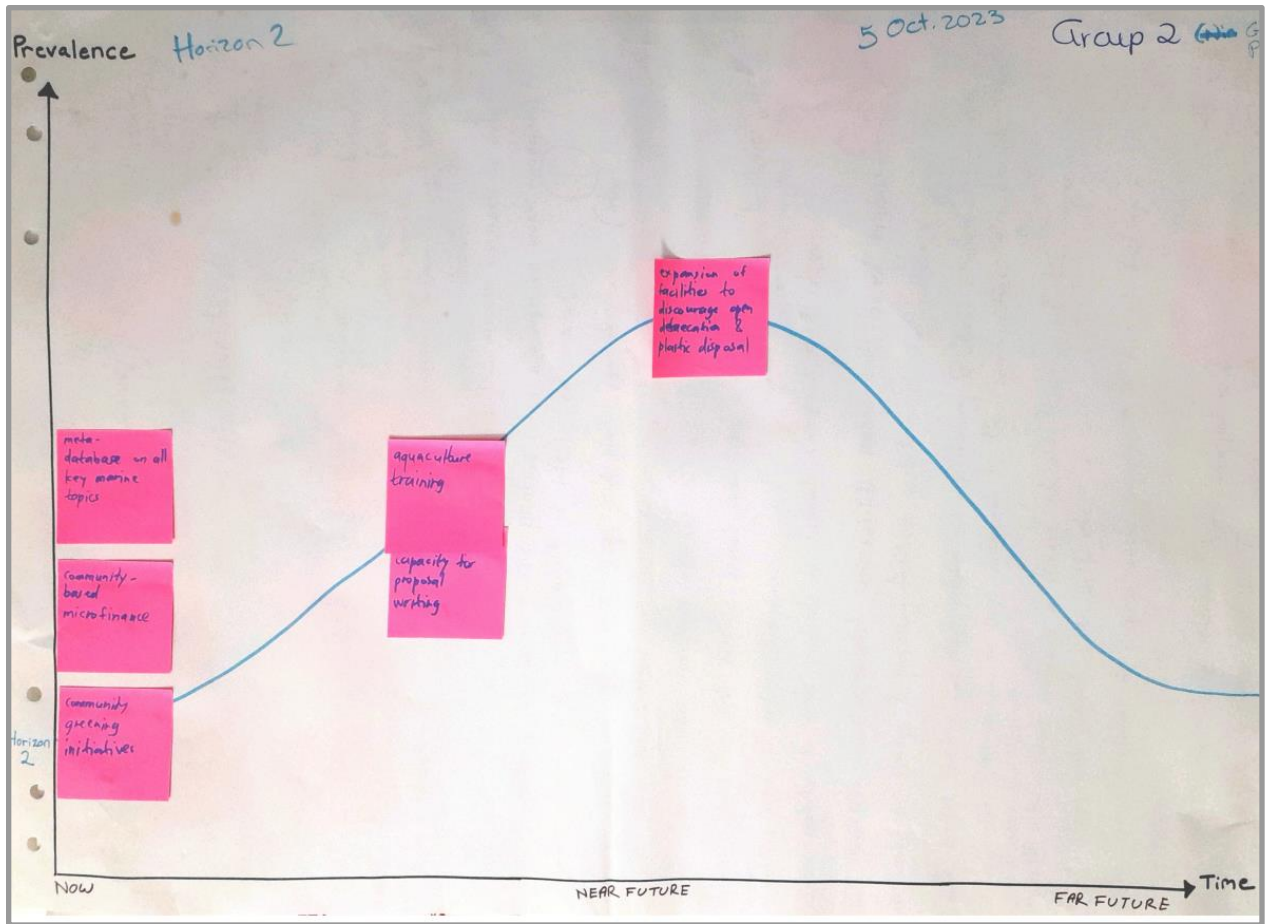
Figure 30: Horizon 2 from Group 2.
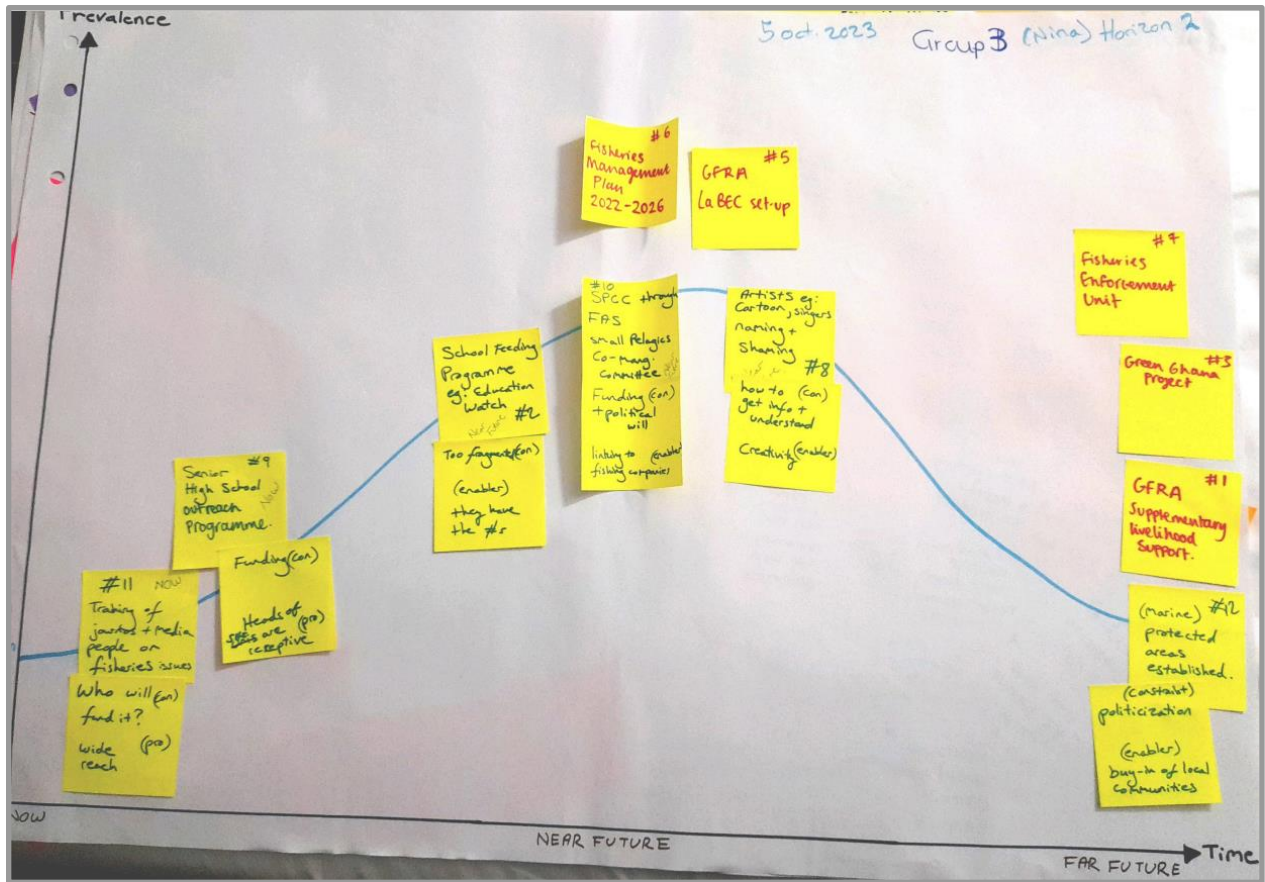
Figure 31: Horizon 2 from Group 3.
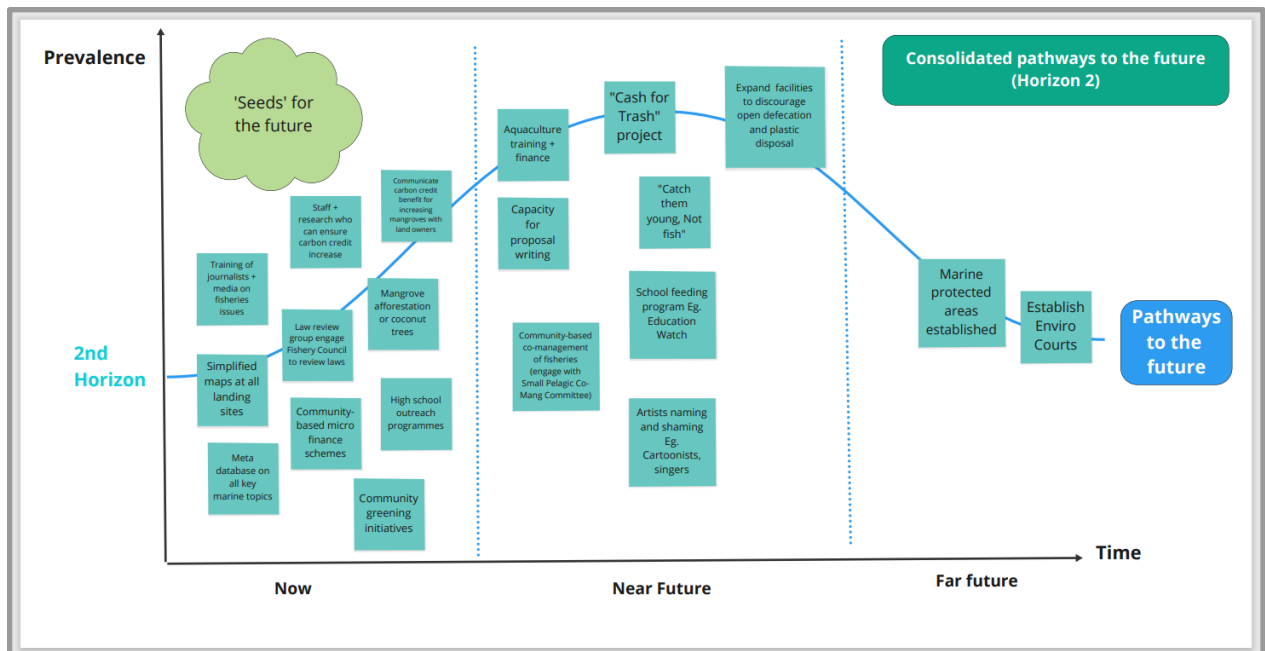
Figure 32: Consolidated 'seeds' for the future (2nd Horizon) of all groups as presented for now, in the near future and in the far future.

Session 7: Pathways to impact and research

In the final session of Workshop Three, groups were asked to choose one of their seeds and develop it into a pathway to impact or research. We provided groups with a template (see Figure 33 below). Questions to think about included considering the Aim (Why?), Who (Who?), resources required/site location of intervention (Where?), resources and identified gaps (How?), Outputs and Desired Impact. The idea was that these could be used as prototypes for future proposals, policy interventions or partnerships. These pathways to impact were further developed in the final workshop, Workshop Four.
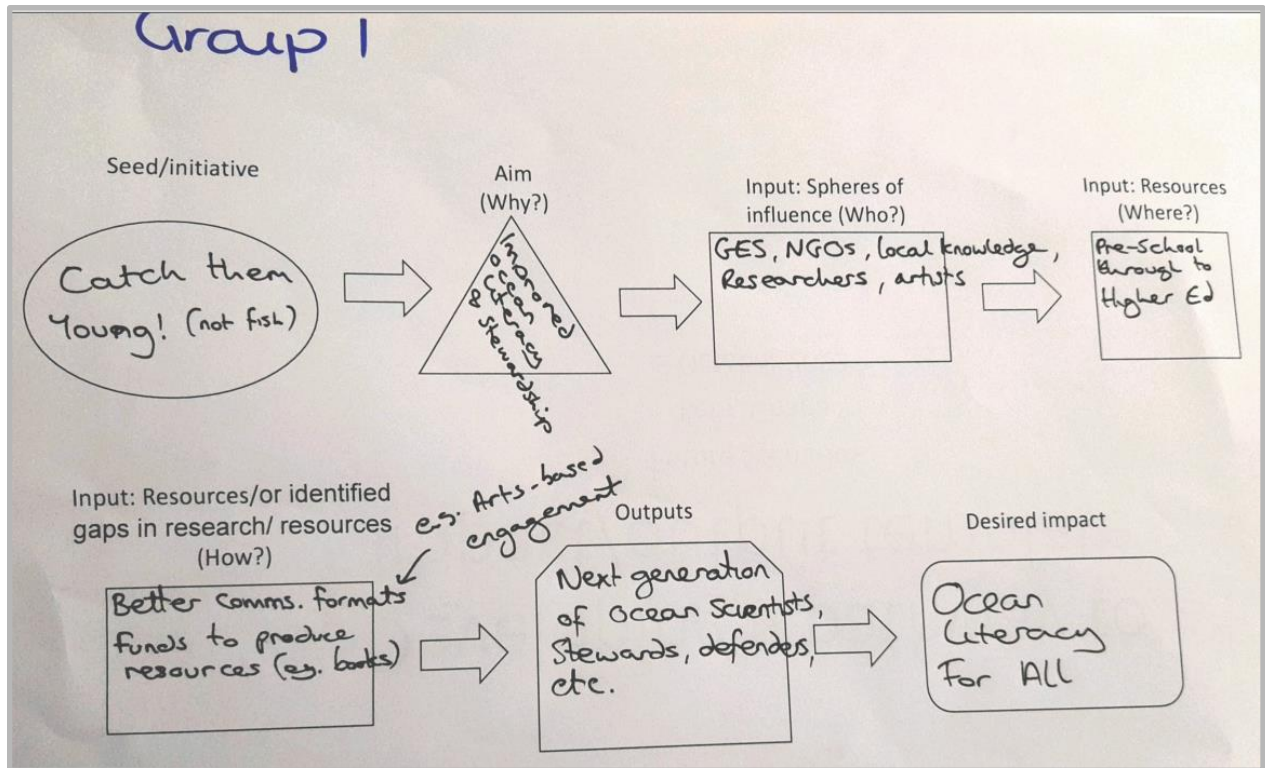
Figure 33: Example of a 'seed' developed into a pathway to impact by Group 1.

Workshop 4: Consolidating a vision for Ghana and developing pathways to impact

The aim of the final workshop was to consolidate the three different 'maps' of Horizon 1, Horizon 2 and Horizon 3 together, as they pertained to climate change, resource overuse and plastics pollution in order to develop an overall picture of Ghana's current state and challenges (H1), a future vision (H3) and then pathways to get there (H2).

Session 1: Putting it all together: a full picture of Ghana

For session one we reviewed consolidated maps of Horizons 1, 2 and 3 in plenary as well as a consolidated overall map combining all the three horizons for Ghana (see Figure 34).
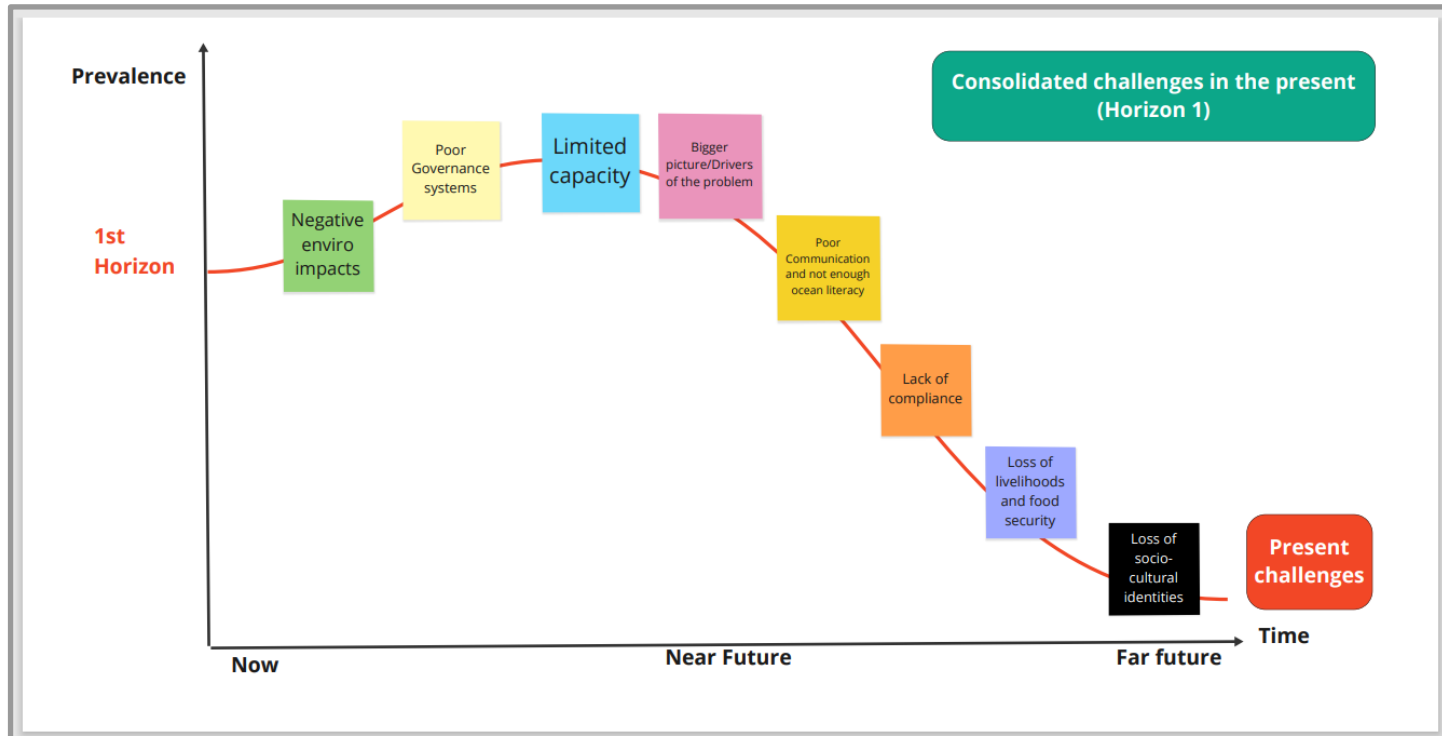
Figure 34: Consolidated map of current ocean governance challenges in Ghana (Horizon 1).
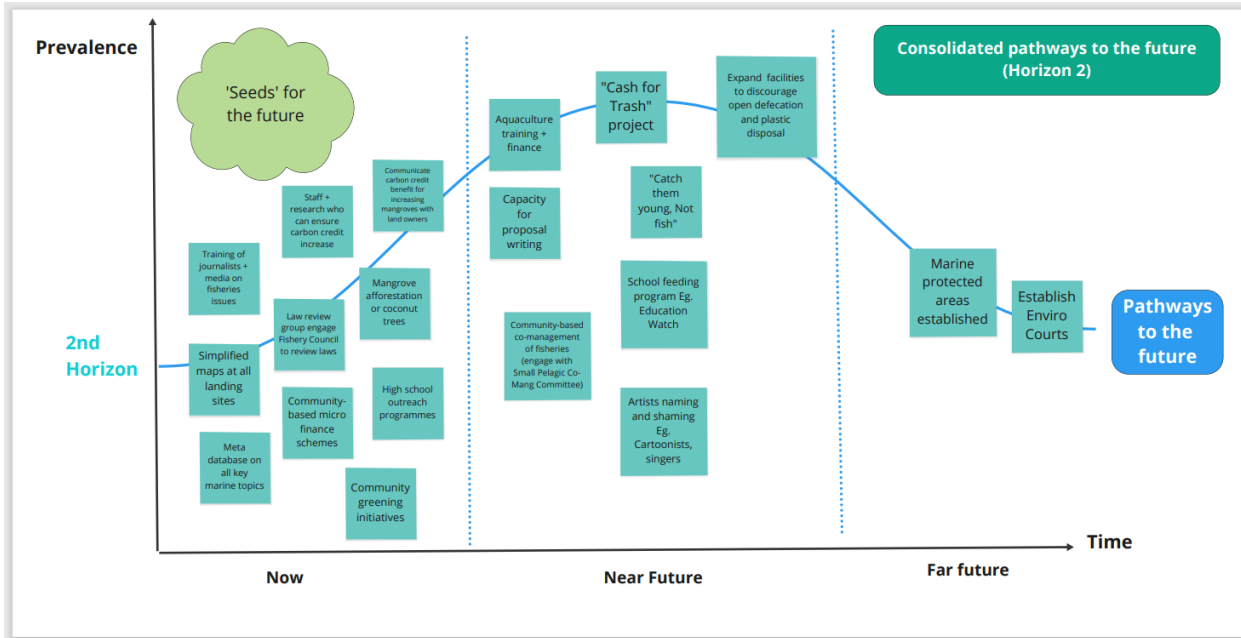
Figure 35: Consolidated 'seeds' for the future in Ghana (Horizon 2).
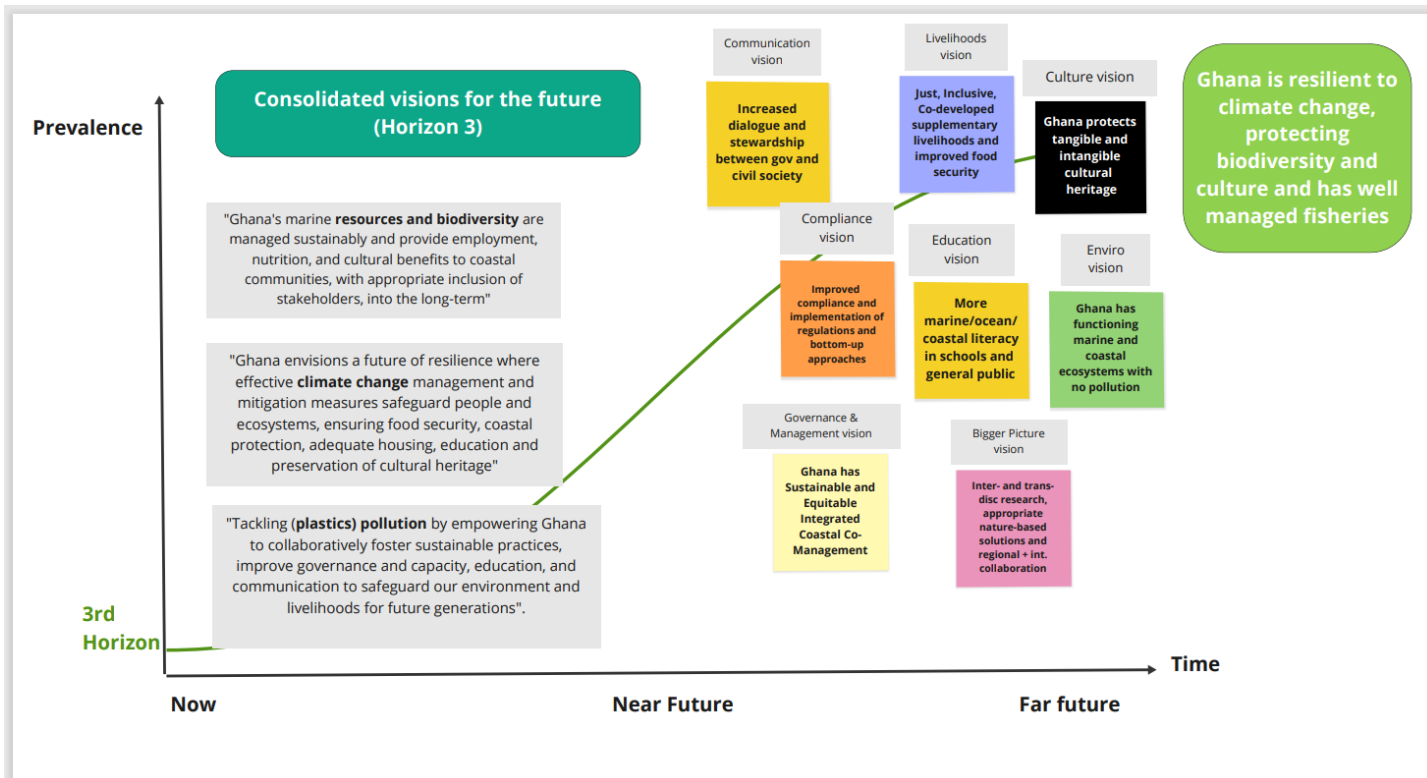
Figure 36: Consolidated visions for Ghana's future (Horizon 3).
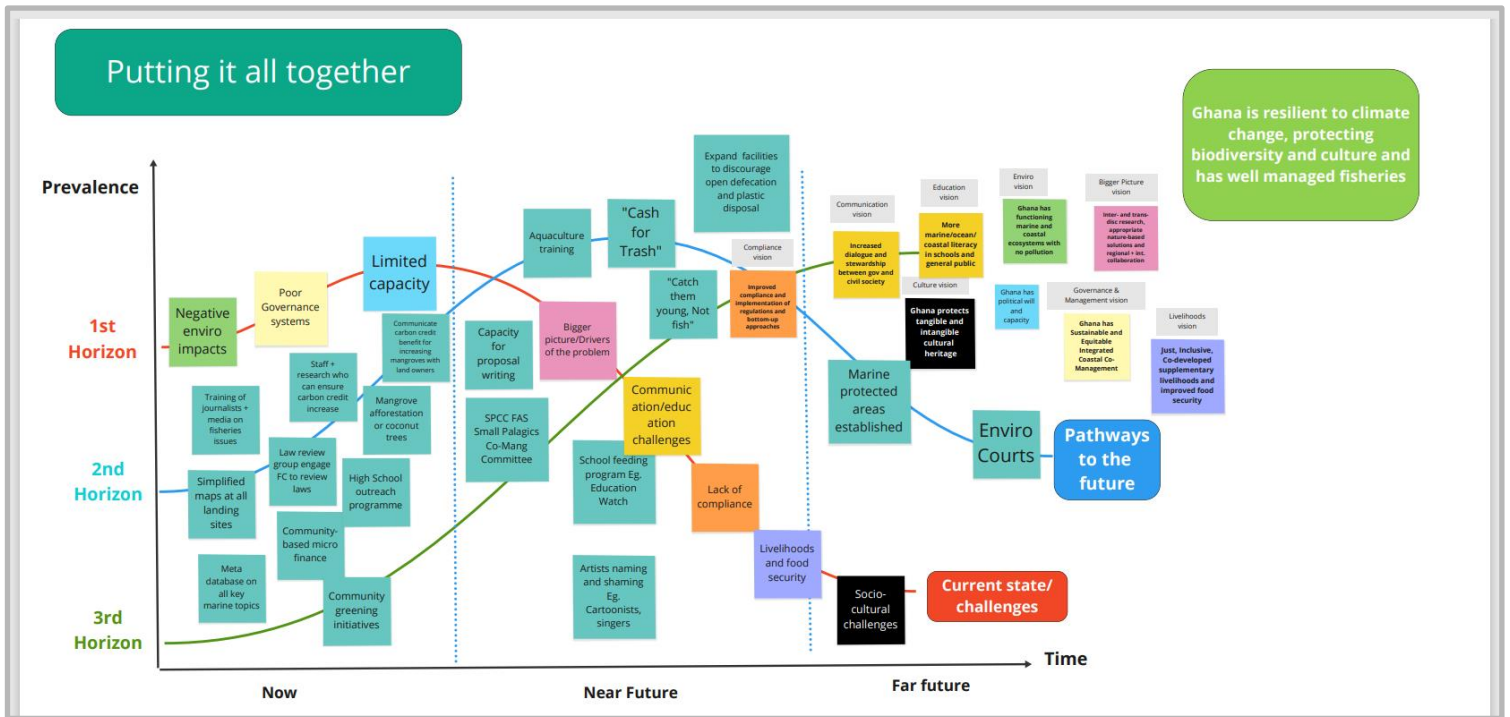
Figure 37: Combined current challenges (1st Horizon), future visions (3rd Horizon) and pathways or 'seeds' to get there (2nd Horizon) from the final workshop.

Session 2: Developing pathways to impact

Groups then presented one pathway to impact in plenary and garnered feedback from the broader group on these.

Figure 38: Example of the task: developing a pathway to impact from a 'seed'.

Figure 39: Group 1 pathway to impact from seed: mangrove afforestation.

Group 1

Seed /initiative

Mangrove afforestation program with national program to enhance carbon credit schemes at community level

purpose and reasoning for mangroves was to be a climate barrier, carbon seq., nursery grounds, and are (arguably) minimally impacted by plastic pollution while instead providing 'cleaning service', natural cleaning of areas

Your pathways to impact need to be climate smart, address pollution, have a biodiversity element and can scale

Remember the storyboards and different actors responsible for actions

30 mins

Aim (Why)?

Ghana's mangroves provide climate resilience and are a carbon sink, have high biodiversity and are productive fish nursery grounds, and are (arguably) minimally impacted by plastic pollution while instead providing a 'cleaning service'. The latter to an extent that this does not impact the sustainable regenerative activities of mangroves for fish stocks, which help reducing the risk of any depletions

How would co-management be linked to this? (SSF co-man committees- big sphere of influence)

Could cash for trash scheme be part of this? eg. Buy-back centres

Input/Spheres of influence (Who?)

*communities where mangroves are used for these projects
* Need to engage with community chiefs to get their support and buy-in
* Wildlife division of the forestry commission
* Hen Mpoano (have already started projects)
* Youth should be engaged to potentially benefit from these programmes
*local political elites and state actors at the community level
* Ministry of Science and Technology (have existing funding through World Bank)
* Environmental Protection Agency
* tourism sector / ministry of tourism
* Ghana wildlife society
* Institute of environment and sanitation
* Universities close to these mangrove projects
* existing resource users

Input: Site location/ geographical area (Where?)

Western Region (Amansuri wetland area)
Volta region (Keta area)
Central region
(Entire coastline, but be mindful of land that has been taken, for example in Keta - and where it will take a lot of resources for mangrove afforestation - therefore look at alternatives, such as coconut plants)

Our pathway is climate smart/or build climate resilience in these ways

Input: Identified research or resources (How?)

How well do mangroves grow in different areas?

How fast does biodiversity respond to mangrove restoration projects?

How do we consider land ownership?

Are other measures needed to prevent overharvest - for firewood for example?

Is health of fish/shellfish impacted by trapped microplastics, are there knock-on effects for food provisioning?

Research on the influence of mangrove afforestation programmes on customary rights

Resilience to climate change provided by mangroves
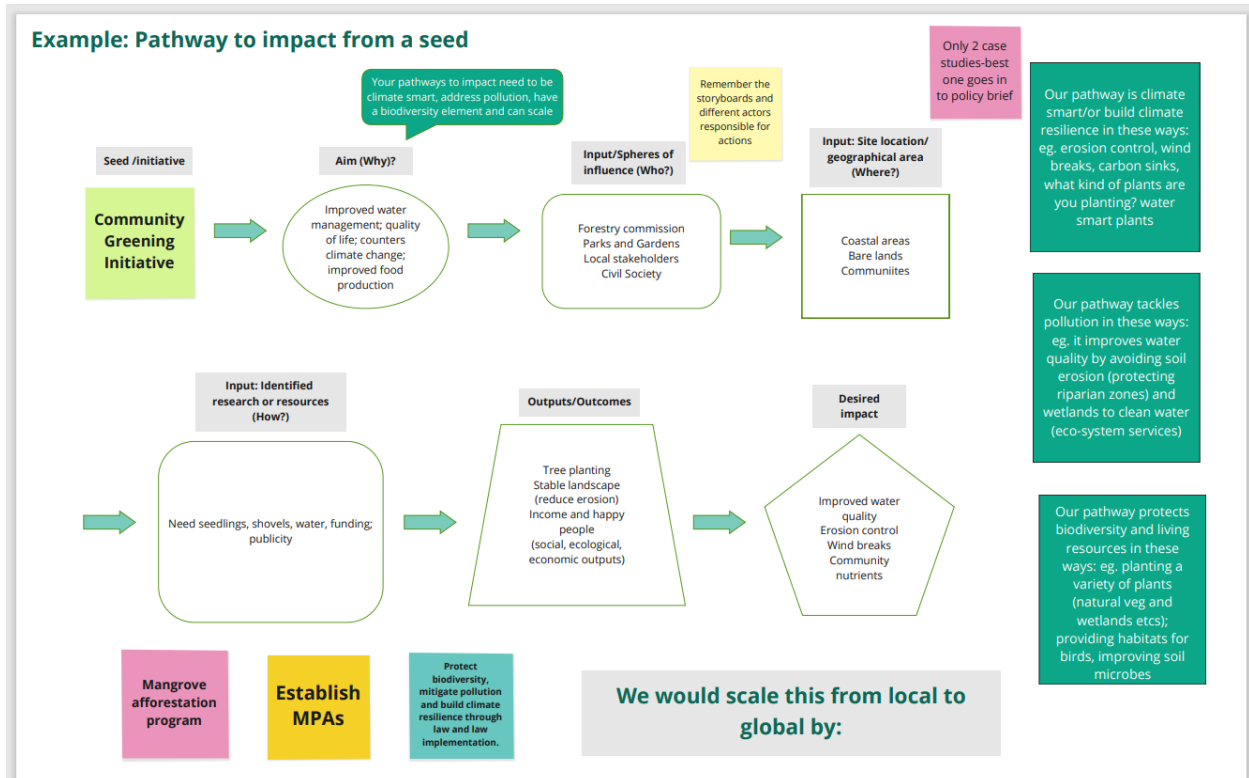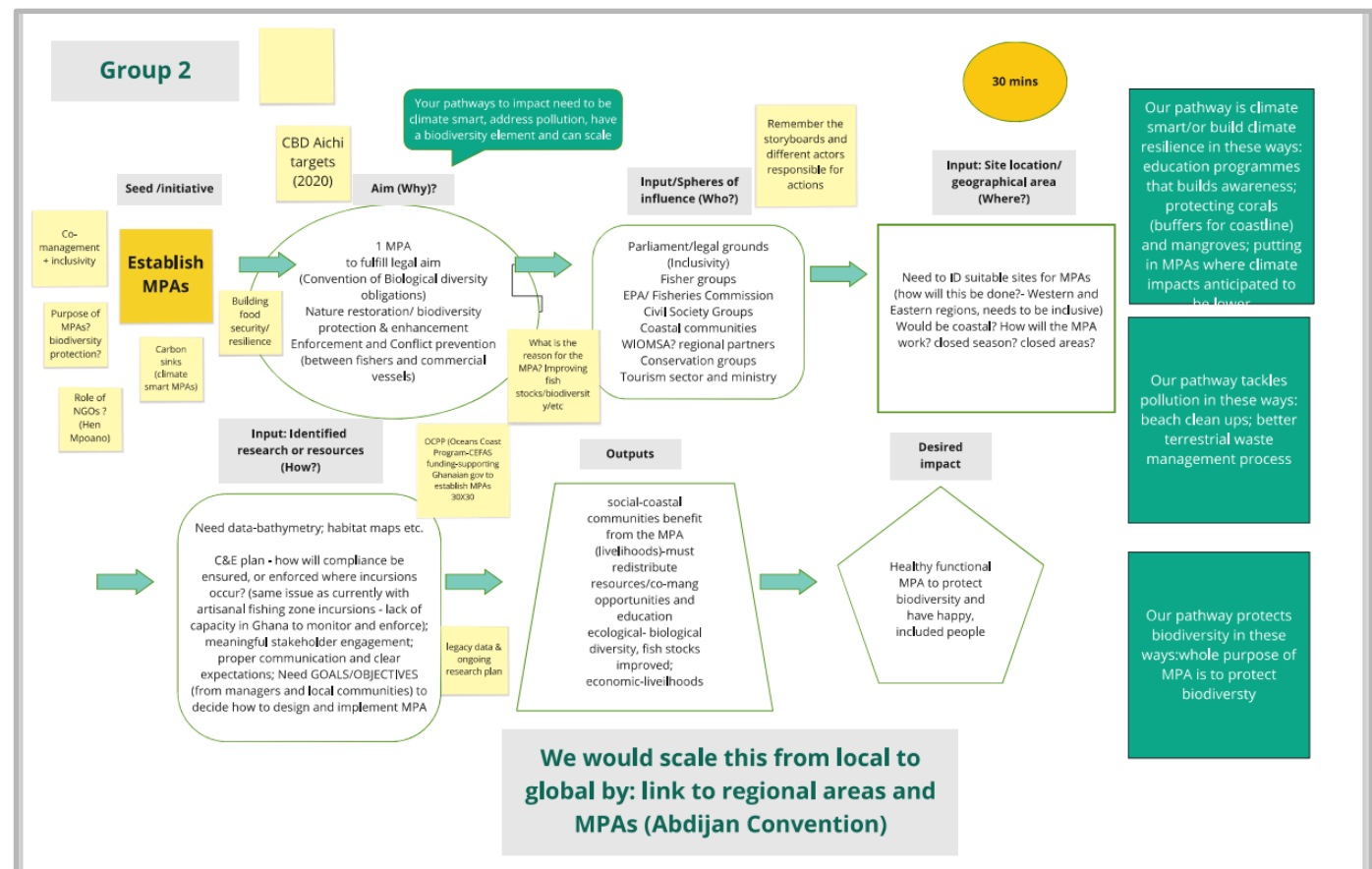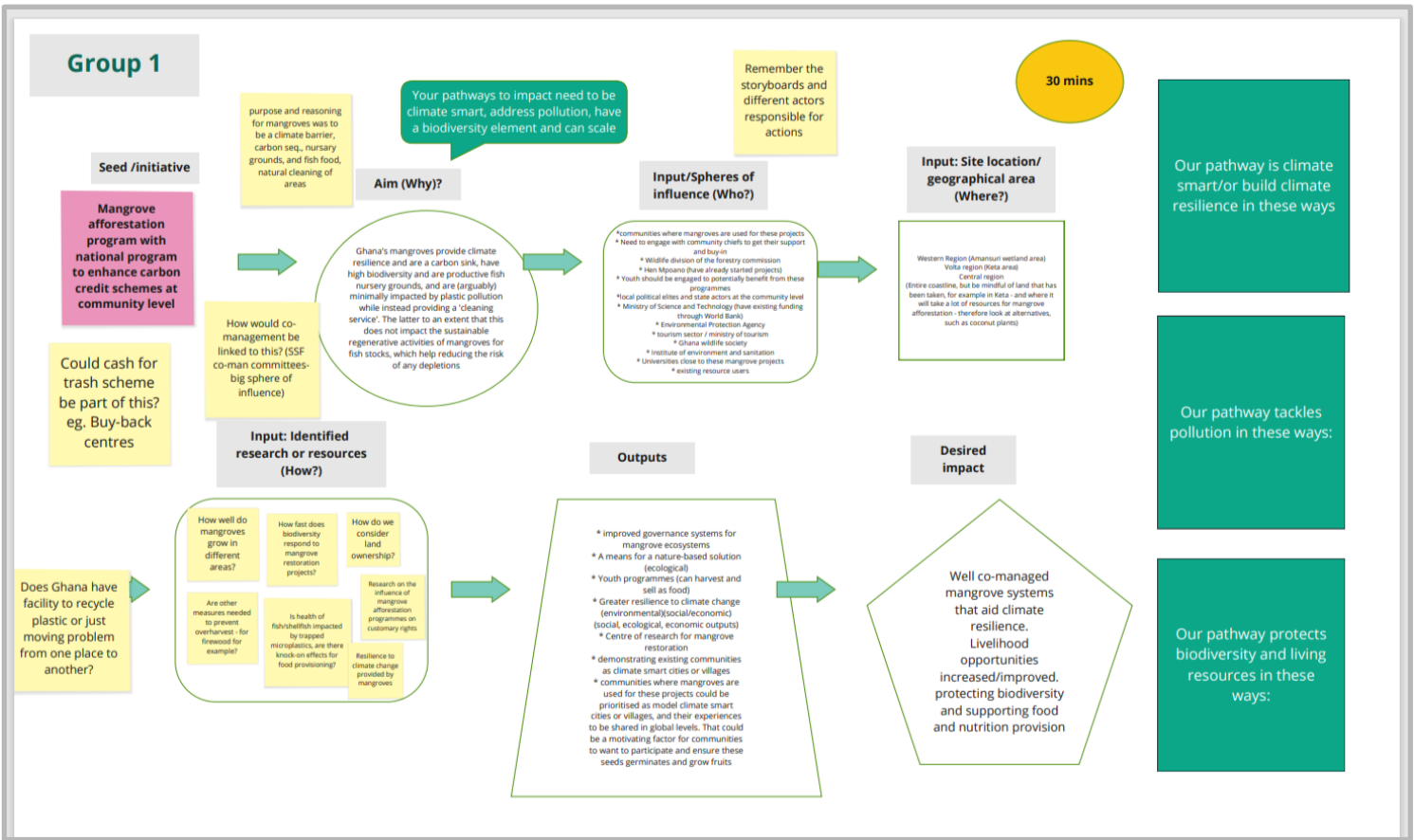
Does Ghana have facility to recycle plastic or just moving problem from one place to another?

Outputs

* improved governance systems for mangrove ecosystems
* A means for a nature-based solution (ecological)
* Youth programmes (can harvest and sell as food)
* Greater resilience to climate change (environmental)social/economic) (social, ecological, economic outputs)
* Centre of research for mangrove restoration
* demonstrating existing communities as climate smart cities or villages
* communities where mangroves are used for these projects could be prioritised as model climate smart cities or villages, and their experiences to be shared in global levels. That could be a motivating factor for communities to want to participate and ensure these seeds germinates and grow fruits

Desired impact

Well co-managed mangrove systems that aid climate resilience. Livelihood opportunities increased/improved. protecting biodiversity and supporting food and nutrition provision

Our pathway tackles pollution in these ways:

Our pathway protects biodiversity and living resources in these ways:

Group 2

Seed /initiative

CBD Aichi targets (2020)

Establish MPAs

Co-management + inclusivity

Purpose of MPAs? biodiversity protection?

Role of NGOs ? (Hen Mpoano)

Carbon sinks (climate smart MPAs)

Your pathways to impact need to be climate smart, address pollution, have a biodiversity element and can scale

Remember the storyboards and different actors responsible for actions

30 mins

Aim (Why)?

1 MPA
to fulfill legal aim
(Convention of Biological diversity obligations)
Nature restoration/ biodiversity protection & enhancement
Enforcement and Conflict prevention (between fishers and commercial vessels)

Building food security/ resilience

What is the reason for the MPA? Improving fish stocks/biodiversity/etc

Input/Spheres of influence (Who?)

Parliament/legal grounds (Inclusivity)
Fisher groups
EPA/ Fisheries Commission
Civil Society Groups
Coastal communities
WIOMSA? regional partners
Conservation groups
Tourism sector and ministry

Input: Site location/ geographical area (Where?)

Need to ID suitable sites for MPAs (how will this be done?- Western and Eastern regions, needs to be inclusive)
Would be coastal? How will the MPA work? closed season? closed areas?

Our pathway is climate smart/or build climate resilience in these ways: education programmes that builds awareness; protecting corals (buffers for coastline) and mangroves; putting in MPAs where climate impacts anticipated to be lower.

Input: Identified research or resources (How?)

OCPP (Oceans Coast Program-CEFAS funding-supporting Ghanaian gov to establish MPAs 30X30

Need data-bathymetry; habitat maps etc.

C&E plan - how will compliance be ensured, or enforced where incursions occur? (same issue as currently with artisanal fishing zone incursions - lack of capacity in Ghana to monitor and enforce); meaningful stakeholder engagement; proper communication and clear expectations; Need GOALS/OBJECTIVES (from managers and local communities) to decide how to design and implement MPA

legacy data & ongoing research plan

Outputs

social-coastal communities benefit from the MPA (livelihoods)-must redistribute resources/co-mang opportunities and education ecological- biological diversity, fish stocks improved; economic-livelihoods

Desired impact

Healthy functional MPA to protect biodiversity and have happy, included people

Our pathway tackles pollution in these ways: beach clean ups; better terrestrial waste management process

Our pathway protects biodiversity in these ways:whole purpose of MPA is to protect biodiversty

We would scale this from local to global by: link to regional areas and MPAs (Abdijan Convention)

Session 3: Developing a policy brief from Futures Work

Session 3 was facilitated by George Engelhard from CEFAS and engaged Ghanian colleagues around developing a policy brief out of this work, preliminarily called "*Visioning a Transformed Future for Ghana's Coast: Responding to Climate Vulnerability, Pollution and Resource Overuse*".

The idea is to develop a 6-page policy brief with the following headings:

- Page 1B Overall motivation

- Page 2A+B Storyboards

- Page 3 A Climate vulnerability Storyboard+ B Three Horizons Approach

- Page 4 A+B Case study 1 Mangrove afforestation

- Page 5 Case study 2 Establishing MPAs

- Page 6 Recommendations and refs

The idea of developing a policy brief was well received and will be taken forward by Nina Rivers to be published by the end of 2024. Link to PPP.

Session 4: Legacy work

Session 4 was facilitated by Hub co-director Philile Mbatha who briefly introduced how the legacy themes identified through previous integration work will inform future funding proposals and opportunities and how the pilot work will also form part of the components of the Future part of the Hub's UN Decade Transdisciplinary Toolkit.

Session 5: Feedback and closing

Session 5, facilitated by Nina Rivers, gave thanks to the participants for their time, enthusiasm and energy and explained how this current report as well as the forthcoming policy brief will be the two outputs of this pilot process.

Discussion

From the four month process emerged a holistic picture of the three horizons of Ghana's ocean and coast: present state/challenges, future vision and pathways to get there. A simple yet powerful overall vision statement was agreed on by the group: "Ghana is resilient to climate change, protecting biodiversity and culture and has well managed fisheries". Horizon 1 identified broader themes of negative environmental impacts, poor governance systems, limited capacity, drivers of the problem, lack of communication and

ocean literacy, lack of compliance, livelihood and food security challenges as well as lack of protection for socio-cultural dimensions of ocean governance. Horizon 3 identified broad visions that responded to the challenges identified through Horizon 1: environmental vision (Ghana has functioning marine and coastal ecosystems with no pollution), a governance and management vision (Ghana has sustainable and equitable integrated coastal co-management); a capacity vision (Ghana has political will and capacity), a drivers of the problem vision (inter- and transdisciplinary research, appropriate nature-based solutions and regional and international collaboration), a communication vision (increased dialogue and stewardship between government and civil society), an education vision (more marine/ocean/coastal literacy in schools and for the general public), a compliance vision (improved compliance and implementation of regulations and bottom-up approaches), a livelihoods vision (just, inclusive, co-developed supplementary livelihoods and improved food security) and a sociocultural vision (Ghana protects tangible and intangible cultural heritage).

Some of the seeds or current and past initiatives in Ghana identified in Horizon 2 included: "Cash for Trash" waste management schemes, aquaculture training for coastal communities, support for artists such as political cartoonists and singers to name and shame greed, corruption and maladaptive social-ecological practices, the establishment of environmental courts and customary law training, community greening projects to respond to climate vulnerability and supporting community based co-management of fisheries (see Table 1). These seeds have the potential to be incorporated into future research funding proposals in order to strengthen them and demonstrate the initiatives already 'in play' in the country.

Sharpe et al. (2016: 4) argue that "Epistemic knowledge alone cannot facilitate the kinds of change needed to address contemporary societal challenges, and other forms of practical knowledge are required". Achieving transformative change requires working in a transdisciplinary way, working with contemporary systems of knowledge production. The Three Horizons approach was a useful approach that allowed us to bridge different kinds of knowledges across different disciplines (e.g. social and biological sciences) as well as beyond academia and across sectors (e.g. fisheries, tourism, NGOs, civil society, conservation etc.). The approach also served various purposes, including (1) providing a clear structure for navigating complexity (the structure of Horizons 1, 2 and 3 provided a systematic way to make sense of Ghana's ocean governance system), (2) cultivating a sense of future awareness by recognizing present potential (identifying seeds enabled us to do this), (3) distinguishing between incremental and transformative changes (again, placing seeds in either 'now', 'near future' or 'far future' along the axis representing time, helped us distinguish between incremental and transformative change), (4) explicitly revealing power dynamics and renewal patterns (first, through focused discussions and the visioning board exercise we were able to identify how different actors (e.g. government, civil society, NGOs etc.) can most usefully influence change and secondly, the processes that support or resist change (eg. how a particular society is organised) can be identified and discussed, which can help participants think about how to manage the transitions and change those processes, (5) facilitating the exploration of transition management (developing pathways to impact and change helped us all understand how to catalyse and what is needed for transition and how to manage this) , and (6) establishing a framework for dialogue among individuals with differing mindsets (the tools we used such as interviews with practitioners, holding workshops with participants from various sectors and carrying out the 'seed sower' exercise were all powerful ways to hold dialogue with individuals with differing values, frames, goals and interests.

The pilot process also supported several of the Hub Code of Practice principles including Integration; "Rosetta Stone" approach to inter- and trans-disciplinarity; Inclusiveness; Trust; Complementarity; Multiple dimensions of fairness under the Hub and Transformation.

Integration

According to the principle of **integration** "Hub research…should focus on the interconnectedness of the ocean and…should make connections within science(s) to consider inter-related challenges to ocean health and governance, through inter- (as opposed to multi-) disciplinarity, and connections between different knowledge systems (transdisciplinarity: integrating "modern" science and traditional knowledge of indigenous peoples and local communities, as well as other knowledge systems)". By its very design, this pilot process brought not only multiple disciplines together (eg. ecologists, biologists, anthropologists, economists, geographers, lawyers etc) to collaborate on the three interrelated challenges of climate vulnerability, plastics pollution and resources overuse but we also worked closely with knowledge holders beyond academia which included traditional knowledge holders (eg. local fishers) as well as other knowledge holders from civil society and national and regional government. The Three Horizons approach also gave us a simple and easy to use framework to account for and makes sense of the complexity posed by climate vulnerability, plastics pollution and resources overuse in Ghana by mapping it on Horizon 1 and then thinking through what an alternative future could look like in response to each of the thematic challenges.

Inter and transdisciplinarity

According to the principle of **inter and transdisciplinarity and inclusiveness**, "the Hub will seek to support effective communication and mutual understanding across disciplines (and gradually across knowledge systems), without the need to translate one discipline into the terms of another discipline in order to avoid the risk of something being "lost in translation. Instead, the Hub will use different formats (eg, maps, modelling, art) at the same time, so that different researchers can interact with the format with which they feel more comfortable and their inputs can be reflected in other formats that other researchers prefer". Again, the easy-to-understand and use structure of the Three Horizons approach makes it highly accessible to diverse participants and multiple perspectives by providing a simple framework of working with complexity; helping develop an awareness of the future potential in the present by working with the concepts of 'present', 'near future' and the 'far future'; helping to distinguish between incremental and transformative change by working with 'seeds' for the future and as tiny leverage points to reach the broader future vision; and providing a framework for dialogue among and across actors with different mindsets. Working groups were already varied in their make-up but the 'seed-sower' activity in Workshop 3 for example, allowed for tangible and explicit cross-pollination of ideas as well as refining and validation of seed ideas. It was an important activity to ensure increased knowledge integration and co-design of ideas.

Inclusiveness and trust

In a similar vein, the Code of Practice principle of **inclusiveness** states that, "Hub research should support the inclusion of diverse vulnerable communities, women and youth (as immediate beneficiaries of the Hub), as well as other stakeholders (broader research community beyond the Hub, government departments, private sector, etc) in ocean research, governance, management and economy". Sharpe et al (2016:6) argue that the Three Horizons approach is more of a practice than a theory or concept "because it involves a facilitated process with a diverse group of stakeholders to map out how different patterns change over time". We did this throughout the pilot process, especially in Workshops and 3 where we invited various knowledge holders and representatives from different sectors and walks of life, including representatives from women fisher associations as well as the NGO, Hen Mpoano, who work with vulnerable coastal groups such as women and children. This principle also ties into the Hub's principle of **trust** that is built and protected through "a heightened concern for engaging respectfully with vulnerable communities, women and youth and supporting their leadership under the Hub".

The pilot process also fostered trust by looking for "solutions that build upon and foster cooperation rather than competition" by bringing different stakeholders together as well as researchers and having them dialogue and collaborate together.

Complementarity

The pilot process also fed into the Hub's principle of **complementarity** which argues that the Hub will "contribute to connect existing research projects through the creation of enabling mechanisms to share research across countries, regions and scales (multi-scale syntheses) as well as through new funding applications and legacy activities". The seeds identified in this process are already feeding into Ghana's legacy themes for future funding applications and the seeds also go beyond the academic realm as many of them speak to past, present and future initiatives taking place in the private, civil and government sectors.

Multiple dimensions of fairness under the Hub

The futures pilot process also supported the Hub's practice of **multiple dimensions of fairness**, where collective approaches to fairness included towards:

-vulnerable groups, as spoken to above and will aim to further engage with them into the future if possible regarding new research funding opportunities;

-each region and across regions, as we worked with researchers from Ghana, South Africa and the the UK as well as various regions within Ghana;

-each researcher, as we developed and designed each workshop for ultimate collaboration and for everyone to be able to engage and will aim to further engage with them into the future if possible regarding new research funding opportunities;

-partners, as we designed the pilot to engage with various sectoral partners from Ghana, both in-person and on-line and will aim to further engage with them into the future if possible regarding new research funding opportunities.

Transformation

The future visioning pilot also supported the Hub principles of **transformation** where Hub researchers engaged in research co-development, through creative thinking and debate. Examples of participants engaging in creative thinking in the pilot was brainstorming responses to current challenges in Workshop 2, Session 2 as well as vision boarding in Session 3 of the same workshop and imagining what actions different societal actors need to take towards the desired future vision (Horizon 3). The identifying of seeds for Horizon 2 in Workshop 3 was also an example of this, to name a few.

The pilot, by working with the three primary challenges of climate change, plastics pollution and resources overuse also allowed participants to 'proactively address[ing] the novel challenges of research "for development" as well as 'taking as a starting point the intractability of the challenges to ocean health and governance'. As mentioned in the methodology, we adopted and adapted some design-led thinking tools for the pilot. Richard Perez, director of the d-school Afrika, argues that "Design Thinking is rooted in the question, 'What ought to be?' It's forward-looking and, crucially, forward-moving and…it's now taking aim at society's thorniest challenges – from education and poverty to gender-based violence" (d-school Afrika, UCT). We designed the workshops so participants could 'constructively engag[ing] with disagreements ("conflict transformation")'. This was especially demonstrated in the in-person workshop in Keta, Ghana where participants from academia and beyond could engage with each other in healthy debates around the challenges and responses to the three overarching ocean governance challenges.

This pilot process also presented several challenges (Figure 40) and opportunities (Figure 41):

Challenges

- Time: Due to the online nature of most of the workshops, we always felt pressured for time in terms of keeping people's attention for 3-hour sessions whilst still trying to accomplish the objectives of each workshop

- Online nature of workshops: Due to connectivity issues this was sometimes a challenge and in-person workshops were preferred

- Getting people to participate: Perhaps due to the mostly online nature of the pilot, it was difficult to get people to participate and engage fully. In the one in person workshop in Keta, Ghana this was not a problem at all.

In 3 to 5 words, describe the most challenging aspects of this process for you
20 responses

location characteristics
unfamiliar   platform limitation
virtual setting   no disagreement
technical   trade-offs timing   thematic knowledge
rushed
time
in person best   people not talking   concentration
not used to
online   internet connectivity
common language
technical challenges

Figure 41: Results of a Mentimeter survey of the most challenging aspects of the pilot process.

Opportunities

- Collaboration: The process encouraged collaboration and participation with existing and new civil society and government partners

- Three Horizons framework is easy to understand and use by multiple different participants, both within and beyond academia

- Allows a flexible approach where other engaging activities (eg. seed- sower and storyboarding) could be built into the approach

- Using MIRO as a collaborative on-line tool, although challenging for some, was a new tool participants could use and enabled virtual collaboration

- Participants were exposed to various new concepts which indicates a cross pollination of different knowledge systems

Figure 42: Results of a Mentimeter survey of the most surprising things people learned from the pilot process.

Conclusion

This transdisciplinary pilot process of co-developing transformative future visions for Ghana's ocean, coast and coastal communities achieved several objectives. The first is that it provided a co-produced overall future vision for Ghana's ocean governance system that responded directly to current contextual challenges as well as a pathway to obtain that future through incremental changes by harnessing current and near and far future 'seeds'. The process further supported collaboration across geographies and institutions. The pilot process also supported several of the Hub Code of Practice principles including integration, the "Rosetta Stone" approach to inter- and trans-disciplinarity, inclusiveness, trust, complementarity, multiple dimensions of fairness under the Hub and transformation. The Three Horizons approach also provided scaffolding for us to bridge different kinds of knowledges across different disciplines as well as beyond academia and across sectors in order to coproduce a common vision and roadmap to get there. The seeds and pathways can also be further developed and incorporated to strengthen future funding proposals. We also found that the journey of integration built stronger networks and realised integrated outputs and writing teams - outside of these findings.

Recommendations

Integrating diverse knowledges to tackle complex and messy challenges can be tricky. From the pilot process using both the Three Horizon Futures approach and the SEEDS approach we recommend the following to support transformative and equitable ocean governance:

1. Use processes such as futures approaches to centre collective thinking around a common challenge
2. Include future positive aspects during the integration phases (such as the SEEDS). This builds hope and provides impetus that change is possible and can have the desired impact, towards future implementation.
3. Flexibility of the collective team is important.
4. Communication is important throughout to not only manage expectations, but also address potential conflicts, diversity of worldviews and contextual issues such as connectivity or use of and access to online tools.
5. The skill, flexibility and dedication needed from the facilitation team, cannot be overemphasised, particularly using online and in-person strategies and communicating 'other' ways of thinking by introducing different approaches and theoretical frameworks. Therefore it is highly recommended to have a skilled facilitation team.

References

Ansah, J. W., Oduro, G. Y., & Wilson, D. (2022). Narratives of Non-Compliance in "Tuesday Non-Fishing Day" in Ghana. In *The Palgrave Handbook of Blue Heritage* (pp. 357-382). Cham: Springer International Publishing.

Asiedu, B., Okpei, P., Nunoo, F. K. E. and Failler, P. A fishery in distress: An analysis of the small pelagic fishery of Ghana. (2021). Marine Policy, Volume 129: 104500: https://doi.org/10.1016/j.marpol.2021.104500.

Bell, J.B., Acheampong, E., Ansah, J.W., Assiam, B., Erinosho, B., Engelhard, G., Golo, H., Gray, C., Harrod, O., Koomson, A., Rivers, N., Sakyi-Djan, P., Searle, P., Snow, B., Sulley, I., Tsidi, W. and Nyarko, B.K. (2023). One Ocean Hub Ghana: Workshop Report October 2023. 35 pp.

Bennett, E. M., Solan, M., Biggs, R., McPhearson, T., Norström, A. V., Olsson, P., … Xu, J. (2016). Bright spots: Seeds of a good Anthropocene. Frontiers in Ecology and the Environment, 14(8), 441–448. https://doi. org/10.1002/fee.1309.

Boateng, J. K., Golo, H. K., Ibrahim, S. and Erinosho, B. T. (2024). Reconciling conflicts between cultural beliefs, and human rights standards in coastal communities of Ghana: preserving cultural rights and promoting sustainable fishing practices, Cogent Social Sciences, 10:1, 2340427, DOI: 10.1080/23311886.2024.2340427.

Cook, R. and Nyarko, B. K.and Aggrey-Fynn, J. and Acheampong, E. and Asiedu, G., Assessment of Demersal Fish Stocks in Ghanaian and Adjacent Waters (2021): https://ssrn.com/abstract=3964757 or http://dx.doi.org/10.2139/ssrn.3964757.

Gbogbo, F., Essandoh, A. A., Bafoe, W. T., Groos, H., Boateng, C. M., and Blankson, E. R. Plastic waste and fish landed by beach seine fishers in coastal Ghana. (2023). Environmental Science and Pollution Research (2023) 30:92371–92378. https://doi.org/10.1007/s11356-023-28897-9

Harrod, O.L., Bell, J., Townhill, B.L., Nyarko, B.K., Tsidi, W., Acheampong, E. & Engelhard, G.H. (2024) Ghanaian artisanal fisheries: Adapting to climate change. One Ocean Hub Report. https://doi.org/10.14465/2024.ooh00.pol

Hellweg, S., Benetto, E., Huijbregts, M.A., Verones, F. and Wood, R., (2023). Life-cycle assessment to guide solutions for the triple planetary crisis. Nature Reviews Earth & Environment, 4(7), pp.471-486.

Kläy, A., A. B. Zimmermann, and F. Schneider. (2015). Rethinking science for sustainable development: reflexive interaction for a paradigm transformation. Futures 65:72–85. http://dx.doi.org/10.1016/j.futures.2014.10.012

Kwadzo, M., Miyittah, M. K., Dovie, D. B.K., Kosivi, R. K. and Owusu, R. (2022). Pollution and climate change impacts on livelihood outcomes of lagoon fishermen in Central Region, Ghana. Current Research in Environmental Sustainability 4: 100137. https://doi.org/10.1016/j.crsust.2022.100137

Pereira LM, Davies KK, den Belder E, et al. Developing multiscale and integrative nature–people scenarios using the Nature Futures Framework. *People Nat*. 2020; 2: 1172–1195. https://doi.org/10.1002/pan3.10146.

Peterson, G. D., Harmáčková, Z. V., Meacham, M., Queiroz, C., JiménezAceituno, A., Kuiper, J. J., … Bennett, E. M. (2018). Welcoming different perspectives in IPBES: 'Nature's contributions to people' and 'Ecosystem services'. Ecology and Society, 23(1), art 39.

Sharpe, B. (2013). *Three horizons: patterning of hope*. Triarchy Press, Axminster, Devon, UK.

Sharpe, B., A. Hodgson, G. Leicester, A. Lyon, and I. Fazey. (2016). Three horizons: a pathways practice for transformation. Ecology and Society 21(2):47. http://dx.doi.org/10.5751/ES-08388-210247

Appendix A: Plastics, climate change and fisheries storyboards

Story boarding your future vision

Title of our vision: Reducing climate change risk to coastal communities in Ghana: flooding and sea level change

Paste your vision statement below

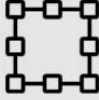|			
In Ghana where there is a challenge of (overall **challenge**) **climate change** when it comes to flooding and sea level rise	that impacts upon the environment by salt water intrusion... (**ecological impact**)	and impacts upon people by loss of homes, access to educational sites and burial sites (**social impact**)	and impacts on the economy by impacting market places and landing sites (**economic impact**)
and impacts on people's culture by... (**cultural impact**) loss of access to traditional homes/communities	**Policy makers** have decided/committed to... (**action**) implement nature-based solutions to reduce flood risk	**National government** has decided/committed to a comprehensive legal framework on tackling climate change impacts (including flooding and sea level rise) (**action**)	**Civil society** groups have decided/committed to support dialogue between communities and public authorities and community-led climate change policy and activities to reduce flooding risks (**action**)
Researchers have decided/committed to... (**action**) investigate what NbS are most needed & where	**Educators** and **communicators** have decided/committed to...(**action**) enhance learning of the risks and adaptations associated with flooding	**Local residents** have decided/committed to avoid settling in flood zones... (**action**)	**Local coastal managers** have decided/committed to (**action**) sponsor community-led NbS projects
And ...international partners and funders have decided/committed to... provide funding and support to NbS implementation	until finally **Ghana's coastline and marine environment** is conserved for future communities	where **people have/are happy** (image of ultimate vision)	and the **environment is healthy** (image of ultimate vision)

Our vision:

"Ghana envisions a future of resilience where effective climate change management and mitigation measures safeguard people and ecosystems, ensuring food security, coastal protection, adequate housing, education and preservation of cultural heritage"

Abundant fish and sustainable fisheries

Example: "Healthy ocean, happy communities"

				Our vision:
In Ghana where there is a challenge of (overall **challenge**) fisheries resource overuse	that impacts upon the environment by... (**ecological impact**) damage to biodiversity (fish stock collapse, marine food webs)	and impacts upon people by... (**social impact**) human rights by undermining food supply and livelihoods	and impacts on the economy by... (**economic impact**) loss of income, increased conflicts	**Ghana's marine resources and biodiversity are managed (exploitation?) sustainably, and provide employment, nutrition, and cultural benefits to coastal communities, with appropriate inclusion of stakeholders, into the long-term**
and impacts on people's culture by... (**cultural impact**) declines in inshore fishing and traditional practices	**National government and policy makers** have decided/committed to... (**action**) rebuild fish stocks to maximum sustainable yield	**Government agencies** has decided/committed to... (**action**) devise policies to balance fishing efforts to sustainable levels	**Civil society** groups have decided/committed to (**action**) help with alternative & supplementary livelihood strategies	
Researchers have decided/committed to... (**action**) support the policies through research and education, co-develop resources with educators	**Researchers, Educators and trainers** have decided/committed to...(**action**) improve understanding of effects of over-fishing and potential solutions	**Local residents** have decided/committed to... (**action**)	**Local coastal managers** have decided/committed to (**action**) Do these exist in Ghana?	
Inshore and offshore fishing industry have decided/committed to... (**action**) work together to implement sustainability policies	until finally **Ghana's coastline and marine environment** will look like this....(**image of ultimate vision**)	where **people have/are....** (image of ultimate vision)	and the **environment is** (image of ultimate vision)	

Credit HPI d-school Africa

Climate Change and Small-Scale Fisheries Governance: Insights from Costal Communities in Ketu South, Ghana

One Ocean Hub Future Scenarios Planning for Ghana Webinar

24 August 2023, 10:00 – 13hours

Sulley Ibrahim & Harrison Kwame Golo

Ecological challenges

- Geographically, coastal communities of Ketu South are sandwiched between the ocean (i.e., Gulf Guinea coast) and several lagoons

- Types of climate change threat includes periods of heavy rainfalls, which are typically accompanied by high sea level rise, flood and landslides

- These events leads to displacement of populations, households, while sometimes threaten individuals with deaths and physical injuries

- Floods also contaminate drinking water bodies, damage toilet facilities, which combine to occasion new forms of diseases and compound prevailing fragile sanitary and public health conditions of the communities

- There have been increased cases of stunted growth among children (evidence of nutrition deficiency), foot shores, diarrhea, cholera and malaria, all linked to threat of climate change events occurring in coastline communities in Ketu South
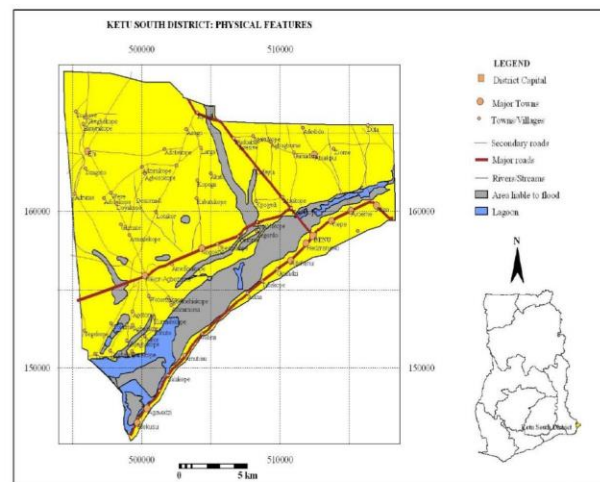
Geo-locational map of Ketu South

Socio-cultural challenges

- Annual floods wash away cultural artefacts, undermining lifestyles fishing communities

- Loss of culture literally implies loss of identity and self-worth as evidenced by persistent refusal of coastal communities to accept to be relocated and resettled among nearby in-lands communities.

- Relocation means relocation of ancestral homes, shrines, and thus abandonment of ancestral gods which represent their identity and become subservient to gods and spirituality items and authority systems of in-land communities.

- Relocation and resettlement also implies derivation of identity, loss of lifestyle, which in effect means cultural disempowerment

- **In effect, socio-cultural threat links with loss of socio-cultural rights**

Economic challenges

- Loss of livelihoods, such as fishing boats, gears, catch and market sheds to floors & landslides from sea level rise

- Loss of livelihoods means being visited with multiple deprivations, ensuing multi-dimensional poverty for households, individuals and communities

- Different vulnerabilities and poverty push able to people migrate which also means a denial of sufficient care to the elderly who would typically depend on younger generation for subsistence.

- Engaging in alternative forms of livelihoods, such as crop farming, animal husbandry appear to be viewed as alien since they have been culturally accustomed to fishing and fisheries economies

- Torrential rainfalls and accompanying floods tend to cause damages to already fragile houses, school buildings, leading to increased cases of school drop and poor access to education

- There are also damages to commercial properties, such as market shops and boat-making and mending platforms

- **The economic challenge, in effect, includes loss of economic rights**

Flooded shop in a market-place

Governance challenges

- Apparent state unwillingness to mount and complete sea defense wall, to at least protect communities again the 'wild' sea

- National governments often show preference for relocation and resettlement in nearby townships, but residents often show preference for the building of sea defense wall, to protect their communities and livelihoods against 'wildernesses' of sea-level rise and floods from torrential rainfalls

- Flood events are opportunistically appropriated by national politics, which then draws partisan political cleavages within national politics into the life-threatening cases of Ketu South predicament

- Partisan cleavages undermine efforts to mobilise national consensus on the issue of sea level rise, landslides and flood and this has contributed to the lack of comprehensive national response to the problem of climate change in the coastal communities of Keta South.

Member of Parliament (MP) of Ketu South, Abla Dzifa Gomashie has visited some flood-hit areas in the constituency.

Thank you

- Comments

- Questions

- Suggestions

- Reservations

Resource over-exploited

- Challenges:
  - ecological
  - socio-cultural
  - economic
  - governance

Ecological challenges

- Losses in productive coastal habitats eg. brackishwaters
- Disappearance of grey triggerfish in Ghanaian waters since 1987 (Aggrey-Fynn, 2007; Aggrey-Fynn, 2013)
  - Leading to triggerfish fishery collapse
- Fish stocks within the marine waters of Ghana are not exploited within biologically acceptable levels eg. Fig. B
- Target species for various fishing operations/gears has change with time eg. round sardines to anchovy
  - Shift in target species for various gears
- Protect marine habitats and biodiversity
  - marine spatial planning?
- Marine pollution
- Climate Change – increase in the depth for locating fish stocks (Fig. A)
- Mangrove forest degradation (threat to fisheries)

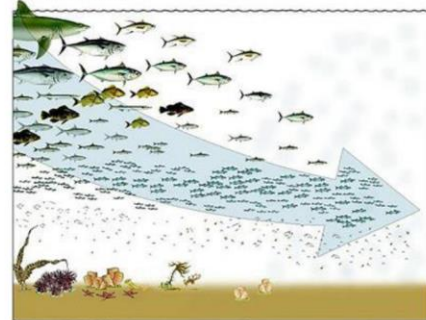Fig. A: increase in the depth of locating fish stocks

Fig. B: Unsustainable fisheries

Socio-cultural challenges

- Traditional believes fading away
- Mangroves are no more sacredly protected
- Fishermen fish on non-fishing days
- Closed season
  - eg. Ga festival

Economic challenges

- •

- Upstream illegal gold mining, threat to coastal resources/fisheries (implications on sustainable marine small-scale fisheries)
- Overcapacity in fishing effort
- Illegal Unreported Unregulated (IUU) fishing
  - destructive fishing methods

Coastal Plastic Pollution on the central coastline of Ghana; Main challenges

• Future Scenarios Planning for Ghana

• 24 August 2023

Philomena Aboagye-Danso

Presentation outline

1. Introduction
2. Study area
3. Ecological Challenges

4. Socio-cultural Challenges

5. Economic Challenges

6. Governance Challenges
7. Conclusion

Introduction

- Empirical study: central coastline of Ghana - ascertain the socioeconomic effects of coastal plastic pollution on fishermen.

- Instruments: field observation, questionnaire and interview.

Source : field survey, 2022

Study area: Study area: Bantoma –Anwona (Elmina), Ola (Cape Coast), Moree, Saltpond, Abrekum (Apam), and Akosua Village (Winneba).

Source : Geography Department, UCC

Ecological challenges
1. Environment :destruction of nesting grounds and habitat of marine life like turtle, seabirds, crab, etc. (Butterworth et al. 2012; Allsopp et al., 2016)

Source : field survey. 2022

2. Marine life: Seabirds, whales, fish and turtle mistake plastic waste for prey : starvation, ingestion, infections, entanglement, internal injury, etc. (Allsopp et al., 2016)

Laceration, entanglement and death (Gall & Thompson , 2015)

Socio-cultural challenges

1. Education

Source : field survey, 2022

2. Social identity, value and pride

Source : field survey, 2022

3. Aesthetic nature of beaches: Tourism and recreation

Source : field survey, 2022

4. Health : food security, mental health issues (psychological & emotional effects)

Source : field survey, 2022

Economic challenges

1. Reduction in income : the total weight of plastics mixed with fish catch for the six communities is 97kg which is equivalent to GH¢5820.00

2. Damage of fishing equipment (net & propeller)

3. Affects fishmongers

Source : field survey, 2022

4. Waste of time, human resources, fuel & energy

Source : field survey, 2022

Source : field survey, 2022

Governance challenges

- Effective leadership and implementation of laws
- Only one community (Bantoma-Anwona) has laws governing beach pollution

Source : field survey, 2022

Conclusion

- Fishers experience great impact of plastic pollution

- Consumers of sea food

- Effective leadership and implementation of laws

- It is a collaborative work, lets all help in our little ways to stop coastal plastic pollution
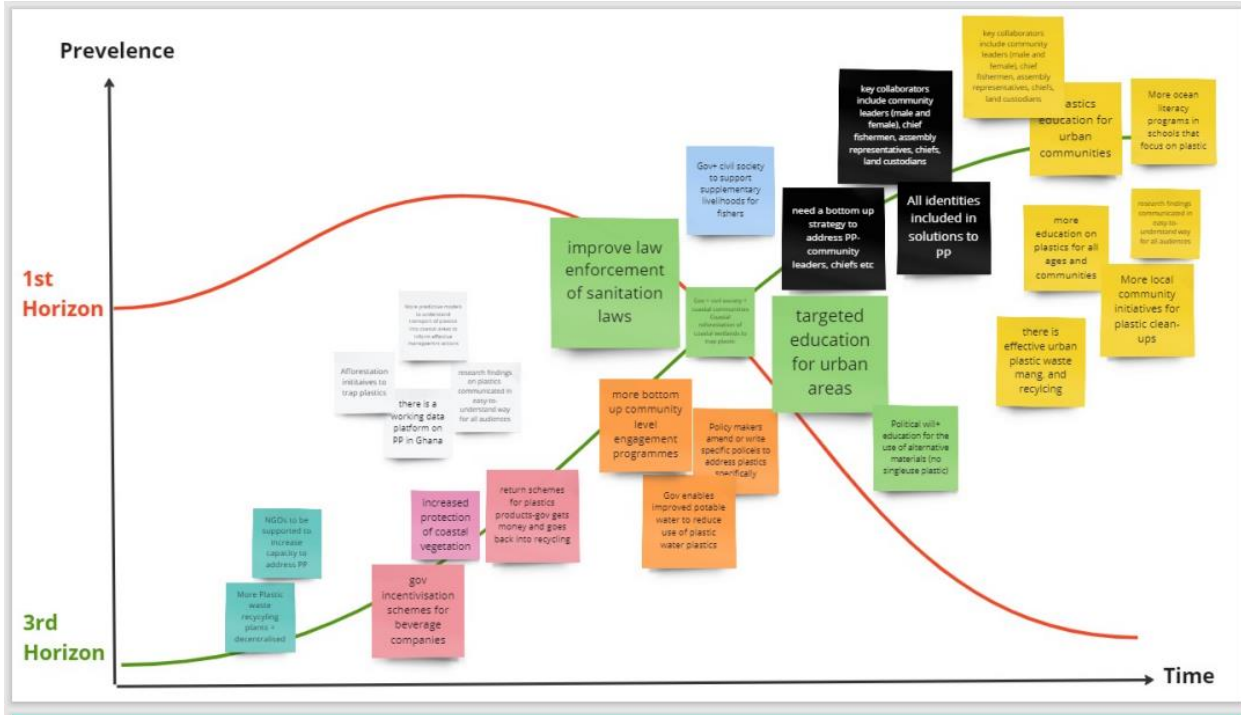
THANK YOU

Appendix E: Plastics Horizon 3

Appendix F: Resources overuse Horizon 3