Documentation of the (Virtual) Workshop on

"The Urgency of Climate Change and its Consideration as a Topic in IORA"

08 November, 2021

CONTENTS

1 INTRODUCTORY STATEMENTS

1.1 RCSTT Director Dr. Tahereh Miremadi

On behalf of the Regional Centre for Science and Technology Transfer (RCSTT), it is my pleasure and my honour to welcome you to the second workshop on “the Effects of Climate Changes on the Indian Ocean Marine Environment", titled “The Urgency of Climate Change and its Consideration as a Topic in IORA”.

Established in 2008, as the specialized agency on Science and technology, the IORA RCSTT is mandated to serve as the platform to connect IORA Member States and dialogue partners to enhance knowledge sharing and capacity building in the region.

Since its establishment, RSCTT has held more than forty events in person or virtually on different topics, including water and desalination, climate change, medicinal plants, medical technologies, COVID 19, etc., under the co-operation with different IORA Member States and Dialogue Partners.

The idea of holding a series of webinars on the impact of climate change was first, submitted in the Second Meeting of the WGBE, held on 12 April 2021, and was well noted.

On the 10 May 2021, the first phase of this series was covering “the Effects of Climate Changes on the Indian Ocean Marine Environment". This series consisted of an informational workshop and the key takeaway of the first workshop was that climate change is likely to have a greater impact on the Indian Ocean region than on other areas because of its geography, population density, large low-lying areas and many coastal cities. Impacts include sea-level rise, ocean acidification, changing meteorological patterns which result in increasing severity and frequency of extreme weather events, leading to freshwater concerns and resulting in human migration. That calls for building a collective and resolute determination for a regional policy response.

We live in a consequential moment. This moment is considered the world’s “last best hope” to avoid catastrophic **environmental destruction.** As we speak, more than 120 heads of state and government leaders are effectively participating at the **COP26,** in Glasgow, negotiating collective measures aimed at “maintaining the 1.5° Celsius” threshold level in global warming.

The world is deciding, Now, on who supports and who implements, and who will carry the burden. Who will fix the climate, who revive the oceans? What is the role of states, non-state actors, markets and people in the transition pathways to net Zero?

For decades, science has been sounding the alarm bell. But science by itself cannot solve wicked problems. Without States’ policy frameworks, markets mechanism and the most importantly, people on the scene, science cannot get it done

In the same vain, the RCSTT sought partnership with GIZ and the working group of blue economy (WGBE) and this workshop was co-created. The following are hopefully going to be delivered:

1) Some tangible recommendations on how IORA could or should deal with the topic of climate change in the future. These would be discussed and elaborated in a form that can be presented at the forthcoming IORA CSO and COM meetings in mid-November 2021.

2) A list of climate change-related topics which should be taken up by IORA in the future, including suggestions on how these topics should be addressed, discussed and documented for further consideration.

3) Recommendations for further elaboration of aspects/topics of climate change to be considered and reflected in the Work Plan of the IORA-WGBE.

The workshop will be conducted in three distinct parts, with a half hour break in between. These parts are structured as follows:

Part one will set the stage by presenting some scientific evidence at the regional level on the relevance and urgency of addressing the issue through collective action in the region.

Part two will then be conducted in two breakout rooms which allow for a more in-depth discussion:

The first breakout room will be reserved for members of the Working Group of Blue Economy (WGBE) and other official representatives from Member States. The aim is to develop some suggestions / recommendations to be tabled at the forthcoming CSO/COM meeting.

The second breakout room will be for the general public, i.e. academia, Government participants from other ministries and agencies, representatives of Dialogue Partners, NGOs, as well as from civil society. They will discuss the questions: "Which are the climate change topics to be addressed by IORA as a regional organization?" and "Through which ways can and should IORA address these topics?"

Then, Part three will allow for summary presentations of the results of these break-out group discussions in a plenary session and it concludes by Presentation and discussion of the results of two working groups and concluding remarks.

1.2 IORA-ASG Dr. Gatot Gunawan

Ladies and Gentlemen,

Frist of all, I wish you all a warm welcome to the (Virtual) Workshop on "The Urgency of Climate Change and its Consideration as a Topic in IORA", jointly organised by the IORA RCSTT and GIZ, in collaboration with the IORA Secretariat.

Climate change is a global issue that affect the whole world and can affect our health, ability to grow food, housing, safety and work. However, some countries are more vulnerable than others such as the Small Island Developing States. Climate change driven disturbances such as sea-level rise, increase in sea surface temperatures, more severe storms, flooding, droughts and so on, are threating the world's delicate ecosystems, include the marine ecosystems, for example through habitat destruction, as well as impact on people's livelihoods and communities. For example, in some countries, saltwater intrusion have advanced so much that the whole communities have had to relocate, and protracted. In addition, droughts are increasing the risk of famine. In the future, the number of "climate refugees" is expected to rise.

We all know that one single country cannot do much but instead we need the whole to reach and address this pressing matter given that the emissions that cause climate change come from every part of the world and affect everyone.

In IORA, further to the establishment of the Working Group on the Blue Economy (WGBE), the Committee of Senior Official (CSO) recommended that Climate Change and Marine Pollution

(in particular plastic pollution) be included in the Work Plan of the WGBE. At the First Meeting of the WGBE in 2019, Member States had a focused discussion on the modalities for implementation of the Work Plan of the WGBE and considered mechanisms to include the aspects related to climate change and marine pollution (in particular plastics) in the Work Plan as highlighted by the CSO. Member States recommended that the issue of climate change be also included in the priority on Disaster Risk Reduction.

In addition, the Secretariat, GIZ and the WGBE met on 4 March 2021 to align their work, find synergies and avoid duplication, as well as come up with some strategic focus on what IORA need to do in the field of climate change cooperation. It was agreed to have a high-level strategic workshop on the integration of climate change in IORA.

At the Second WGBE Meeting, RCSTT announced that it will host a series of online workshops/webinars, which will cover the topics on the effects of climate change on the physical, chemical, biological and meteorological properties of the Indian Ocean and adjacent seas. The first of the webinar series entitled “Webinar on The Effects of Climate Change on the Indian Ocean Marine Environment” was held on 10 May 2021 and addressed several topics related to climate change.

This webinar is the second of the workshop series that has been proposed by the RCSTT that will address the “The Urgency of Climate Change and its Consideration as a Topic in IORA”.

I am confident that today’s webinar will allow the participants to learn more about climate change and its impacts. I also hope that experts present here provide tangible recommendations on how IORA could or should deal with the topic of climate change in the future, as well as come up with a list of climate change-related topics which should be taken up by IORA in the future, including suggestions on how these topics should be addressed, discussed and documented. RCSTT could consider presented these

outcomes at the upcoming IORA CSO and COM and also recommend that these be reflected in the Work Plan of the WGBE.

I again wish to thank the IORA RCSTT and GIZ for organising this webinar.

Thank you.

2 KEY NOTE ADDRESSES AND PLENARY PRESENTATIONS

2.1 Scientific keynote address, by Prof. Bruce Glavovic (IPCC member)

(Powerpoint Presentation, attached as Annex)

2.2 Scientific evidence from within the region, by Prof. Mahmood Hossain, Bangladesh

(Powerpoint Presentation, attached as Annex)

2.3 Karuna Rana (SYAH/Mauritius) - The urgency for climate action from a youth and Indian Ocean SIDS perspective

I'd like to open this intervention with a quote:

> *"The biggest challenge we face is shifting human consciousness, not saving the planet. The planet doesn't need saving, we do." - Xiuhtezcatl Martinez*

We are living in a **climate emergency**. From higher incidences of respiratory and vector borne diseases in Bangladesh, to more frequent and intense fire seasons in Australia, climate change has been severely impacting member states across the IORA region, taking a toll on all facets of our economy. Most importantly, the arrival of COVID-19 has only exacerbated the impact that climate change has on our livelihoods, economy, food supply, and survival. That said, there are two groups in particular that face unique challenges and remain highly vulnerable to the impacts of climate change:

1. **Young people**; and
2. **Small Island Developing States (SIDS)**

On behalf of these groups, I thank IORA for the opportunity to make this intervention. The young people of the IORA member states collectively represent **more than 60 percent** of the region's human population. This being a significant number, the young people of this region have resolved to address climate change and other interconnected environmental issues to ensure a more sustainable, resilient, prosperous, and equitable world. However, young people, especially those from the small island developing states of the Indian Ocean, are not immune to the existential threat that climate change poses.

I'd like to highlight some of the key sources of vulnerability that young people face when it comes to climate change:

1. **Employment:** Young people, especially those facing structural disadvantages, suffer disproportionately in the labour market in the times of crisis and those impacts are exacerbated by climate change.
2. **Poverty:** By 2050, the global youth population is projected to increase by **62 percent** in the poorest and most vulnerable countries as indicated by the latest United Nation's (UN) world population estimates, putting in jeopardy the future of this growing demographic group. With many challenges already being experienced by young people migrating to cities in search of opportunities, this raises risks of escalating poverty and inequality.

3. **Education:** Extreme weather events have also shown to reduce participation, especially of females, in education since the burden of schooling costs becomes higher and the need for children and adolescents to contribute economically to households becomes greater.
4. **Health:** In addition to higher incidences of respiratory and vector borne diseases in many countries, climate change can increase malnutrition amongst young people through food shortages resulting from lower agricultural yields and higher dependency on imports. Additionally, climate change was seen to be contributing to anxiety and other mental health problems in young people as per a recent research (Hickman et al., 2021).
5. **Social well-being:** One of the principal adaptations to climate change is migration, therefore, many young people would leave the comforts of their homes in search of opportunities.

The fate of our generation and that of our offspring lies in our hands, and this is why we must all act now.

Despite efforts made towards combating the global climate crisis, significant gaps exist. Recent findings according to the sixth Intergovernmental Panel on Climate Change (IPCC) assessment report reveals that heatwaves, heavy rainfall, and droughts are more severe and frequent and the most vulnerable groups who have had the least contribution to climate change have suffered the most from its impacts. As we've also heard from previous speakers, the Indian Ocean will be warming at faster rates, thus, resulting in real harm to lives and livelihoods. The sixth IPCC assessment report further highlights the likelihood of temperatures exceeding 1.5°C above preindustrial levels as well as the findings of the United Nation's Framework Convention on Climate Change (UNFCCC) nationally determined contributions (NDC) synthesis report showing that the current ambitions of countries are not on track to meet the targets of the Paris Agreement. These trajectories hinder our ability to deliver a common sustainable and prosperous future for all, particularly young people.

In light of the above, here are the four key recommendations that I'd like to put forward:

1. **We should honour the rights of young people and future generations by prioritizing climate action within the IORA**. These climate change mitigation and adaptation strategies should be designed and implemented in partnership with communities most affected by it, young people. Human resources are one of SIDS key assets and as such, trusting and giving capacities to a risk-informed population is crucial to reduce the impacts of climate change. This should include financially and technically supporting youth-led climate action programs and organisations such as SYAH, including entrepreneurial activities in the green and blue economy sectors. It should also include an active inclusion of youth in decision-making.
2. **Bold policies are needed to limit the global temperature increase to 1.5$_{o}$C**. A good number of the world's top twenty greenhouse gas emitters are located in the Indian Ocean region; these countries will have to be a role model for other countries to follow suit and thus make tangible commitments to close the emissions gap. This would need to include steering away from any petroleum or coal investments in their countries, and getting rid of fossil fuel subsidies to instead divert efforts and funding to low-carbon, regenerative and climate positive development strategies.
3. **Climate change cannot be tackled in silos.** It also necessitates tangible action tackling the other two aspects of our triple planetary emergency: plastic pollution and biodiversity loss. This would have to include bold policies to eradicate the use of single-use plastic and replace it with truly sustainable, climate positive solutions. This should also include putting maritime economic activities within the framework of climate agreements. An example of this is the MV Wakashio oil spill incident that shocked my country Mauritius in 2020. MV Wakashio ran aground on the coral reef, broke apart, and leaked

4,000 tonnes of low-sulphur, poisonous bunker fuel right next to two of our most ecologically and culturally sensitive, internationally protected sites. This not only highlighted weakness of maritime security architecture in the Western Indian Ocean but also raised questions over ship fuel safety.

4. And finally, we need to redefine out relationship with nature, especially as large ocean states. Nature based solutions are key to tackling climate change and as such, **investments should be made both in the protection of our marine blue carbon ecosystems as well as in the development of ocean-based solutions that tackle climate change and its impacts.** I applaud the IORA Blue Carbon Think Tank initiative and request for young people, especially those from SIDS/large ocean states, to play a **formal role** in it.

IORA represents a very unique mix of member states and as such, should utilise their convening power to prioritise and design climate action strategies for the region and the world. **A failure to prioritize climate action would not only count as a missed opportunity, but would also fail to secure a safe future for our children.**

Thank you.

2.4 The relevance of addressing climate change in IORA – some thoughts from a Dialogue Partner´s point of view (by Dr. Thomas Krimmel, GIZ)

(Powerpoint Presentation, attached as Annex)

2.5 Prof. Anil Sooklal (IORA Past Chair): Climate change as a topic for IORA

Opening

Distinguished Guests, Ladies and Gentlemen,

On behalf of the Government of South Africa I would like to thank you for the opportunity to address the second webinar on Climate Change organised by the IORA Regional Centre for Science and Technology Transfer (RCSTT) with the valuable support from GIZ Germany.

Introduction

We are in the final preparations for the Glasgow Climate Change Conference of the Parties (COP26) scheduled for next month and thus hopeful that the commitments made by the international community to the 2015 Paris Agreement towards the ambitious climate action plan to adopt mitigation, financing and adaptation in order to limit global warming to below 2.0 degrees Celsius and preferably to 1.5 degrees Celsius levels will be achieved.

For too long IORA held the position that the issues of Climate Change is complicated and technical and being addressed appropriately by the United Nations Framework Convention on Climate Change (UNFCCC) and other relevant international fora. However, the time has now come for us to take responsibility and ownership to address this important issue within our own Indian Ocean. I would like to take this opportunity to urge the Indian Ocean Rim Association (IORA) Member States, as the custodians of the Indian Ocean region and considering the dire threat climate change has, especially on the future existence of our Least Developed Countries (LDC) and Small Island Developing States (SIDS) Member States, to urgently consider starting the process of developing and crafting IORA's own regional policy response to address the United Nations Secretary General's (UNSG) urgent call related to the realities of climate change.

Specific impact of Climate Change on the IORA Region

We as the inhabitants of the Indian Ocean Region should heed the call more earnestly as our ocean "*is warming at a higher rate than other oceans around the world*" according to the Inter-governmental Panel on Climate Change (IPCC). It is in our region where almost two billion people will be directly and indirectly adversely affected by the devastating effects of climate change particularly, as mentioned above, the developing and Small Island Developing States (SIDS) within our Association in spite of their minimum contribution to the current climate change crisis and as the least responsible for carbon emissions. It should be with a sense of urgency that whilst we delay in agreeing towards a particular way forward, the matter poses an existential challenge for SIDS and LDCs on the African Continent that are part of the IORA family.

It is precisely because of these abovementioned calamities and the unfair and unjust manner in which our current world seems to operate by, that we need to mitigate the impact of climate change which are clearly visible to all of us today.

The rising of the sea levels, the warming and acidification of oceans, the melting of glaciers and the subsequent extreme weather patterns are all alarm bells for a climate crisis which is right at our doorstep. The immediate impact of the emergent climate crisis will be on food and water security. "*With more than 800 million people around the Indian Ocean Rim relying on fish as a major source of protein, overfishing and environmental degradation of fisheries nurseries and reefs has the potential to impact significantly on regional food security*", according to our own 2014 Climate Change Adaptation Officials Report.

Projected increases in ocean temperature and sea levels, associated with climate change, could contribute further to the degradation of fisheries through coastal erosion and deterioration of seagrass beds, coral reefs and mangroves, the report reads. Furthermore, according to a Down-to-Earth publication, the Western Indian Ocean and the Gulf of Oman features amongst the worst-hit areas with coral reef degradations of which can affect $36 billion worth of coral reef tourism including goods and services provided by coral reefs.

It should be noted that the degradation of coral reefs and the lack of protection of shorelines from waves and storms has causal effects. In this regard, the frequent and severe storms, floods and waves previously buffered by coral reef structures have left shorelines open and exposed to devastating chain-reaction effects towards human settlements and infrastructure security which in turn affects water, crop and food security to name a few. Precipitation extremes linked to the monsoons are highly likely not only in Africa, but also in East Asia, South Asia and Australia. Monsoon rainfalls are projected to become more intense in the future and presenting an increase in risk of extreme rain and the devastating after-effects of flooding and landslides which could lead to loss of human lives, crops and livestock and will present damage to buildings and infrastructure.

Therefore, it should be at this juncture, that we become united and resolute in crafting a regional policy response responsible for addressing the regional injustice meted-out on our own developing and SIDS of IORA.

Specific impact of Climate Change on Africa and key climate change challenges

Africa is the most vulnerable region to the impacts of climate change, particularly sub-Saharan Africa which is warming at a faster rate than elsewhere in the world. The driver of this trend is the collective effect of global emissions and consequently the Continent bears a disproportionate share of the adaptation burden, both because of the uneven global distribution of climate impacts and because of skewed historical responsibility for Greenhouse gas (GHG) emissions. In our interconnected global village whereby events in distant parts of the world have direct ramifications to other parts of the world, should we not have an accelerated sense of urgency to develop our own regional response to climate change?

Who can forget the destructive Tropical Cyclone Eloise earlier this year whose devastating flooding left many dead, effected severe damages to thousands of homes, infrastructure and further

displacement of more than 8,000 people in the Sofala Province in Mozambique? The after effects of the storm and flooding were even felt further down-south in Zimbabwe and South Africa. The devastation brought about by the cyclone to developing countries of the Global South and of the African Continent in particular was unpleasant and regretful as we can ill-afford any damages to farmlands and to the destruction of existing infrastructure as these exacerbates Africa's pressing sustainable and developmental needs and challenges such as water and food scarcity.

Therefore, it is within our own backyards that we must begin to mitigate the so-called human-induced climate change crisis and display an Ubuntu-induced climate change solution which will not only assist the most risk averse members of the IORA, but also secure our own survival and fortification in addition to that of the world at large.

In this regard, the wisdom of the founding father of IORA, former South African President Nelson Mandela, never rang more true today than when he stated that, "*We cannot afford to wait for others to stand up for our environment – as nobody stands to lose more than we do*". Consequently, the Association's declaration of IORA becoming a "*zone of peace*" would be futile if we are unable to mitigate climate change and its subsequent socio-economic impacts to highly vulnerable communities of the IORA family who know too well the frequency and intensity of weather-related hazards in addition to the aftermaths of those aforementioned extreme weather patterns.

South Africa's position on Climate Change and commitments made with respect to the Paris Agreement

With almost all Members States of IORA being signatories to the Paris Agreement and as an originator of the aforesaid agreement through the Durban Platform for Enhanced Action, South Africa is fully committed to a collective, multilateral approach to addressing the global challenge of climate change, with the UNFCCC at its centre. As a result, as climate change action takes place in the context of Sustainable Development, South Africa has for its part submitted its updated Nationally Determined Contribution (NDC) on 27 September 2021 ahead of COP26 and look forward to a successful outcome. South Africa has therefore recently undertaken a number of national measures to enhance our climate response. One such initiative is the Presidential Climate Commission to Plan the Just Transition and adopting the National Climate Change Adaptation Strategy (NCCAS) and Low-Emission Development Strategy (SALEDS)

Our poor record, as one of the top Greenhouse gases (GHGs) emitters amongst our IORA peers, has prompted us to undertake major mitigation commitments. In this regard, South Africa's has committed to greater reductions in greenhouse gas emissions from a target range of 398-614 Metric tons of carbon dioxide equivalent (Mt CO2-eq) in the period 2021-2025 and a range of 350-420 Mt CO2-eq in the period of 2026-2030. Furthermore, the top of the range of South Africa's revised NDC is consistent with the Paris Agreement's temperature limit of "*well below 2 degrees Celsius*", and the bottom of the range which is consistent with the Paris Agreement's 1.5 degree Celsius temperature limit. We have also endeavoured to bring forward the year in which emissions are due to decline from 2035, as indicated in the initial NDC to the year 2025 in the updated NDC.

However, in meeting these targets, South Africa will need to implement a range of policies and measures, including a very ambitious power sector investment plan as set out in our 2019 Integrated Resource Plan, the Green Transport Strategy, enhanced energy efficiency programmes, and the recently-implemented carbon tax. In light of our national circumstances of high levels of unemployment, poverty and inequality, we will need a completed Paris Agreement Work Programme to assist Parties to fully implement the Paris Agreement, under the Convention and in accordance with the UNFCCC´s guiding principles, including equity and common but differentiated responsibilities and respective capabilities (CBDR&RC). In addition, the programme should also include enhanced ambition covering the three pillars of the Paris Agreement, namely: mitigation, adaptation and means of implementation support to developing countries.

Similar to the other developing countries of IORA, South Africa will require substantial multilateral support in order to transition to a low carbon economy and climate resilient society as provided for in the Paris Agreement. This Just Transition will ensure that no-one is left behind and is squarely located at the core of implementing climate action in South Africa. The same Just Transition should apply across the board to all developing countries of the world and that of our Association particularly.

Therefore, it is important that developed countries show leadership and come forward with massively enhanced support to developing countries, particularly at this time when sustainable development has been set back decades by the COVID-19 pandemic.

In light of the above, however, we have not been idle and three distinct meetings addressing climate change challenges in the Indian Ocean region with particular outcomes have been hosted thus far as follows;

i) Meeting of IORA Adaptation Officials held in Chennai, 1 – 3 April 2014,

ii) Workshop on Cross-Indian Ocean Region climate risk management held in Colombo, 25 – 26 September 2014

iii) Webinar on the Effects of Climate Change on the Indian Ocean Marine Environment held virtually on 10 May 2021

Consequently, we need to look at the outcomes of the abovementioned meetings and implement the recommendations contained therein as they have been compiled by our foremost scientists and experts on the climate change topic as it pertains to the Indian Ocean region specifically. Deliberations have already been presented to us on the origins, impacts, and mitigation strategies to lessen the frequency and intensity of possible penalties to be meted-out on us by climate change after-effects in the form of droughts, storms, heat waves, floods to name just a few.

Practical Steps and Programmes that IORA could adopt

Fortunately, as IORA we have a largesse of knowledge and expertise and need to only look to our past to come up with solutions for the future. Recommendations to observe the devastation wrought by climate change and to decisively act accordingly are to be found in our adaption measures of the Disaster Risk Management priority area which include: i) Disaster Risk Assessment, Protection of the Environment, ii) Development of Early Warning Systems and; iii) Sustainable and Safe Building of Settlements.

These measures implemented together with Nationally Determined Contributions (NDCs) of each IORA Member State would be able to increase resilience of communities which fell victim to climate change induced disasters. Therefore, the recommendations made to IORA to focus on measures and actions which could assist in analysing and managing disasters can be configured to focus solely on climate change induced disasters. Existing IORA Disaster Risk Reduction measures and actions utilised accordingly by our experts would be able to improve preparedness for adverse climate change induced events as well as reduce vulnerability of peoples and assets of our region.

Yes, the situation might look dire and urgently call for action, however, I believe that with the required political will, existing scientific knowledge and tools at our disposal and our refusal to become complacent in the face of our possible demise, we can take the necessary steps to reverse the setbacks and own goals we have scored against ourselves and emerge as victors as we secure better prospects for future generations.

Conclusion

IORA has brought together key developing countries of the Global South and developed partners with a presence in the Southern Hemisphere. We, as IORA have a proud reputation for technical cooperation and expertise on marine science issues. In this regard, IORA has a role to play to further contributing to the development of science, including marine climate science, and studying

the impact of climate change on coastal communities and ecosystems. The work of IORA will feed well into the UNFCCC, including in the context of the UNFCCC Global Stocktake.

In closing, I would like to again extend our appreciation to the RCSTT for arranging this event and in particular I would like to thank GIZ for making available the required resources. Germany is regarded as a leading country in the struggle against climate change and we have no doubt that we can learn a lot from their expertise and know-how in this field. South Africa, supported by the RCSTT and GIZ, is also planning to host a Climate Change event in 2022 where we have as the objective to lay the foundation for a joint IORA Climate Change strategy with the support of our Dialogue Partners. More details regarding this event will become available in due course

3 DOCUMENTATION OF THE DISCUSSIONS IN THE BREAK-OUT SESSIONS

3.1 Deliberations of Working Group A

VISION: ***Developing a sustainable Blue Economy as a key source of inclusive economic growth, job creation and education***

DELIVERABLES		
Short-term	**Medium-term**	**Long-term**
Developing and harnessing opportunities of the oceans for socio-economic development, whilst safeguarding the ocean's health and ensuring sustainable development and management of its resources.	Appropriate policy frameworks, effective leadership and innovative technologies to generate blue growth and to manage risks to the marine ecosystem and associated biodiversity.	Creating an enabling environment for private investments and sustainable financing for Blue Economy initiatives in order to secure sustainable, economic and inclusive growth.
Promote capacity building and research in resource mapping and sustainable utilisation/management of marine resources .		

WORKING GROUP ON THE BLUE ECONOMY

Priority Areas of IORA	Pillars of the Working Group on the Blue Economy	OBJECTIVES
• Maritime Safety and Security. • Trade and Investment Facilitation. • Fisheries Management. • Disaster Risk Management. • Academic, Science and Technology Cooperation. • Tourism and Cultural Exchanges. • Women's Economic Empowerment. • Blue Economy.	• Fisheries and Aquaculture. • Renewable Ocean Energy. • Seaports and Shipping. • Seabed Exploration and Minerals. • Marine Biotechnology, Research and Development. • Tourism (in particular Coastal and Marine Tourism). • Climate Change. • Marine Pollution.	• To implement resource mapping on renewable ocean energy technologies. • • To promote research and development of low carbon technologies. • To promote International collaboration and technology transfer on renewable ocean energy. • To provide potable water to coastal areas and remote islands using Low Temperature Thermal Desalination (LTTD). • • To standardise Blue Carbon assessment methods in the Indian Ocean. • To strengthen collaborative research opportunities, data gathering and sharing in the IORA region. • To address marine pollution issues in IORA Region.

Discussion:

1. How should the topic of Climate Change be addressed by IORA?

- Sharing experiences and Lessons learnt from Member States (Adaptation and Mitigation) for integration of Climate Change at a macro level within IORA.
- Utilisation of the Academic Group – with Indian Ocean focus – Academic Conference : How we integrate Climate Change in the work of IORA.
- Inclusion and utilisation of the experiences / programmes of Dialogue Partners.

2. **How should the topic of Climate Change be addressed by the Working Group of Blue Economy (WGBE) in the future?**

   - Expand on marine pollution in the ocean with dialogue partners who expressed an interest and cater for interlinkages with IORA Working groups - Ensure that there is a formalised structure to deal with joint sessions around cross cutting topics.
   - Recommend that the Fisheries Support Unit to undertake the necessary background research that will support the inclusion of climate change aspects, especially for fisheries management and aquaculture.

3.2 Deliberations of Working Group B

At the beginning of the Session, Maliha Masfiqua Malek gave a brief overview over the main research findings of the International Centre for Climate Change and Development in Dhaka, Bangladesh. She focused on the following aspects which deserve regional consideration:

- The use of “blue bonds” for financing climate action, such as through reforestation; and
- The importance of SLR monitoring through tidal gauges and by creating a platform to share knowledge on SLR to build resilience to CC.

A second input was then presented by Prof. Erika Techera from Australia. She focussed on the opportunities for IORA to contribute to regional leadership to address climate change through regional agreements, action plans and model laws. She advised that IORA should

- Make more use of the existing Blue carbon hub in IORA, including for the introduction of Nature Based Solution for the Coastal Risk Reduction.
- Learn from the Pacific for defining a climate action plan for the region.
- Progress with building of capacities to address regional targets and goals.
- Take a leading role in providing guidance, or model laws, for climate change legislation and a regulatory framework.
- Fill gaps by identifying key areas where common action is needed.

Thereafter, there was an open discussion, covering the question: Which are the climate change topics to be addressed by IORA as a regional organization? The topics mentioned included the following:

  - Rising sea water levels
  - Salt water intrusions
  - Early warning systems
  - Flooding and storm surges
  - Food security
  - (Off-shore) aquaculture
  - (Off-shore) renewable energies
  - Low carbon transport alternatives (for land, sea, and air transport)
  - Protection of coral reefs

- Ocean Acidification.

The second question dealt with concrete ideas for climate action at national level of IORA Member States and opportunities at regional level which could be taken up by IORA. The ideas generated here were:

- A **Regional Action Plan** or Adaptation Program should be developed - similar to the Pacific region (https://www.sprep.org/pacc).
- This should be based on a **Mapping** of what is already happening, with sharing of knowledge and expertise on success stories, eg on blue carbon, or mitigation, but should also highlight factors which have made measures and systems to fail in different countries.
- Introduce an **inclusive think tank** which will also be taking on board young people. The focus should not only be on adaptation, but also on mitigation measures. With this, for instance, IORA could help member states to design mitigation policies that aren't extractive or petroleum/coal intensive but rather adopt low carbon technologies.
- Support the work of **youth-led organizations and talented young entrepreneurs** around green and blue economies to support creativity in the region through a dedicated program.
- Provide **training of civil society** representatives for UN CC negotiations, esp. young people.
- **Raise awareness of communities**, and provide education on CC topics, e.g. for avoiding plastic waste and to stop cutting down the trees for charcoal, but rather plant trees instead. This was done in Zanzibar and could serve as an example.
- Take up the issue of **Ocean Acidification** through capacity building, awareness creation and knowledge building on restoration measures with a roll-out to measure PH levels systematically in the whole region. In this respect, Mauritius is working on the IOC-UNESCO-WIOMSA Project in Western Indian Ocean and East Africa and presented a policy paper at the Nairobi Convention, under the Global Acidification Network.
- Promote technologies around the **Internet of Things (IOT)** related to climate change, e.g. on how to react to different climate-change driven disasters, by actively involving women in these topics.
- Many countries in the IO region are highly dependent on tourism, in particular the SIDS. But the GHG emissions for flights and cruise ships are so far not considered in their emission budgets and NDCs. These have to be taken into consideration when working on sustainable tourism. These emissions could be compensated through **carbon contributions of incoming passengers** to be used for **local carbon sequestration projects**, such as mangrove afforestation, or other blue carbon projects. This is also an opportunity how the IORA blue carbon hub could be used.
- As a principle, it is important that the **leadership** of member states is transparently involved in IORA proceedings.

4 PRESENTATION OF WORKING GROUP RESULTS AND CLOSING

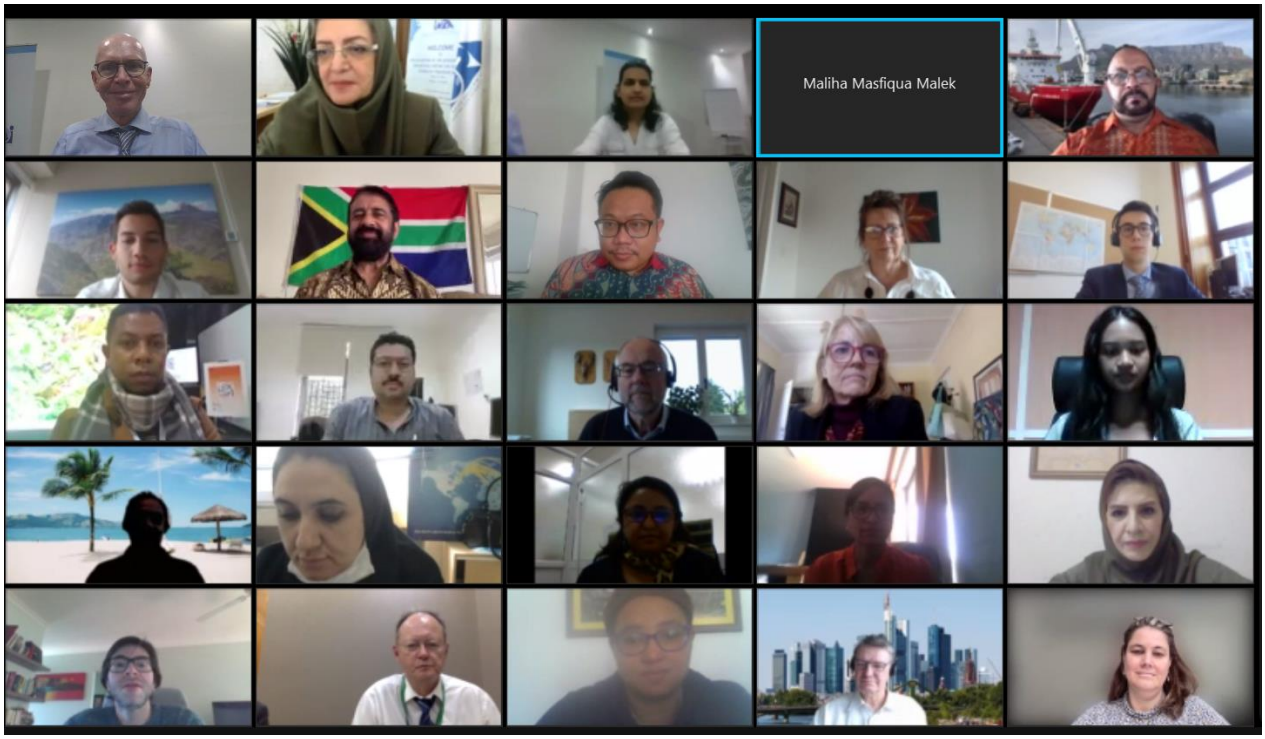
In this last plenary session, the results of the discussions in the two break-out working groups as documented above were summarised and presented to the audience. This lead into the closing session of the workshop.

In his concluding remarks, Prof. Anil Sooklal stressed the importance of climate change which, as a topic and way forward, should become an integral part for all of the proceedings of IORA. For this, it should be recognized as a cross cutting issue. The many good recommendations made in the two break-out groups should be implemented as soon as possible. For this, these recommendations have to be screened and translated into short, medium, and long term programmes, and into a workable plan of action. He promised to take these recommendations forward to the forthcoming CSO and COM meetings, through the Secretariat.

Dr. Miremadi then closed the session, by pointing out that RCSTT will organize a follow-up workshop in the first quarter of next year, within the ongoing workshop series on climate change.

ANNEXES

A. IORA Family Photo

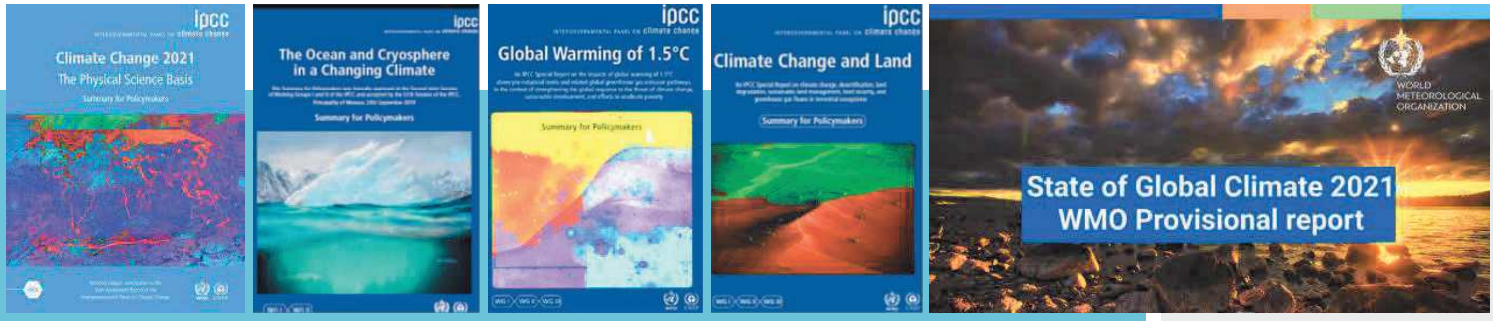


B. Powerpoint Presentations

a. **Scientific keynote address (by Prof. Bruce Glavovic)**

b. **Scientific evidence from within the region (by Prof. Mahmood Hossain)**

c. **The relevance of addressing climate change in IORA (by Dr. Th. Krimmel)**



Climate-change related disasters as a threat to peace, stability, and prosperity in the Indian Ocean region

Bruce C. Glavovic

Scientific Keynote Address

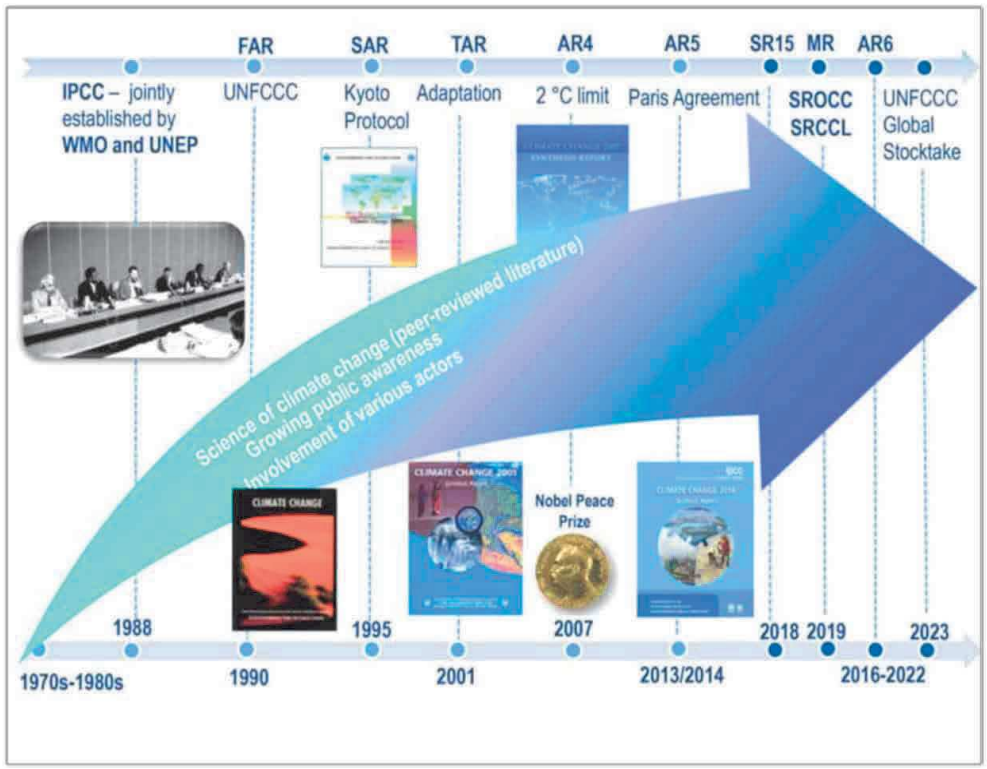
Workshop: "The Urgency of Climate Change and its Consideration as a Topic in IORA"

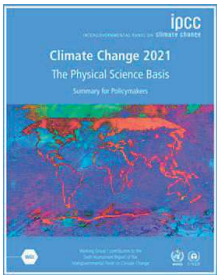
8 November, 2021

MASSEY UNIVERSITY
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
TE KURA PŪKENGA TANGATA

IOR A
INDIAN OCEAN RIM ASSOCIATION

IPCC Contribution to climate science and Policymaking

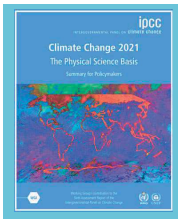




The numbers:

- 234 authors from 65 countries
- 28% women, 72% men
- 14,000 science publications assessed
- 78,000+ review comments

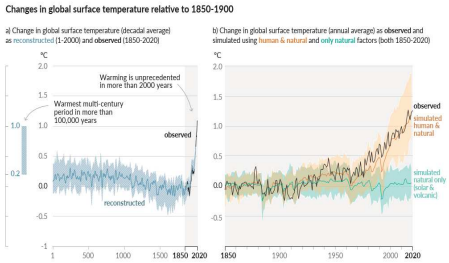
The planet in uncharted territory



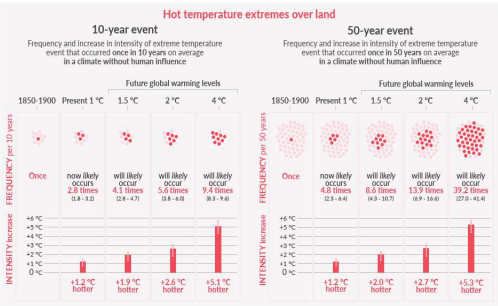
Climate change & the Indian Ocean: Key findings

WGI SPM WMO 2021

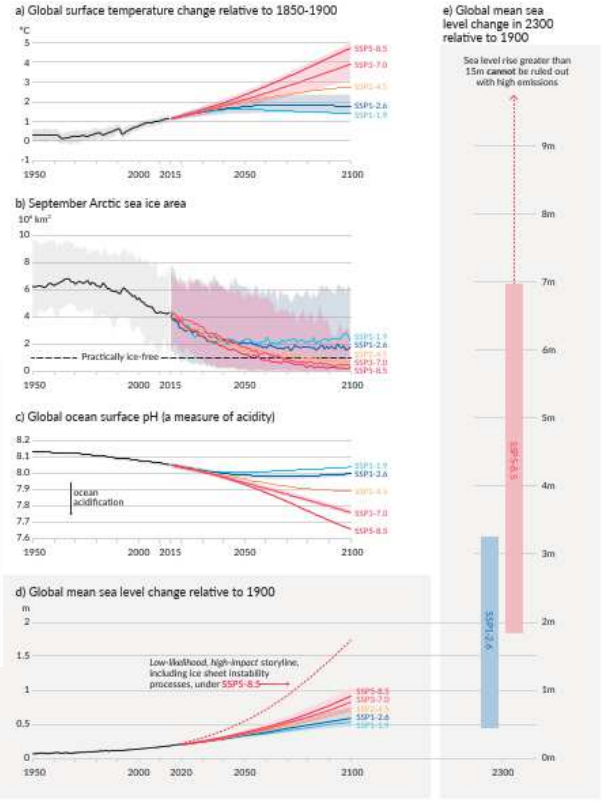
Human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years



Projected changes in extremes are larger in frequency and intensity with every additional increment of global warming



Human activities affect all the major climate system components, with some responding over decades and others over centuries

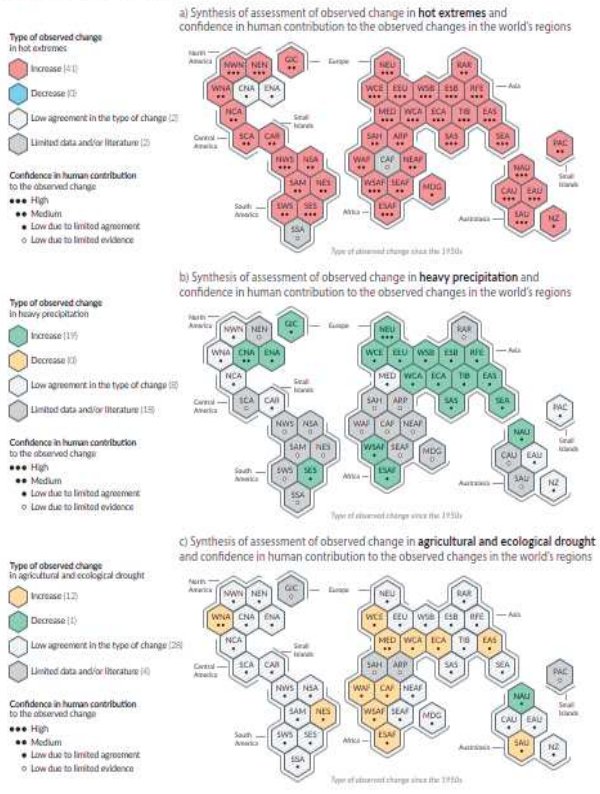


Past seven years on track to be 7th warmest on record
SLR accelerated since 2013 to new high in 2021; > hotter & acid ocean

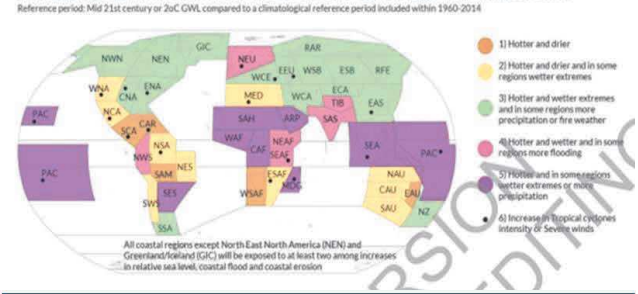
Climate change & the Indian Ocean: Key findings

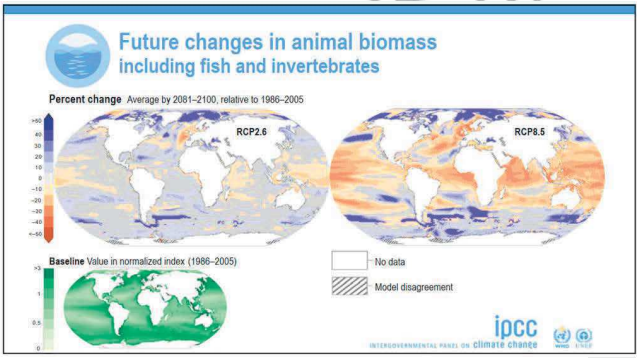
WGI TS SROCC

Climate change is already affecting every inhabited region across the globe with human influence contributing to many observed changes in weather and climate extremes

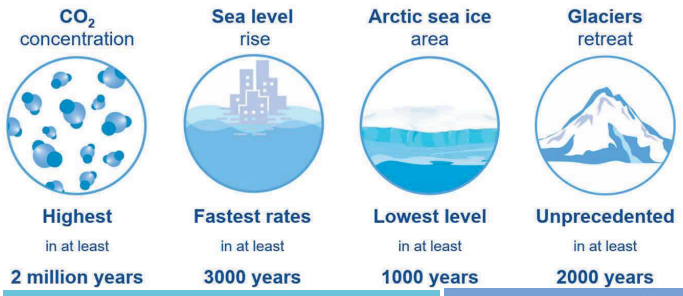


While changes in climatic impact-drivers will happen everywhere, there is a specific combination of changes each region will experience

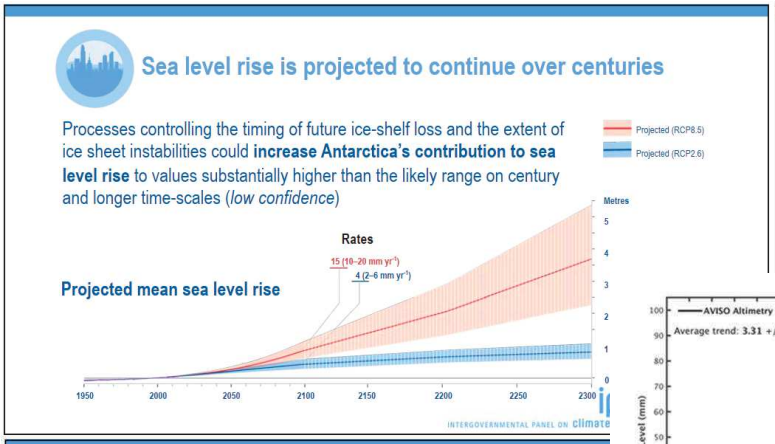


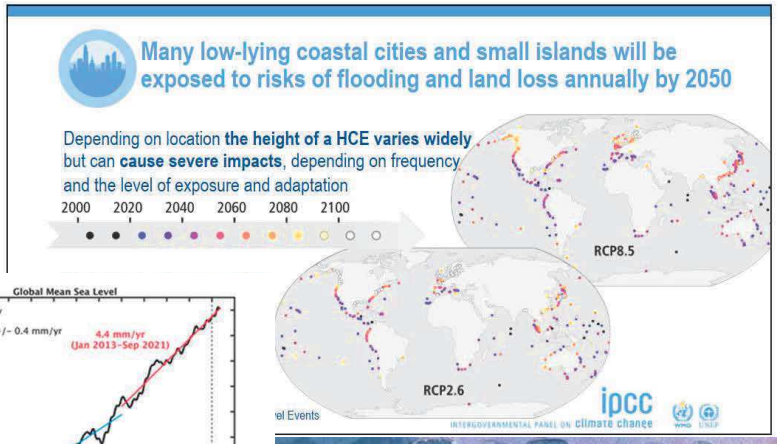


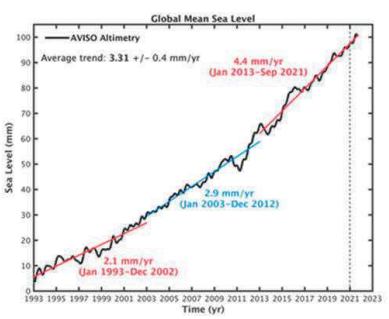
The surface temperature of the Indian Ocean has warmed faster than the global average *(very high confidence)*

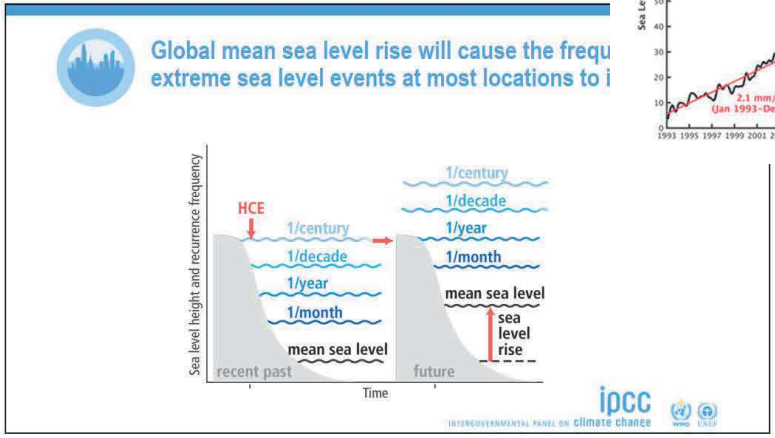


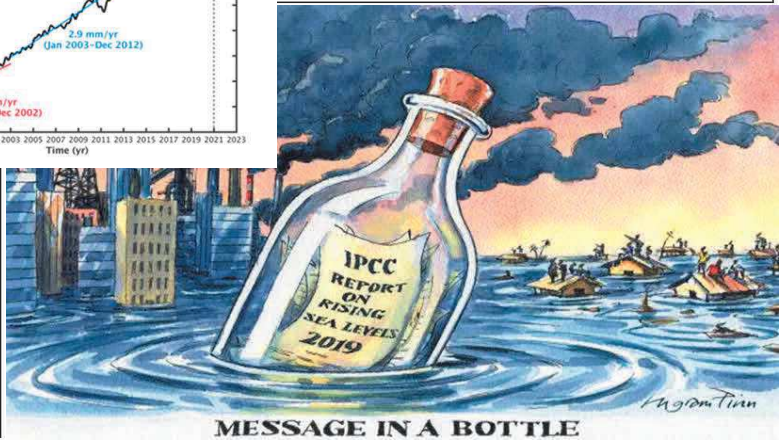
Climate change – Why it is an unfolding catastrophe … on top of COVID-19







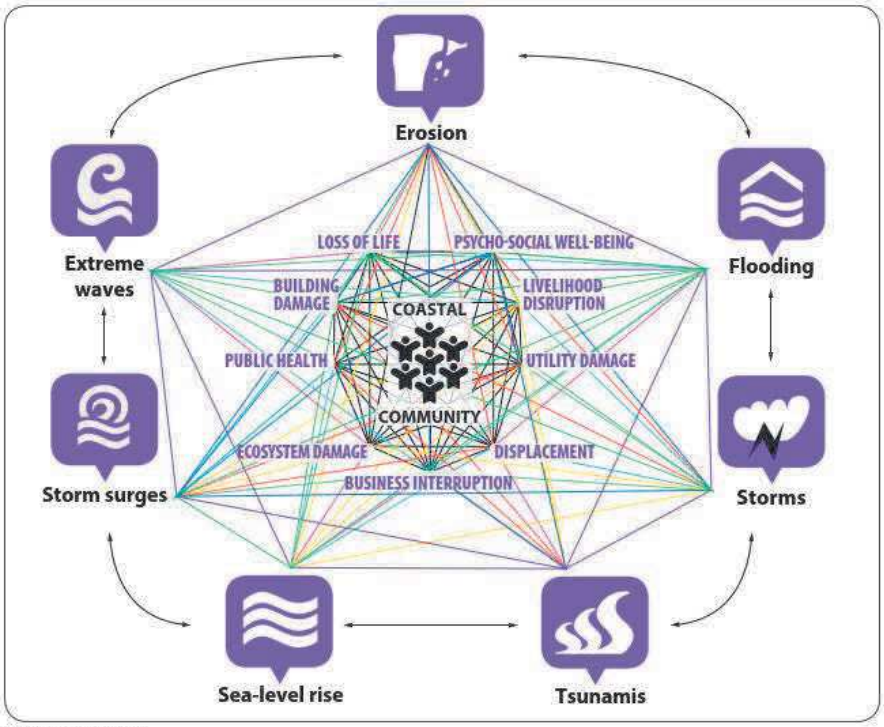




Climate change & the Indian Ocean economy

- Continued warming trends an Indian Ocean El Nino could be in place by 2050, with **more extreme shifts in weather patterns and extreme events**
- Connecting east Africa, Middle East, east Asia, Indo-Pacific, Australia and Antarctica, the **livelihoods** of some 3 billion people are shaped by Indian Ocean – climate interactions
- Global and intra-regional trade dependent on **at-risk coastal port cities** (23/100 top container ports) **and choke points for maritime and energy trade**
- High dependence on fisheries and marine resources increase **food insecurity & fragile economies**
- Region's **political economy ties to climate change** and consequent displacement and migration impacts on peace and security, e.g., Somalia's piracy; illegal trade
- **SLR redefines EEZ (UNCLOS) and blue economy future**

Livelihood prospects, risk, resilience & sustainability



Source: Bruce Glavovic

Cities & settlements – Centres of risk & innovation

Small islands – Existential risk

Displacement & migration

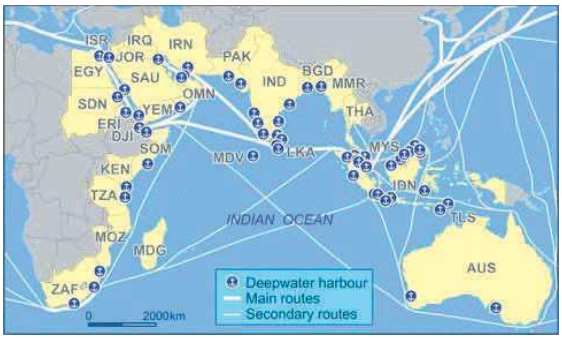
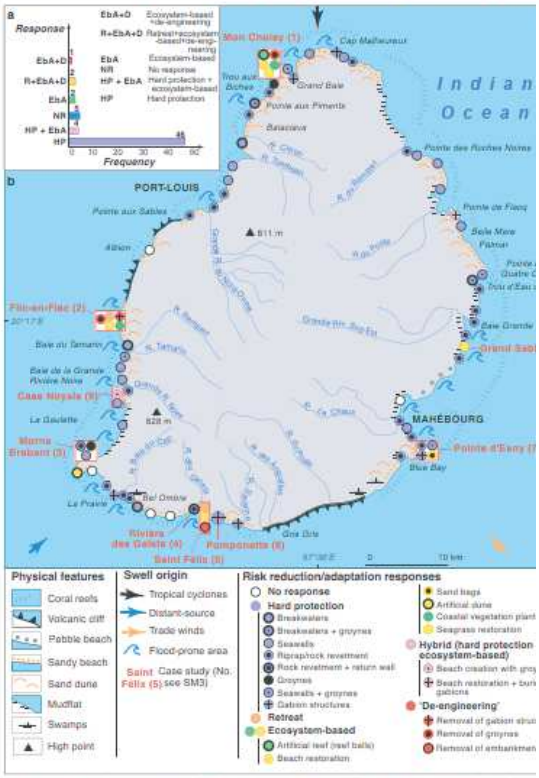
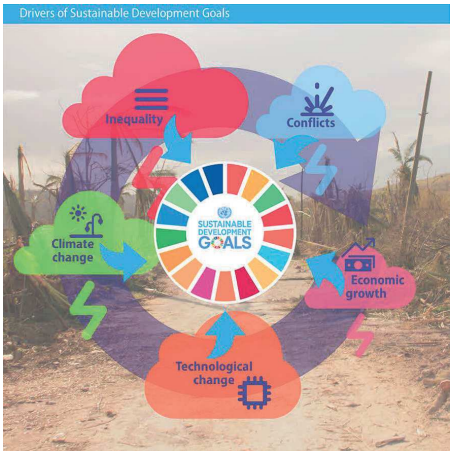


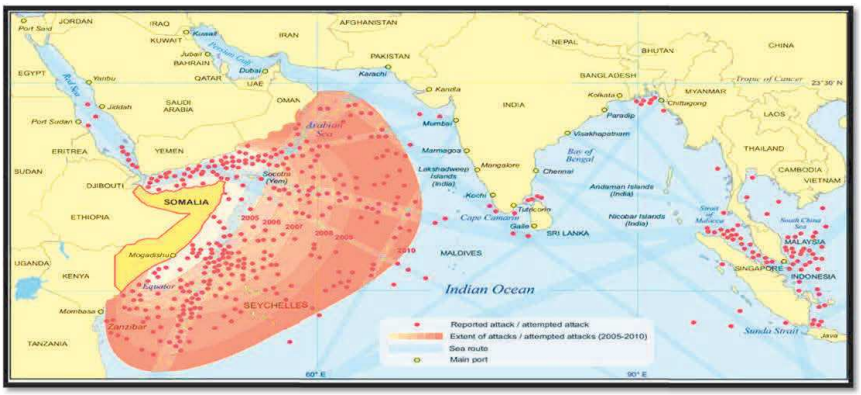
Figure 49: Stock-take of interventions to reduce coastal hazard risk and adapt to climate change on Mauritius Islan
Panel a shows the distribution of these responses at 60 sample beach sites by type and frequency.
Panel b shows contextual features and spatial distribution of responses, including nine more detailed case stu



Source: Duvat, V. K. E., et al., 2020. Assessment of coastal risk reduction and adaptation-labelled responses in Mauritius Island Indian Oce
Regional Environmental Change, 20: 110, p3 of 15 https://doi.org/10.1007/s10113-020-01688-2

Regional development, climate change & conflict





Source: https://thenewstoday.com.pk/wp-content/uploads/2020/05/Indian-Ocean-Security-Threats.jpg

Imperatives for climate action: Towards peace, stability & prosperity

Key governance challenges	Critical enablers	Example lessons learned
Time horizon and uncertainty ■ SLR is certain to continue for many centuries, with deep uncertainty about the magnitude and timing of SLR beyond 2050 ■ SLR challenges standard planning and decision-making practices, which strive for certainty and predictability ■ SLR goes beyond short-term bureaucratic, political, electoral and budget cycles ■ SLR risk is dynamic and difficult to address given the inflexibility of laws and institutions like private property rights ■ Given its long time horizon, it is hard to mobilise visionary action through today's civic and political leaders	Adopt a long-term view but take action now and keep options open to adjust responses as sea level rises and circumstances change	Experience in diverse communities from Nigeria to Bangladesh, Brazil, the Arctic, Indonesia, China, Netherlands and New Zealand shows the importance of: ■ Enabling national policies and guidance that takes a long-term view (e.g., 100 years) ■ Buy-in from key stakeholders in government, the private sector and civil society ■ A shared medium- to long-term community vision ■ Meaningfully involving stakeholders in adaptation planning ■ Reconciling divergent perspectives ■ Addressing power imbalances and human development needs ■ Drawing on local, indigenous and scientific knowledges
	Avoid new development commitments in high-risk locations	Experience in communities from Australia to the USA shows the importance of: ■ Spatial planning to regulate coastal development in exposed localities ■ Leveraging the window of opportunity created by extreme events ■ Adopting tailor-made risk reduction and resilience building measures post-disaster ■ Understanding political risks and local opposition to enable managed retreat when risk is intolerable and inundation is unacceptable

Source: Adapted from: Oppenheimer, M., *et al.*, 2019. Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities. In: *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*, H.-O. Pörtner, *et al.*, (Eds.). Cambridge, UK: Cambridge University Press, pp. 321–445.

Imperatives for climate action: Towards peace, stability & prosperity

Key governance challenges	Critical enablers	Example lessons learned
Cross-scale and cross-domain coordination ■ SLR impacts extend across scales and levels of governance ■ SLR impacts extend across sectors, policy domains and functional areas of governance (e.g., planning, emergency services, asset management, etc.) ■ SLR exceeds the capacity of many local governments, communities and property owners ■ A 'joined-up' response to SLR is is hard to achieve in practice	Develop networks and linkages within and between different governance scales and levels, and across policy domains and sectors, to improve coordination, build trust and legitimise decisions	Experience from the Caribbean to the United Kingdom shows the importance of: ■ Collaborative projects involving state and non-state actors ■ Multi-lateral agreements, e.g., between neighbouring countries (or between communities) ■ Boundary spanning organisations that connect people, organisations and communities ■ Leadership by central actors with capable teams ■ Mobilising the capabilities of communities and non-state actors ■ Addressing policy inconsistencies and clarifying roles and responsibilities ■ Securing national and regional resources to support local efforts ■ Measures to enable interaction, deliberation and coordination
	Build shared understanding and enable locally appropriate responses through experimentation, innovation and social learning	Experience in communities from India to Brazil, USA, Europe and east Asia shows the importance of: ■ Experimenting and innovating in ways that take account of local history, culture and politics ■ Generating socio-economic, livelihood and climate-development co-benefits ■ Take advantage of national and trans-national community and local authority networks

Imperatives for climate action: Towards peace, stability & prosperity

Equity and social vulnerability ■ SLR impacts and responses affect people in diverse ways, with costs and benefits unevenly spread ■ SLR responses can compound vulnerability and inequity ■ SLR can undermine societal aspirations, like SDGs ■ Private responses can cause public harm ■ Responses can lead to land capture by elites that deepen vulnerability, risk and marginalisation	Recognise political realities and address vulnerability and equity concerns to achieve impactful and enduring outcomes	From Mozambique to the USA, experience shows the importance of: ■ Exposing the drivers and root causes of structural inequity and vulnerability ■ Linking human development concerns, risk reduction, resilience and adaptation ■ Raising awareness and public support for actions that are just and equitable ■ Understanding racial drivers of coastal land-use patterns and risk ■ Addressing the barriers marginalised groups face in participating in risk reduction and adaptation planning
	Strengthen community capabilities to respond to SLR, drawing on external assistance and government support where necessary	Community experience in places as diverse as Belize, small island states in the Pacific and Caribbean, and rural coastal communities in the USA, shows the importance of: ■ Work by professionals, academics, local NGOs and activists to raise risk awareness and understanding, build community capability and leverage external support ■ Integrating traditional community responses with local government efforts

Imperatives for climate action: Towards peace, stability & prosperity

Key governance challenges	Critical enablers	Example lessons learned
Social conflict ■ As SLR gets progressively worse, social conflict (i.e., non-violent struggles over values, interests, resources and influence) could escalate ■ In addition to exacerbating difficult trade-offs between private and public interests, ecological, social, cultural and economic considerations, and short- and long-term concerns, SLR could increase social tensions over impacted critical infrastructure, cultural connections to the coast, and key livelihood, public health, identity, security and sovereignty concerns ■ SLR could compound socio-political stressors and challenge prevailing legal provisions and processes	Design and facilitate tailor-made participation processes, involving stakeholders early and consistently through to implementation of agreed responses	In coastal communities in South Africa, the following have been important: ■ Creating opportunities for integrative solutions ■ Using conflict resolution mechanisms in the design of participatory processes ■ Appointing independent facilitators / mediators and involving officials as 'bureaucratic activists' to improve inclusivity and iterative and reflexive engagement ■ Aligning informal participatory processes with statutory processes and government practices ■ Sustaining engagement by securing enabling resources for local use, and aligning activities with political and bureaucratic cycles ■ Using practical measures to involve historically disadvantaged and socially vulnerable groups, e.g., using accessible meeting locations / venues, local languages and culturally appropriate meeting protocols ■ Involving local political leaders who can champion risk reduction and adaptation and help mainstream findings into community decision-making
	Create safe settings for inclusive, informed and meaningful deliberation and collaborative problem-solving	Experience from villages in Bangladesh to communities in New England, USA, shows the importance of: ■ Flexible and enabling processes based in local institutions judged to be robust and fair, with support by governing authorities ■ Paying attention to local social dynamics and reducing elite domination ■ Using local knowledge to inform responses ■ Encouraging institutional improvisation to address local concerns ■ Using trusted independent facilitators ■ Incentivising participation of disadvantaged groups ■ Focusing on improving risk literacy, optimism and capacity for joint problem-solving ■ Joint fact-finding, scenario planning, negotiating trade-offs, facilitated public dialogue, and institutional support for action ■ Enabling ongoing public deliberation and social learning ■ Committing to continual adjustments as circumstances change over time

Imperatives for climate action: Towards peace, stability & prosperity

Key governance challenges	Critical enablers	Example lessons learned
Complexity ■ SLR introduces novel interconnected problems, with complex connections between biophysical and socio-economic, cultural and political considerations that challenge conventional science and public planning and decision-making practices ■ The rapid pace, complexity and novelty of SLR is already challenging traditional community decision-making in some localities, e.g., some Arctic and Pacific Island communities	Draw on multiple knowledge systems to co-design and co-produce more acceptable and implementable responses	Experience in communities from Australia, the Comoros, Arctic, Canada, Portugal, Brazil, and New Zealand to Norway and the USA shows the importance of: ■ Using and integrating local, indigenous and scientific knowledges ■ Creating shared knowledge and understanding through storytelling ■ Bridging gaps between science, policy and practice by experimenting with novel approaches supported by stakeholders working across organisational boundaries
	Build capacity to tackle complex problems	Lessons learned in the Dutch Delta Programme to future-proof the Netherlands include: ■ Cabinet-level commitments to long-term policy implementation ■ Dedicated budgets to build government capacity to tackle complex problems ■ Flexible approaches that build resilience, e.g., creating an independent agency alongside traditional administrative bodies ■ Use an adaptation pathways approach to make short-term decisions whilst striving for long-term goals, despite future uncertainty ■ Translate national requirements into local action by having enabling provisions for tailor-made local-level policy and practice ■ Tackle emergent problems by setting up enduring monitoring and lesson-learning processes ■ Establish governance arrangements that reconcile competing demands in an inclusive, timely and legitimate manner ■ Counter policy deadlocks or lock-ins due to short-term priorities and vested interests by adopting a long-term perspective (e.g., 100 years), considering plausible scenarios, and incentivising novel solutions

Climate change and COVID-19

"Climate change and COVID-19 are entwined through the development pathways we choose or are subjected to through decisions made by governments, businesses, civil society and ultimately each one of us as citizens. These decisions are based implicitly or explicitly on ethical and political considerations. Importantly, how we frame development pathways is inherently political and value-laden. An implication of the global support for the sustainable development goals, including the principle of 'leave no-one behind', is that development pathways that are climate resilient are those that foster well-being – even in the face of COVID-19 – for people and the planet."
(Schipper et al., 2021. The global pandemic response and implications for climate resilient development: How can we ensure justice and equity? *Climate and Development*)

Take-home messages for IORA

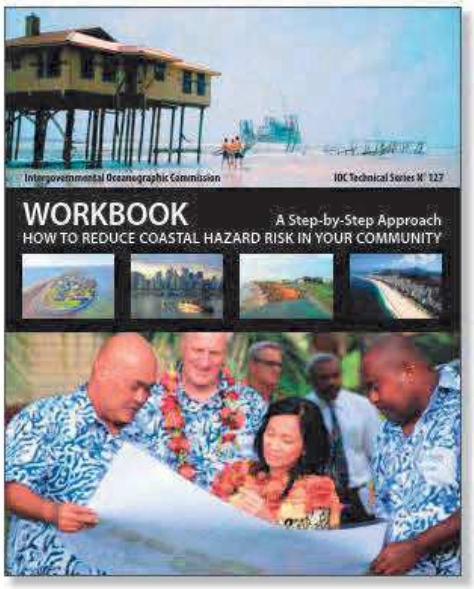
- Recent changes in climate are widespread, rapid, intensifying and unprecedented in 1000's of years
- Without immediate, rapid, global-scale reductions in GHG emissions, keeping below 1.5C above pre-industrial levels will be out of reach
- At present, by 2100 2.7C above pre-industrial levels is likely
- Human-induced CC has already increased frequency and intensity of extreme events from droughts to wildfires to storm events
- Extreme events will get progressively worse as planet warms and oceans acidify
- Coastal and ocean dependent nations especially hard hit in all scenarios
- Scale and locality of impact depends on GHG emissions and stability of ice sheets

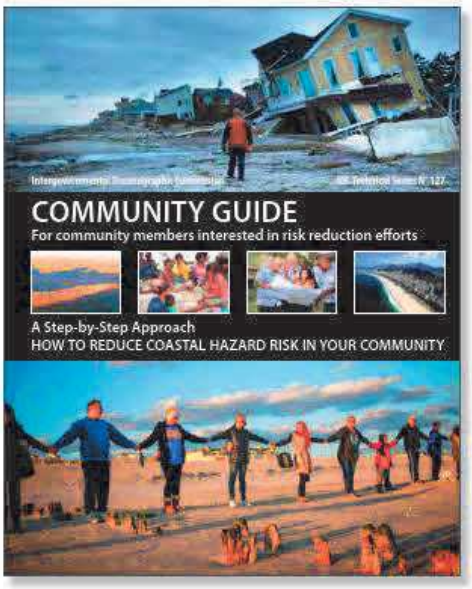
Take-home messages for IORA

- Indian Ocean warming > Atlantic and Pacific
- Major information / knowledge gaps, e.g., East African coast
- Major differentials in vulnerability to CC impacts within and between countries in IOR
- Adaptive capacity highly variable
- Contributions to GHG emissions and susceptibility to CC impacts highly variable in IOR
- Regional inter-dependence means that peace, stability and prosperity is dependent on regional cooperation
- IORA's role in securing a prosperous, resilient and sustainable future is pivotal

Thank you

Translating imperatives into enduring action





b.glavovic@massey.ac.nz

The Urgency of Climate Change and its Consideration as a Topic in IORA"

Major consequences of climate change, prospects and initiatives for forest-based mitigation and adaptation solutions- Bangladesh Chapter

Dr. Mahmood Hossain
Professor
Forestry and Wood Technology Discipline
&
Vice-Chancellor
Khulna University, Khulna -9208

Bangladesh

Area coverage

91th in the world

16th among IORA

Bangladesh- a deltaic plain country with 147,570 km² and 166 million of population

Developing market economy

41st in the world

2nd in South Asia

Population size

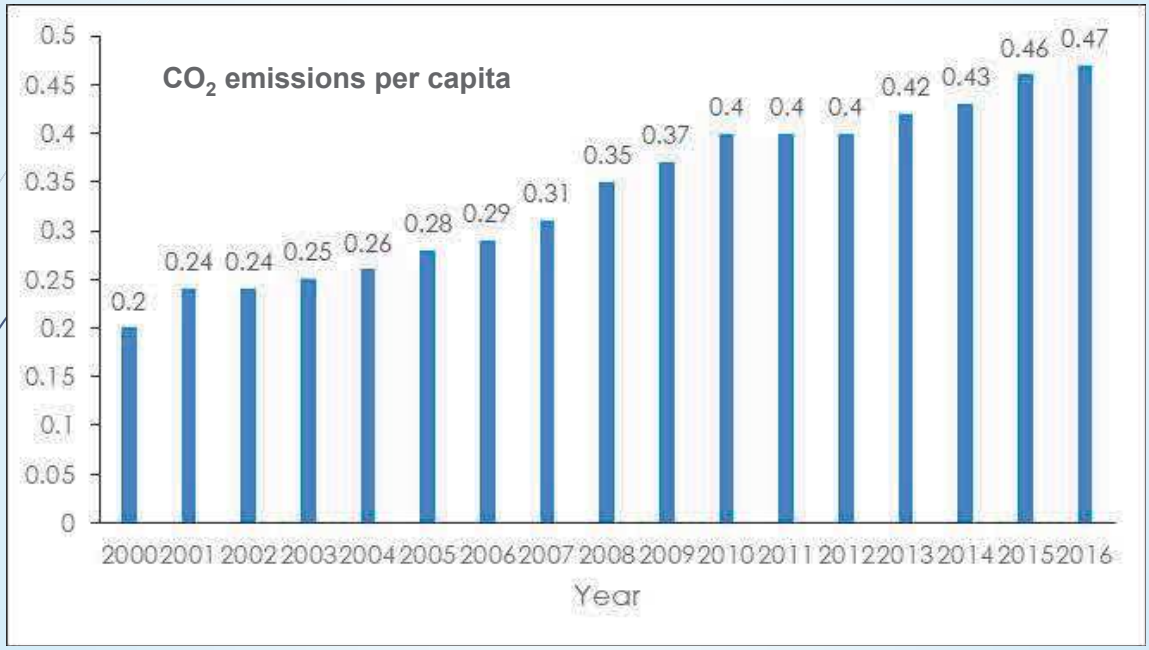
Density (1,252 person/km2)

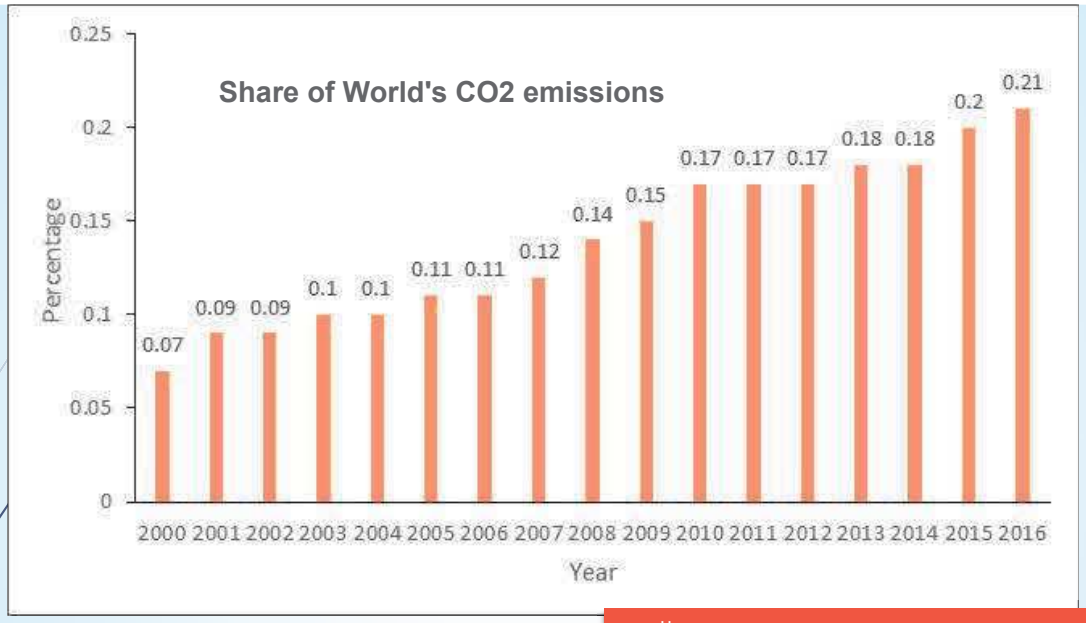
8th in the world

3rd among the IORA

IORA- Indian Ocean Rim Association

CO2 Emission and Vulnerability context of Bangladesh





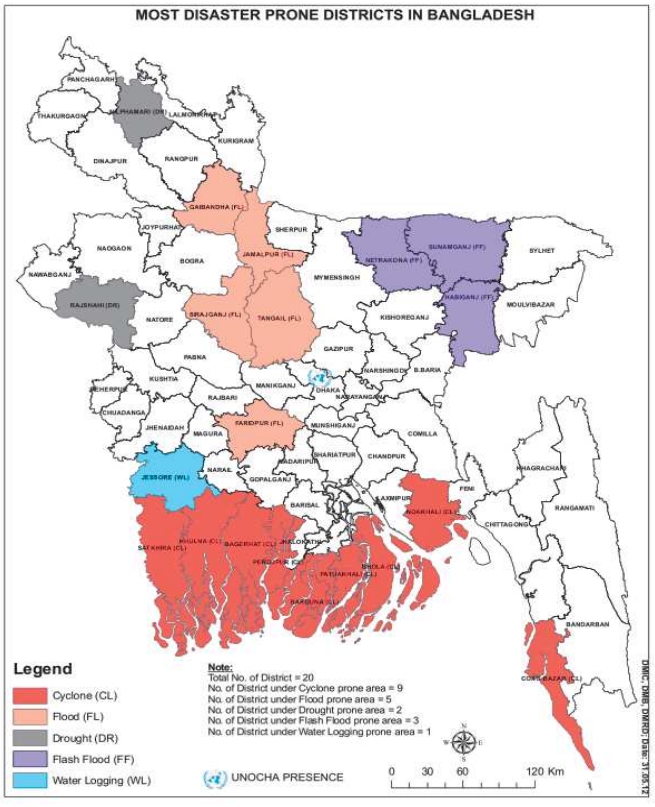
48th position in the World with 0.21% contribution in 2016

7th most climate change vulnerable country

3rd among countries most hit by disaster according to the Global Climate Risk Index 2021

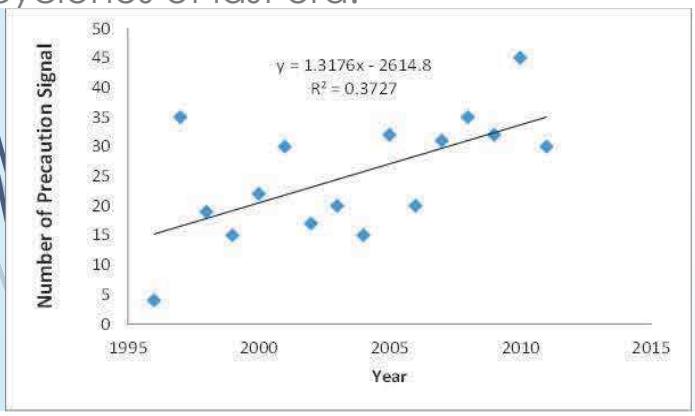
Location map of major consequences of climate change in Bangladesh

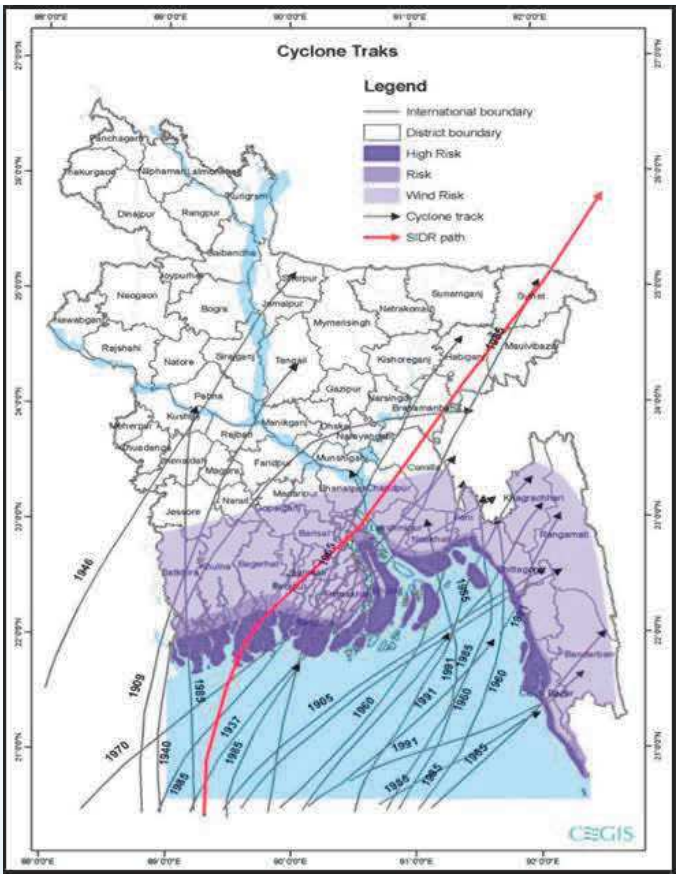
- **South western and south eastern coastal areas are – Prone to Tropical cyclones and tidal surges**
- **Central areas – Prone to Floods**
- **Northern areas – Prone to Drought**
- **Northeastern areas – Prone to flush flood**
- **Upperpart of Southwestern areas- Prone to water logging**



Tropical cyclones

- Bangladesh was hit by **61** tropical cyclones from 1978-2021.
- **Sidr** in 2007, **Aila** in 2009, **Bulbul** in 2019 and **Amphan** in 2020 were the severe cyclones of last era.





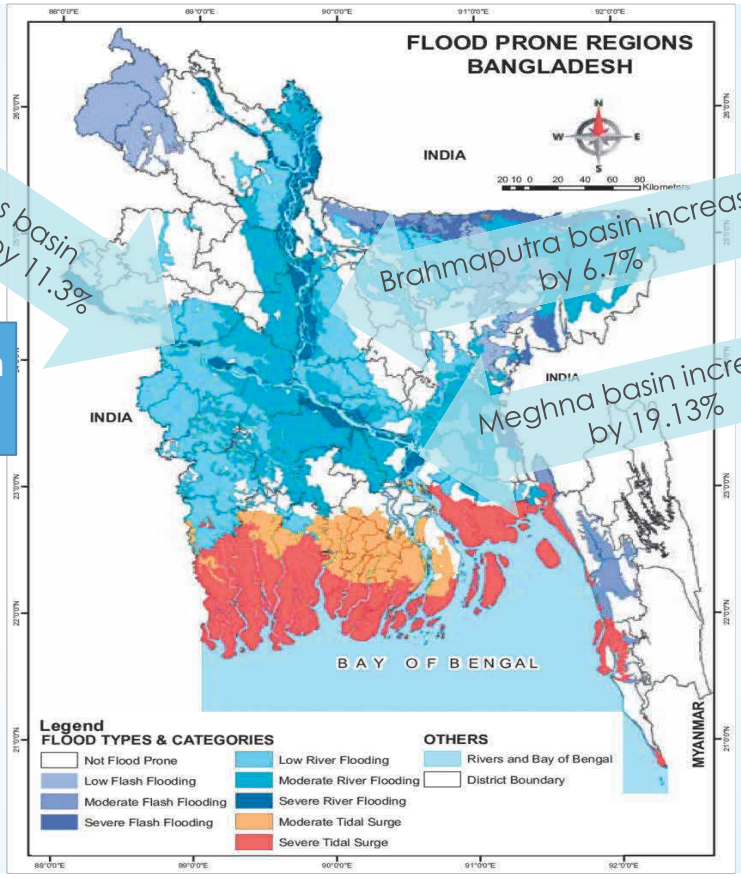
Floods

By 2030s, the long-term annual runoff projection

Ganges basin increased by 11.3%

Brahmaputra basin increased by 6.7%

Meghna basin increased by 19.13%

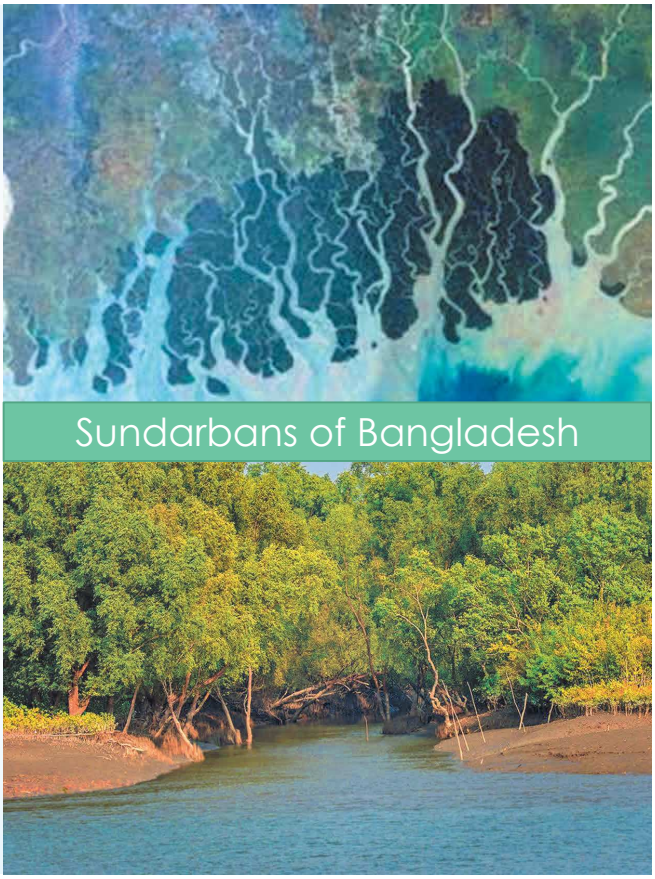


Sea level rise

- At 2050
  - The pristine mangrove ecosystem (the Sundarbans of Bangladesh) will face **0.5** meter sea-level rise resulted loss of 491 Km^2 (about 8%)
- At 2100
  - The Sundarbans of Bangladesh will face 1 to 1.5 meter sea-level rise, resulted loss of about **43 to 61%** of the Sundarbans.

Overall at 2100-

- Salinity will increase
- 25,000 km2 coastal areas of Bangladesh will be affected

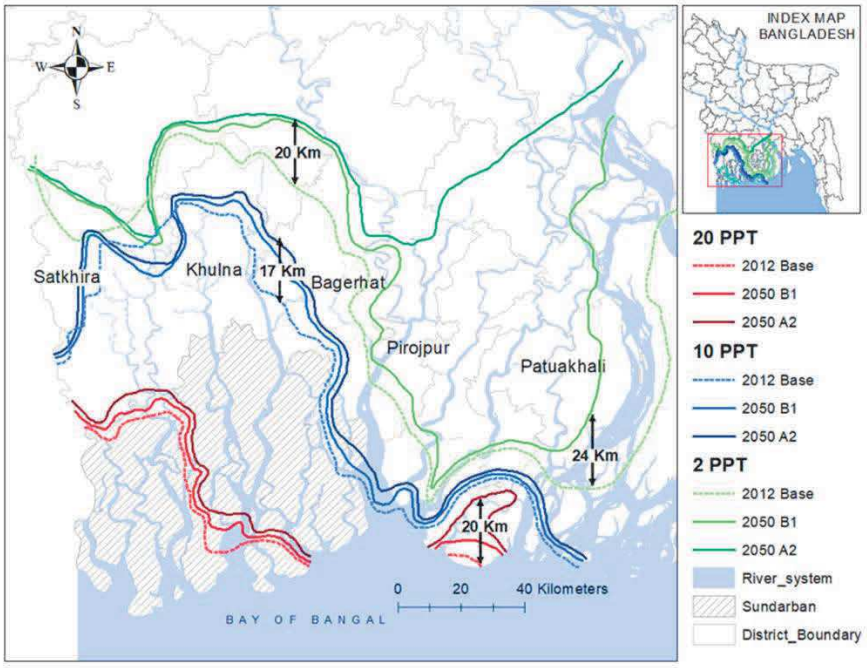


Sundarbans of Bangladesh

Salinity intrusion

Salinity affected land in Bangladesh was-

- 83.3 million hectares in 1973
- 102 million hectares in 2000
- 105.6 million hectares in 2009



It projects a average increase of 26 percent in salinity by 2050

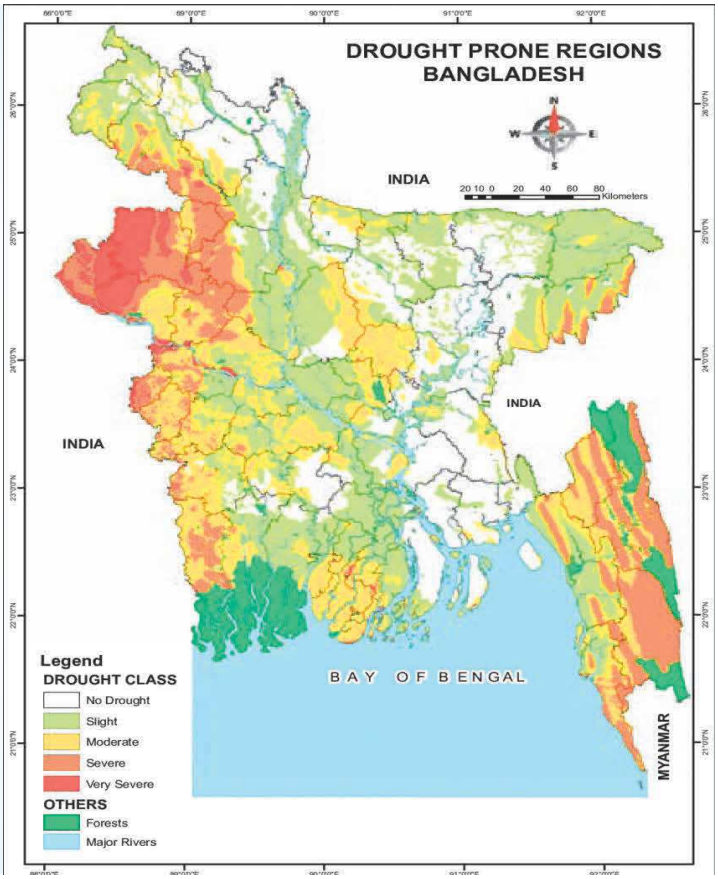
Drought

- **Seasonal drought**

Caused by irregularities in documented rainy and dry seasons

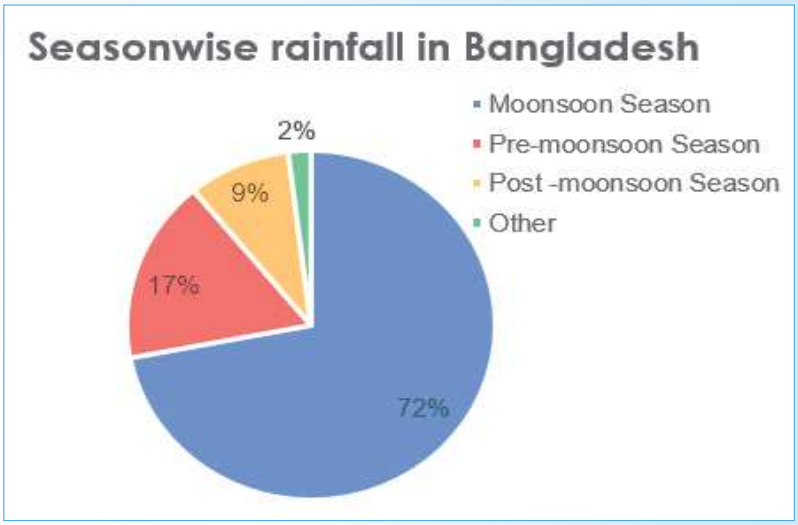
- **Contingent drought**

Caused by irregular rainfall



Change in rainfall pattern

- An increase of about **10 to 15%** of the prevailing total rainfall is predicted all over Bangladesh by 2050.
- The highest increase of about **20%** is predicted over the south-eastern hilly region of Bangladesh by 2050.



What would be the forest-based mitigation and adaptation measures for Bangladesh towards climate change?

Forest-based mitigation and adaptation potentialities for Bangladesh

- Increased forest cover and density
  - Improved the carbon sequestration and carbon stock capacity for per unite area

Reduces the regional and local temperature

Adaptation with the sea level rise

- Mangrove plantation in the offshore islands and along the coast can entrap sediment and reduce soil erosion
  - - Results – increase the elevation

- Coastal afforestation able to protect the lives and properties of the coastal population
- Green belt plantation reduces the devastating effect the tropical cyclone
- Embankment plantations help to strength the coastal embankment

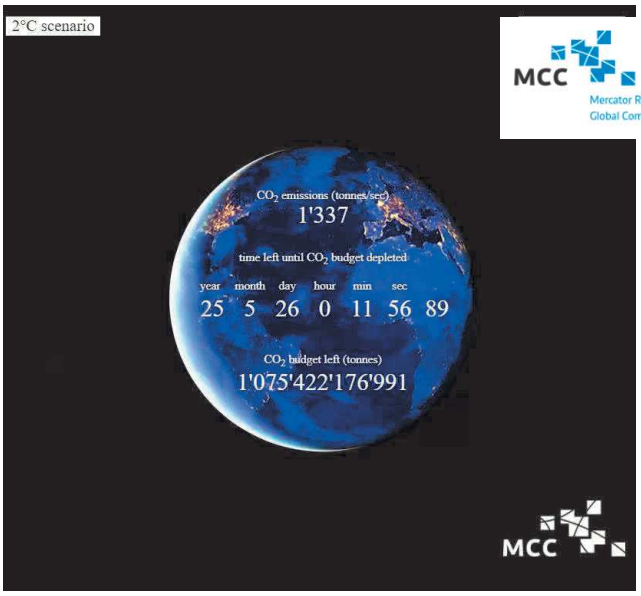
Reduces the devastating impact of Tropical cyclone and tidal surges

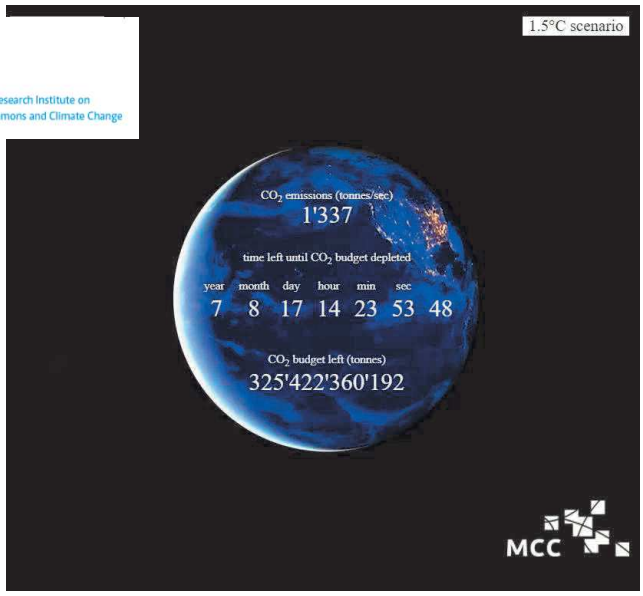
The relevance of addressing Climate Change in

Some thoughts from a
Dialogue Partner´s point of view

Presentation by Dr. Thomas Krimmel
at the IORA / RCSTT Workshop on Climate Change
8th November, 2021

The CO2 clock is ticking



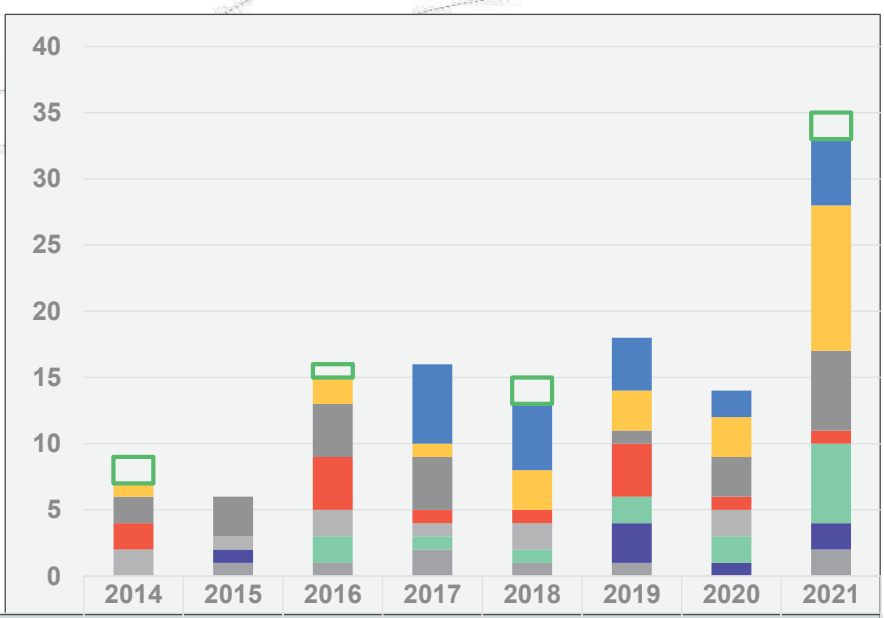


Is this the „Blue Economy“ we are talking about?

Treasures found while Trawling for deep-sea fauna in the Mediterranean Sea.

What to expect in the Indian Ocean?

IORA Thematic Events 2014 - 2021



	2014	2015	2016	2017	2018	2019	2020	2021
REN. EN. / CLIMATE CHANGE	2		1		2			2
Blue Economy				6	5	4	2	5
Women's Econ. Empowermt.	1		2	1	3	3	3	11
Trade & Investment Facilitation	2	3	4	4		1	3	6
Academic, Science & Techn.	2		4	1	1	4	1	1
Tourism & Cultural Exchanges	2	1	2	1	2		2	
Fisheries Management			2	1	1	2	2	6
Disaster Risk Managemt		1				3	1	2
Maritime Safety and Security		1	1	2	1	1		2

Blue Economy and IORA Priority Areas

Is the Blue Economy as cross-cutting issue really covering Climate Change?

CROSS-CUTTING ISSUES	PRIORITY AREAS						Climate
Blue Economy	**Trade**	**MSS**	**Fisheries**	**DRM**	**Tourism**	**Academic**	**Change**
Fisheries / Aquac.			X				X
- IUU			X				X
- Fisheries Managemt.			X				X
- Aquaculture			X				X
- Market Access for fish and aquac.	X		X				X
- Resource Mapping Ocean RE						X	X
- Research low carbon techn.						X	X
- Water desalination				X			X
Seaports and Shipping	X	X					X
Seabed Exploration and Minerals	X					X	X
Marine Biotechnology, Research and Dev.							X
- Needs assessment Blue Economy						X	X
- Blue carbon assessment				X			X
- Marine pollution				X			X
Women Economic Empowerment	X	X	X	X	X	X	X

Can we consider rearranging the IORA Priority Areas?