

Wider Caribbean Regional Nutrient Pollution Reduction Strategy and Action Plan

Mitigating Nutrient Pollution in the WCR

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“Pollution from Excess Nutrients changes the natural balance of nutrients in the ocean and is a leading cause of deterioration of the health and productivity of many of the world’s freshwater and marine ecosystems including the Caribbean Sea. This has serious implications for human wellbeing and socio-economic development, and achievement of the SDGs and other aspirational goals as well as for development of a blue economy in the WCR.”

Nutrients/Nutrientes



Photo: NOAA Ocean Service

UNDP/GEF CLME+ Project:
Reduce the impacts of excess nutrient loads on marine ecosystems in the Caribbean Sea and the adjacent North Brazil Shelf Large Marine Ecosystems

Proyecto UNDP/GEF CLME+ :
Reducir los impactos del exceso de carga de nutrientes en los ecosistemas marinos en el Mar Caribe y los ecosistemas marinos grandes de la plataforma adyacente del norte de Brasil.

Goal: To establish a collaborative framework for the progressive reduction of impacts from excess nutrient loads on priority coastal and marine ecosystems in the WCR.

Objectives:

- *Assist in defining regional standards and criteria for nutrient discharges*
- *Support institutional, policy and legal reforms*
- *Contribute to relevant regional and global commitments*
- *Contribute to the operationalization of the Caribbean Platform for Nutrient Management*
- *Contribute to the UN Global Campaign on Sustainable Nitrogen Management*

Scope

GEF GNC project attributes nutrient flows (losses) to two main pathways:

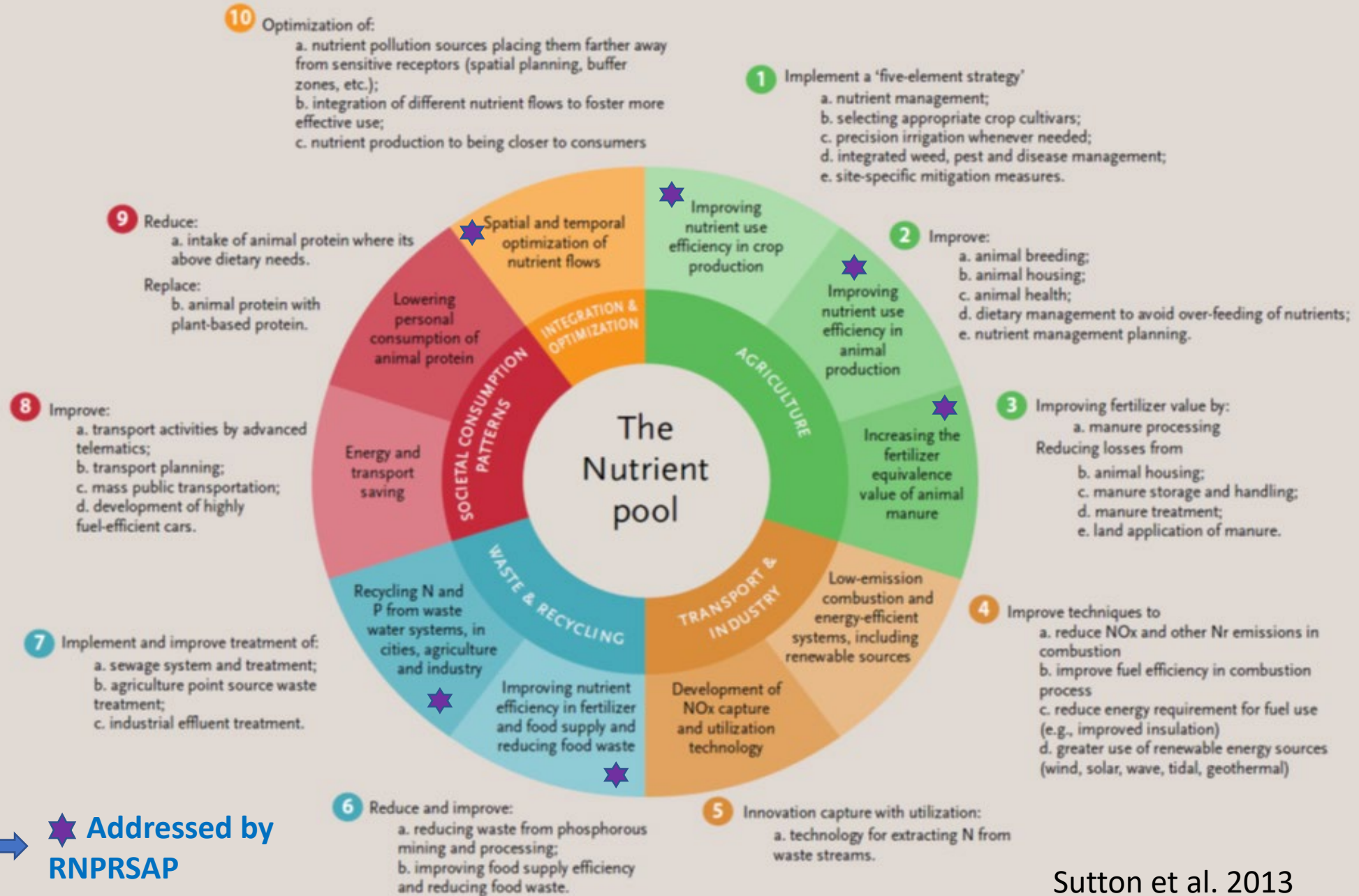
- Agri-food pathway
- Energy-transport pathway.

10 key action areas are identified to reduce nutrient losses from these pathways.

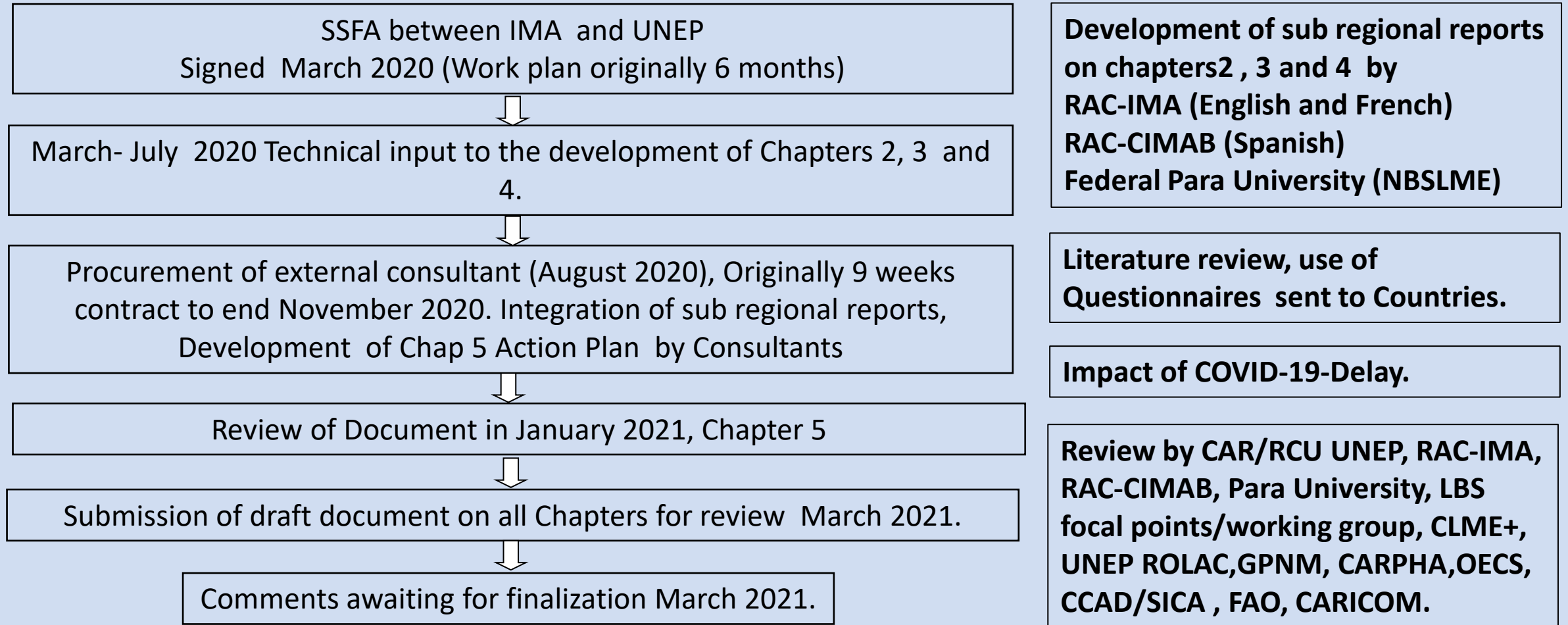
RNPRSAP scope is defined by the Cartagena Convention and LBS Protocol, with focus on major land and sea-based sources of nutrient pollution of the wider Caribbean Sea

➤ Addressed by RNPRSAP

Ten Key Action Areas to Address the Nutrient Challenge



Process of Development of WCR-RNPRSAP



Global & Regional Frameworks

Sustainable Development Goals: Goal 14.1 on Marine Pollution

UNEA Resolutions on Nitrogen

Global Partnership for Nutrients Management (GPNM) – UNEP GPA

International Nitrogen Initiative (INI)

Global Campaign on Sustainable Nitrogen Management

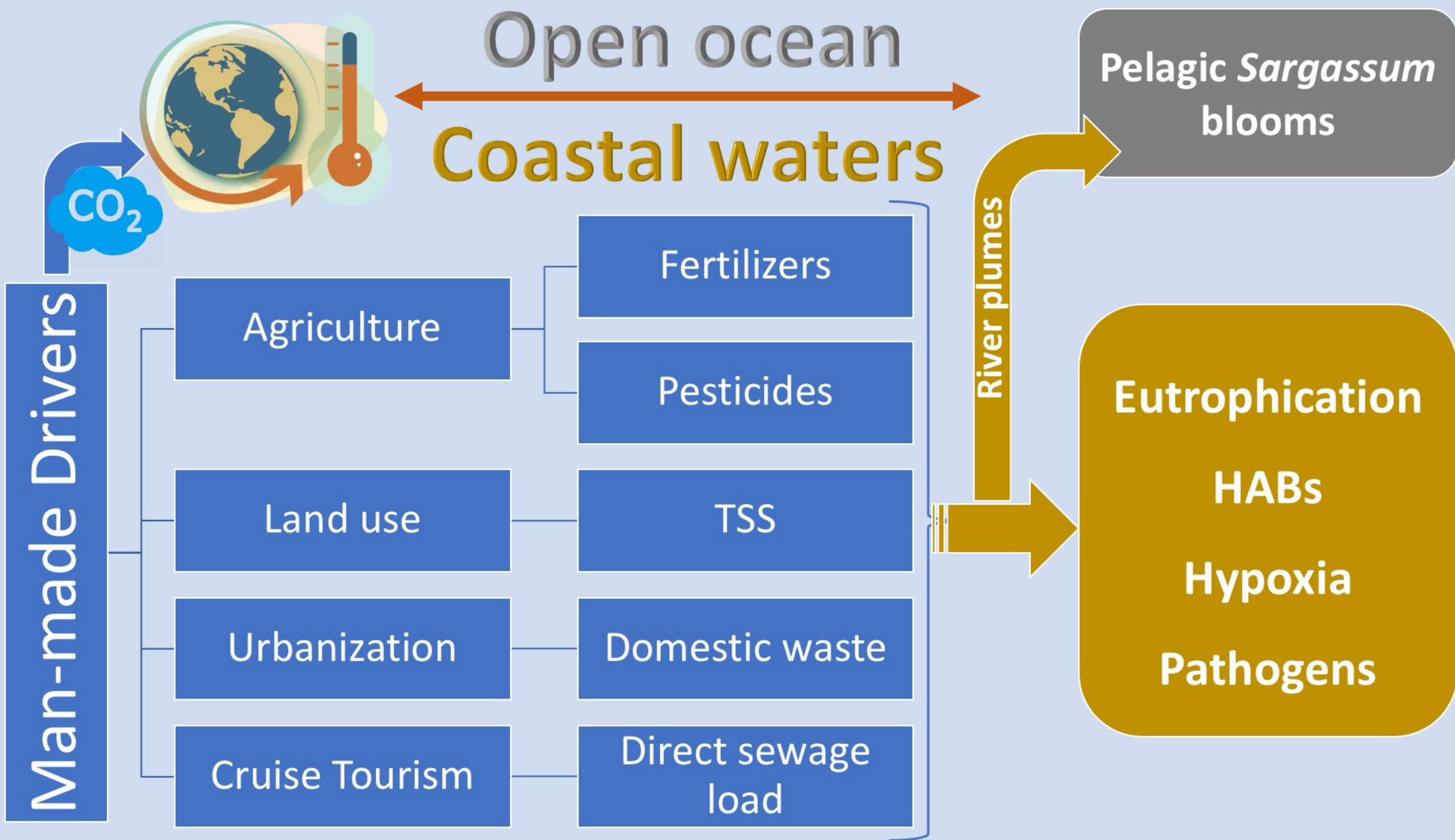
Regional Platform for Nutrients Management (Cartagena Convention Secretariat)

Multiple GEF Projects

Summary of conditions at the regional and national levels

(Chapter 4)

- The WCR has many strengths
- Cartagena Convention & LBS Protocol is an ideal framework BUT needs Increased Ratification & Greater Focus on Nutrients e.g. Protocol Text and/or Annexes
- Wide disparity: *institutional frameworks & mechanisms, policy & legislation, programmes/strategies, technical capacity, standards & criteria, monitoring & data availability, environmental assessments, etc.*
- Governance mechanisms exist for environmental management including pollution, but few specific to nutrient pollution
- Approach is mainly 'end-of-pipe' solutions
- Lack of comprehensive national policies for integrated resource management & pollution prevention
- Major weaknesses, gaps and barriers need to be addressed for effective implementation of the RNPRSAP



Man-made Drivers

Agriculture

Fertilizers

Pesticides

Land use

TSS

Urbanization

Domestic waste

Cruise Tourism

Direct sewage load

Open ocean

Coastal waters

Pelagic *Sargassum* blooms

Eutrophication

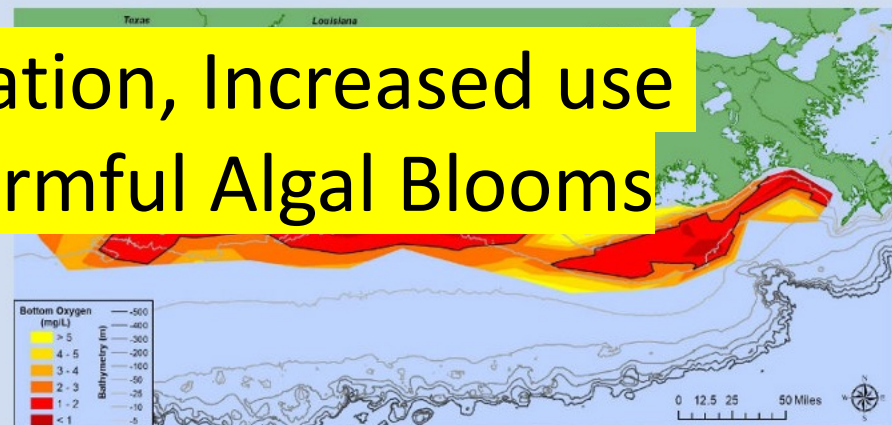
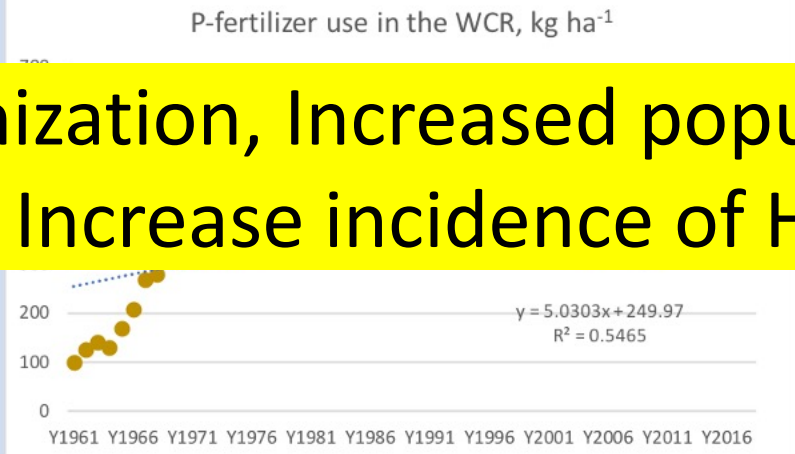
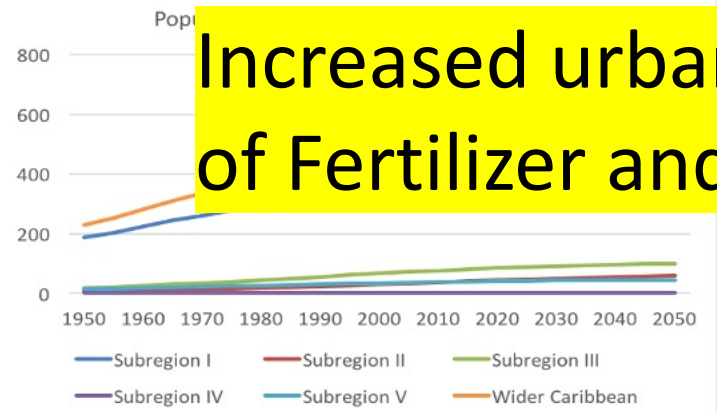
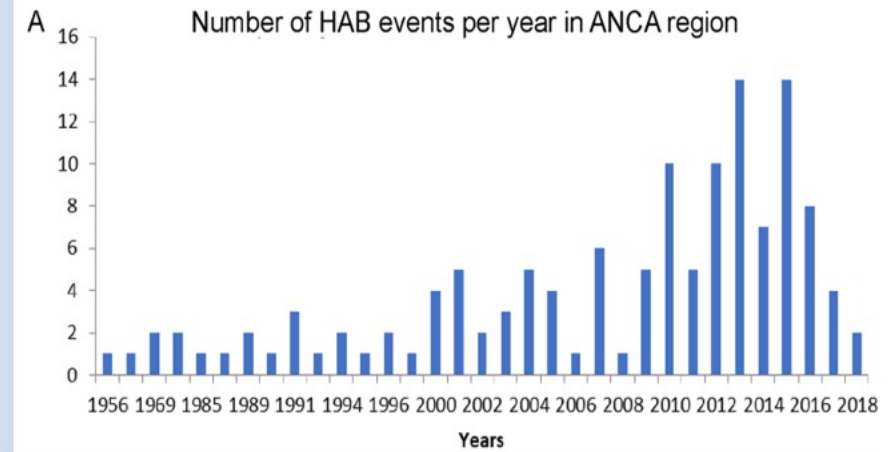
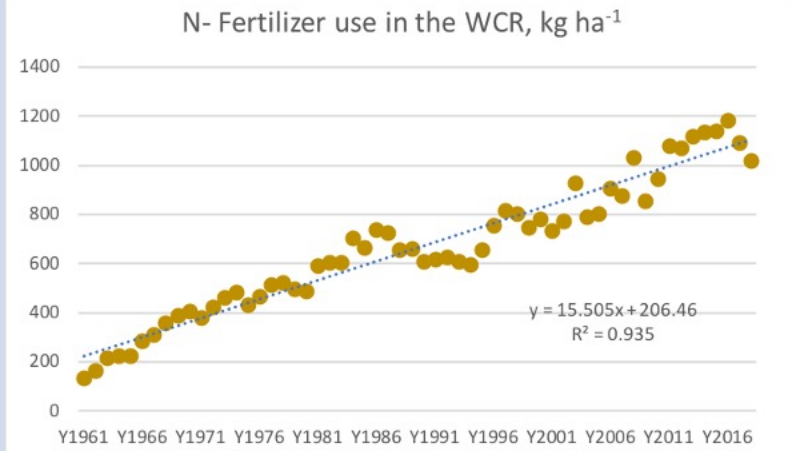
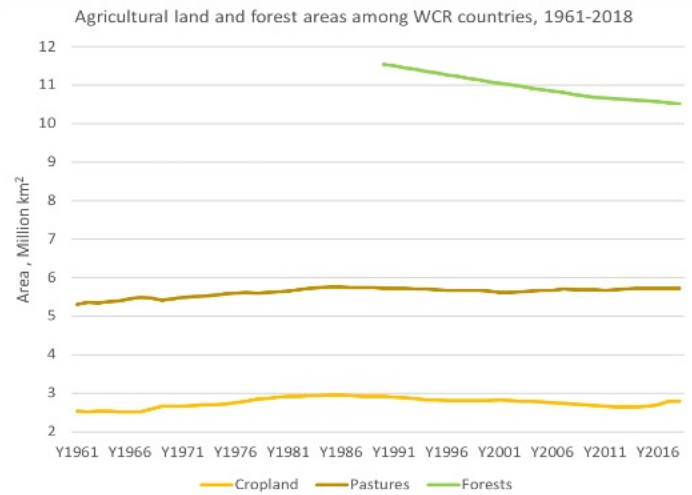
HABs

Hypoxia

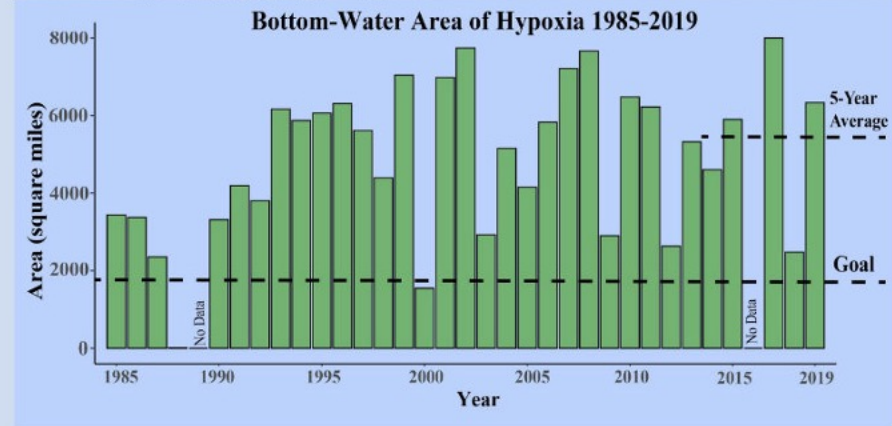
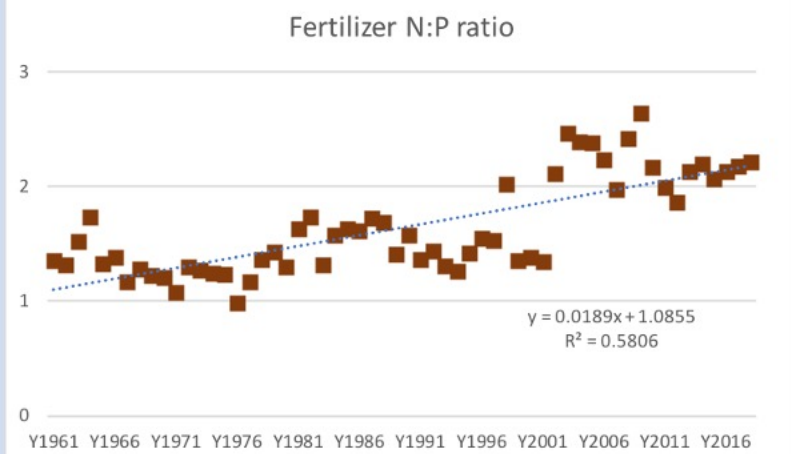
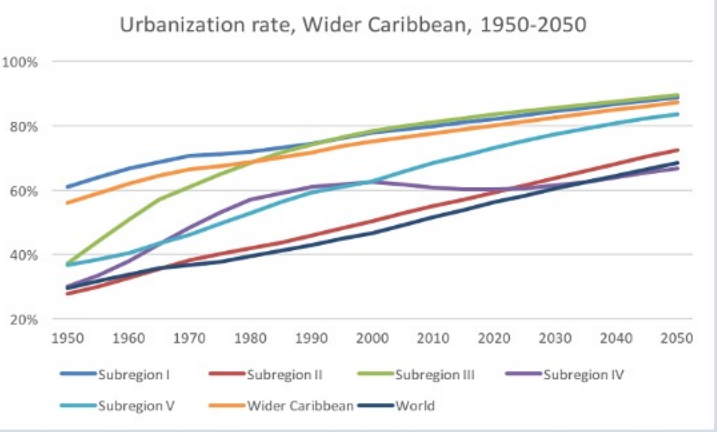
Pathogens

River plumes

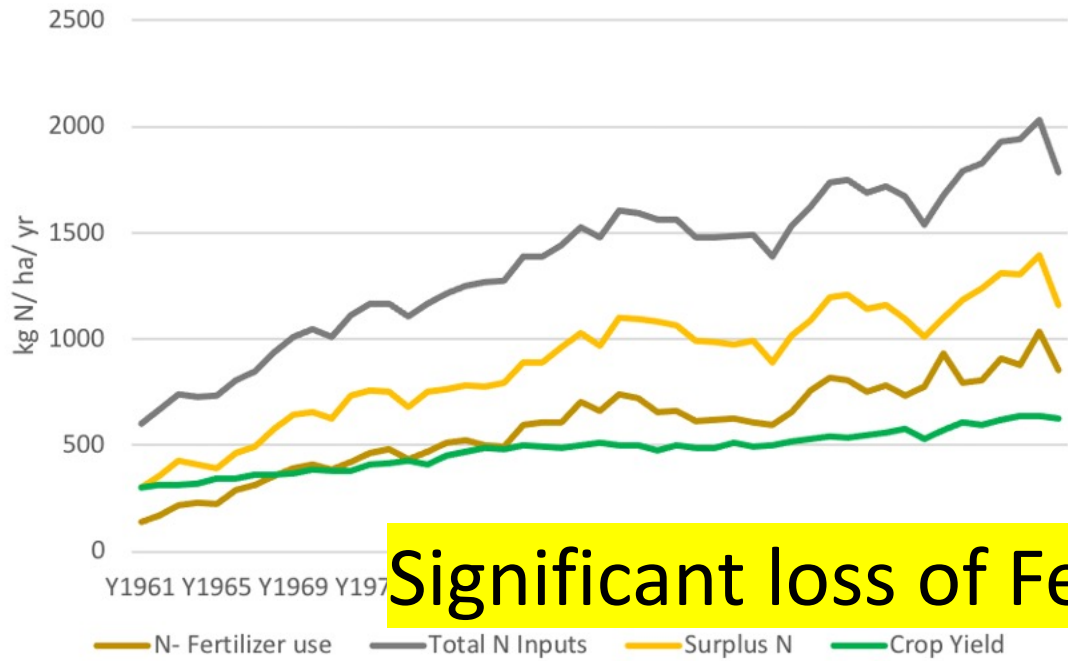
CO₂



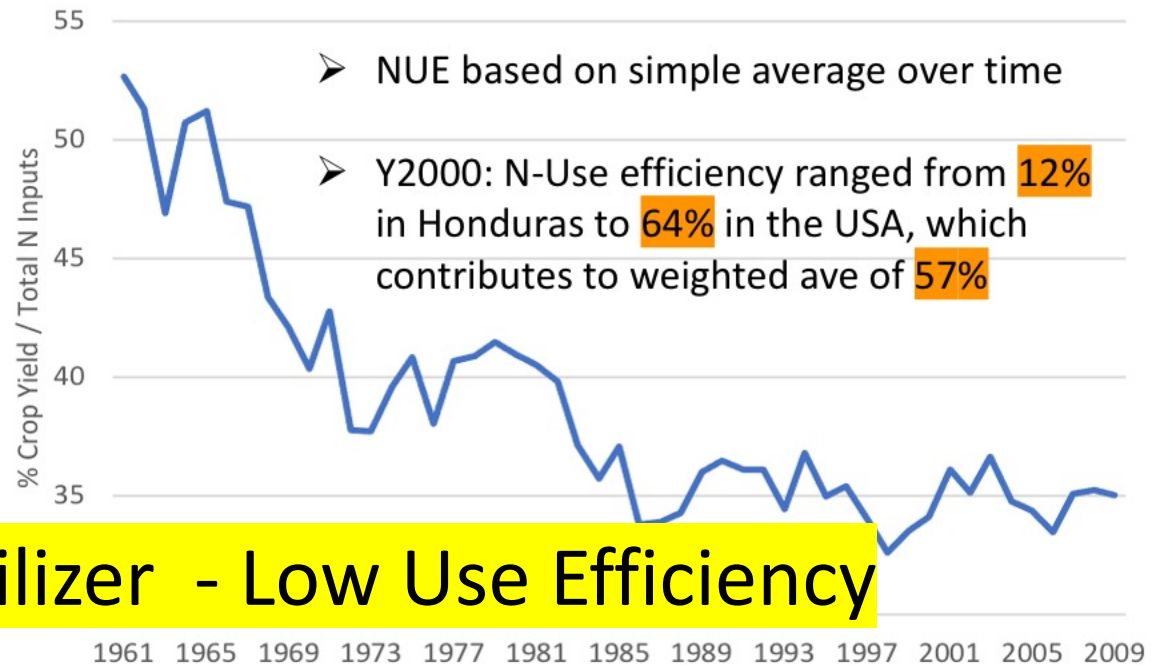
Increased urbanization, Increased population, Increased use of Fertilizer and Increase incidence of Harmful Algal Blooms



Regional Nitrogen Budget for WCR,, 1961 to 2009



Nitrogen Use Efficiency in the WCR, 1961-2009



Significant loss of Fertilizer - Low Use Efficiency


Model year 2000	Cropland, km ²	Pastures, km ²	Surplus N, 10 ³ tons	Surplus P, 10 ³ tons
Sub-region I	1,606,388	1,720,510	9,916	509
Sub-region II	46,466	95,529	305	15
Sub-region III	134,096	924,159	1,140	95
Sub-region IV	2,549	4,223	No data	2
Sub-region V	76,431	58,836	321	21
WCR Total	1,865,930	2,803,257	11,682	641

Nutrient (N, P) Use

Efficiency, % = Crop Yield / Total N Inputs

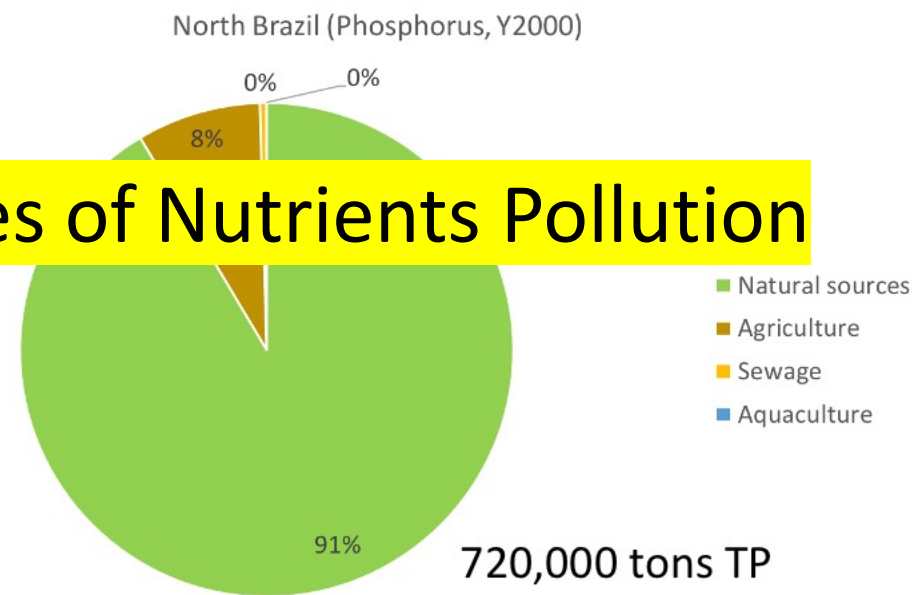
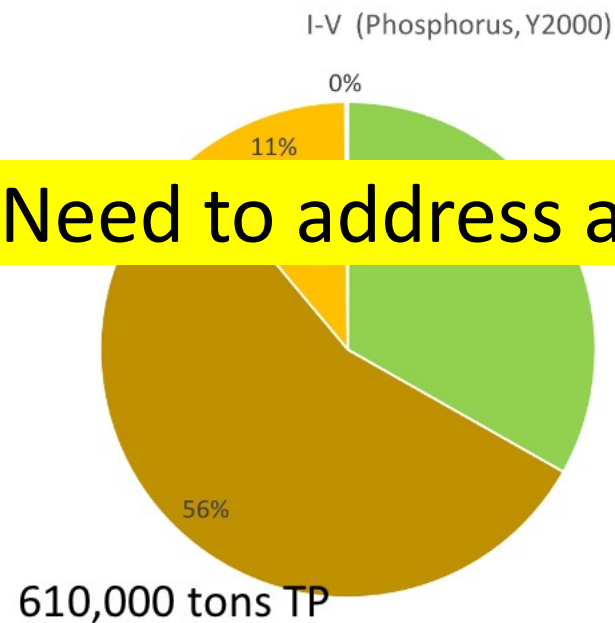
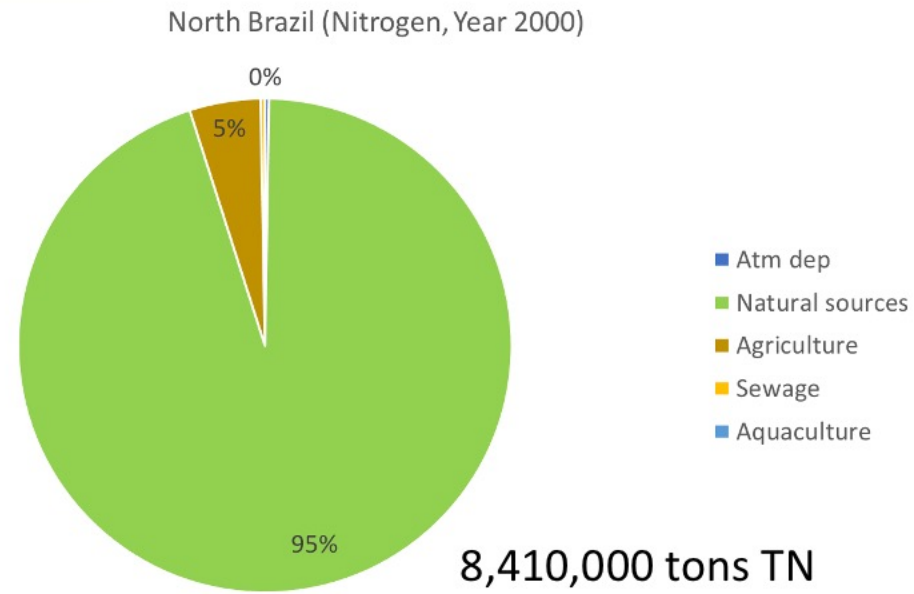
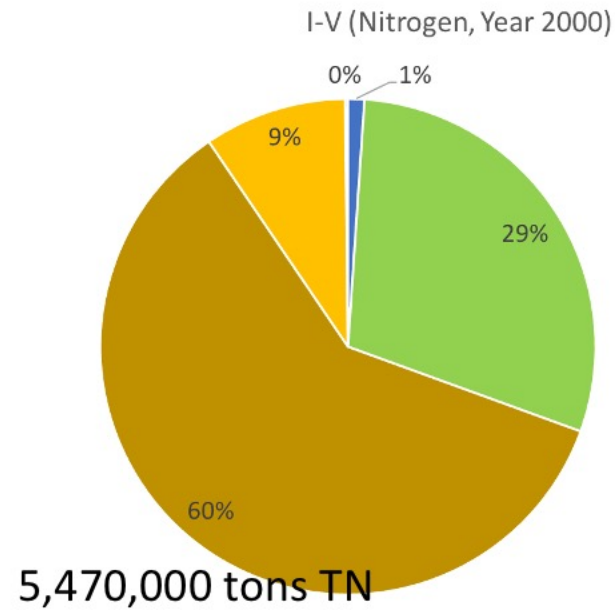
- Decreasing Use Efficiency generates **SURPLUS Nutrients** which contribute to **agricultural runoff**
- N use efficiency = 57%
- P use efficiency = 57%
- **Fertilizer waste = 40% (regional; country-scale waste range from 35 to 90%!)**

Domestic waste: Inventory method for year 2010



WCR Sub-region	Population in watershed area draining to WCR, 10 ³ (2010)	2010 Untreated Wastewater released to environment 10 ⁹ m ³ /yr	10 ³ · tons TN in Untreated Wastewater (2010) (N = 60 g m ⁻³)	10 ³ tons TP in Untreated Wastewater (2010) (P = 10 g m ⁻³)
Sub-region I	198,402	5.68	341	57
Sub-region II	20,262	0.81	48	8
Sub-region III	70,018	4.70	282	47
North Brazil	22,634	0.79	39	13
Sub-region IV	3,014	0.18	11	2
Sub-region V	38,017	2.45	147	25
WCR	352,449	15.00	869	152

Land-based Sources of Nitrogen and Phosphorus (Beusen 2016, Model Year 2000)



Need to address all sources of Nutrients Pollution

Marine Based sources of nutrient pollution:

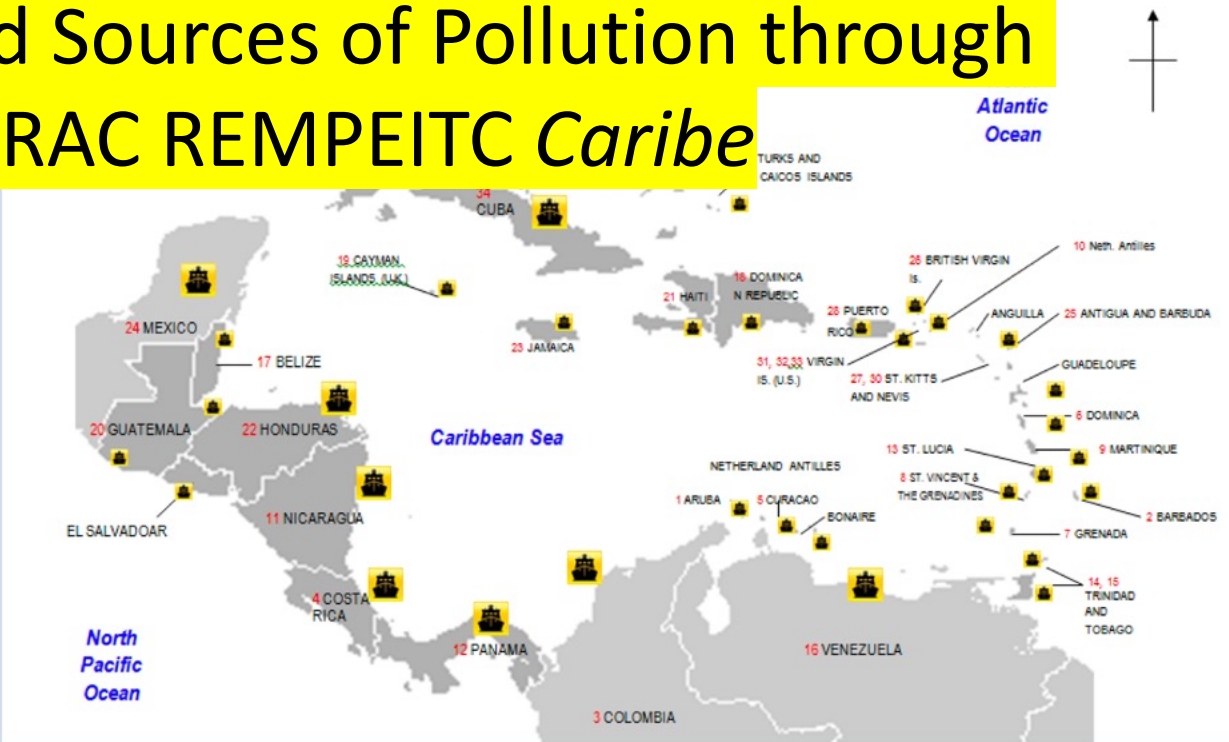
Year 2020 Report Card for 18 Cruise Lines with 320 cruise ships

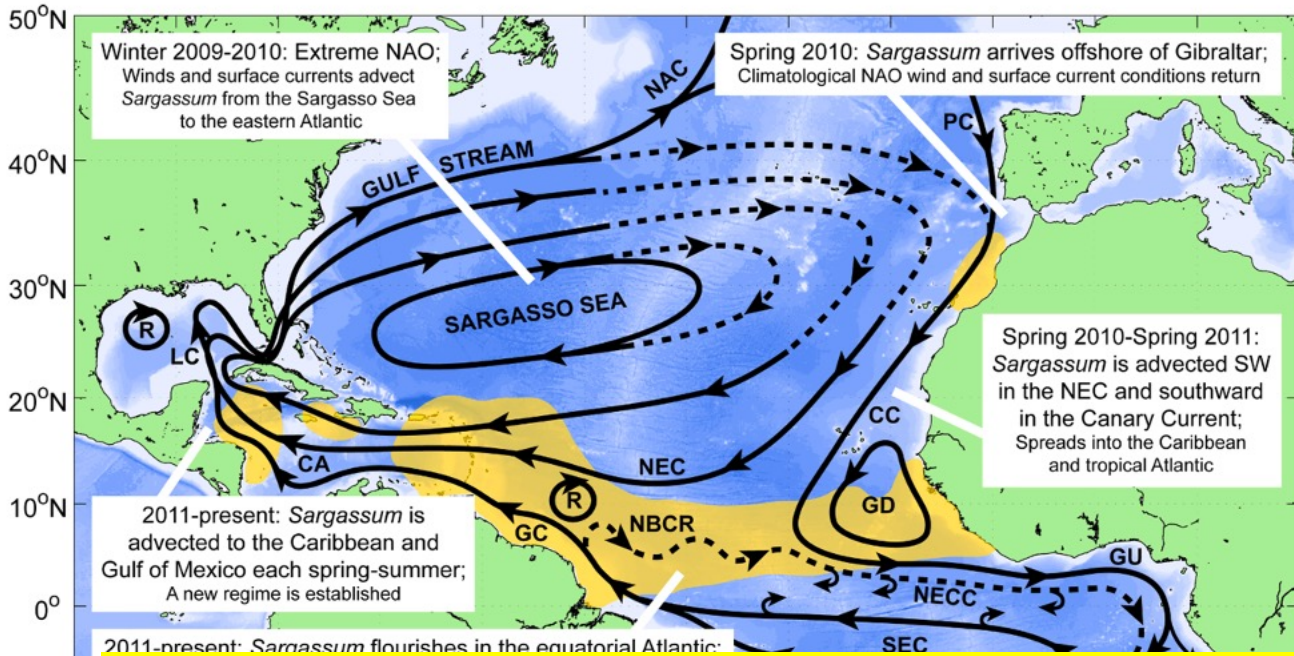
Criminal Violations: All Carnival Corporation companies committed criminal environmental violations from 2017 - 2020.						
CRUISE LINE	Sewage treatment	Air pollution reduction	Water quality compliance	Transparency	Criminal Violations	2020 FINAL GRADE
Disney	C	A-	A	A		X -B-
Silversea	D-	F	A	A		C
Celebrity	C	F	F	A		D+
Royal Caribbean	C-	F	F	A		D
Virgin Voyages	C	F	F	A		D
Regent Seven Seas	C	F	A	F		D
Princess						
Norwegian						
Oceanic						
Seabourn						
Holland America	C	F	F	F	✓	X F
Cunard	C	F	F	F	✓	X F
AIDA Cruises	C-	F	F	F	✓	F
P&O Cruises	D-	F	F	F	✓	F
Carnival Cruise Line	F	D	F	F	✓	F
MSC Cruises	D-	F	F	F		F
Costa	F	F	F	F	✓	F
Crystal	F	F	N/A	F		F

We need to address Marine Based Sources of Pollution through collaboration with IMO including RAC REMPEITC *Caribe*

(Friends of the Earth)

Type of visitor	Total number of visitors	Percentage of total visitors	Avg. length of stay (days)	Average daily expenditure (US\$)	Total expenditure (US\$ millions)	Contribution toward overall tourism revenue
Yachting	29,114	5.2%	10.8	42.71	13.43	4.5%
Stay-Over	207,662	36.8%	7.8	169.67	274.83	92.4%
Cruise Ship	328,038	58.1%	1.0	27.95	9.17	3.1%
Total	564,814	100%	4.0	240.59	297.43	100%





Linkages between Sargassum & Nutrient Enrichment – LBS/SPAW

Category	Costs	Economic effect
Beach Clean-up	\$1,000 per meter of beach (Mexico) \$45 million per year (Florida, USA)	\$17 million spent by Mexico since 2011 to remove 520,000 tons of seaweeds, plus \$2.6 million to remove 85,000 tons in 2019 (Chavez et al. 2020) or removal cost of \$33/ton of seaweeds;
H ₂ S and NH ₃ Gas Intoxication	No data	Euros 10 million grant by the French government to do medical surveillance and training and beach cleanup in Guadeloupe and Martinique (Resieri et al. 2018)
Damaged coral reefs	No data	Caused by nuisance-bloom induced eutrophication over Mexican coral reefs (Cabanillas-Teran et al 2019)
Damaged seagrasses	No data	Caused by nuisance-bloom induced eutrophication over Mexican seagrasses (van Tuessenbroek et al. 2017)
Lost Tourism Revenues	No data	Occupancy dropped during nuisance blooms and hurricanes
Lost Fishery Revenues	No data	Barbados: Losses by harvest and post-harvest sectors for the period 2010-2015 (Ramlogan 2017)

RNPRSAP Structure

➤ 9 STRATEGIC PILLARS

Nutrient sources (5), Ecological impacts (2)
Socioeconomic consequences (1), Enabling conditions (1)

➤ IMPLEMENTATION FRAMEWORK

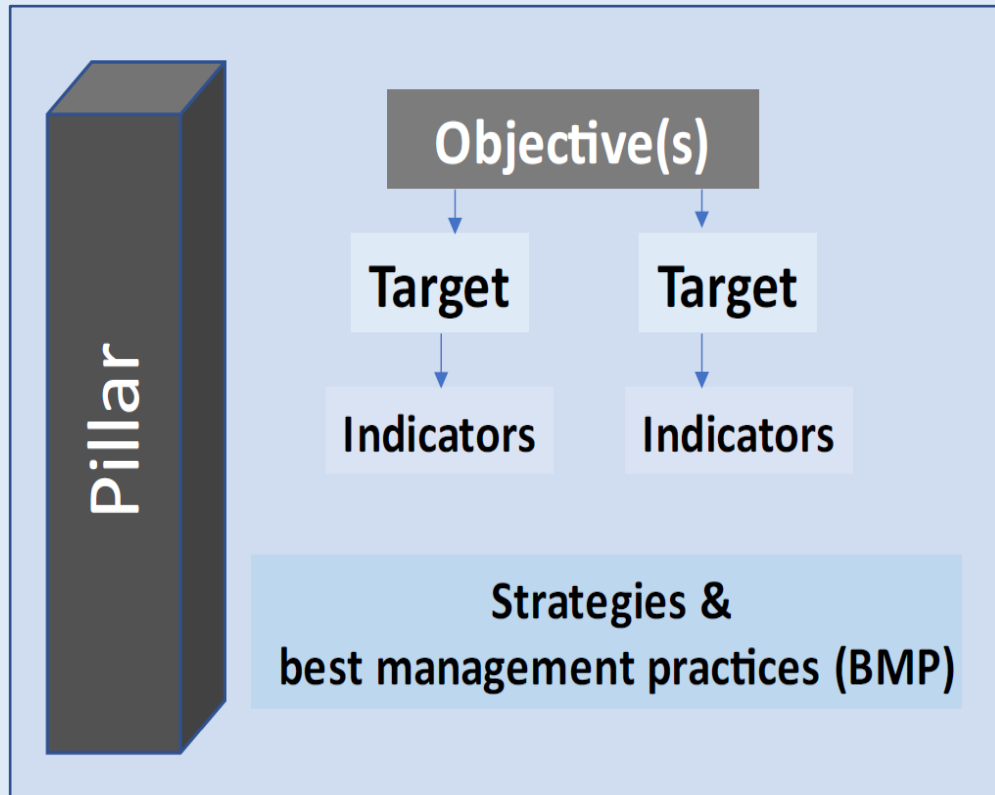
- Institutional Implementation Framework
- Action Framework (2021 - 2030)

➤ MONITORING FRAMEWORK

- Baseline, Targets & Indicators

➤ COMPENDIUM OF BEST MANAGEMENT PRACTICES

➤ RECOMMENDATIONS



Guiding principles

Science-based approach

Building on the existing foundation

A ridge to reef, integrated watershed approach

Balancing ecological, social, and economic imperatives

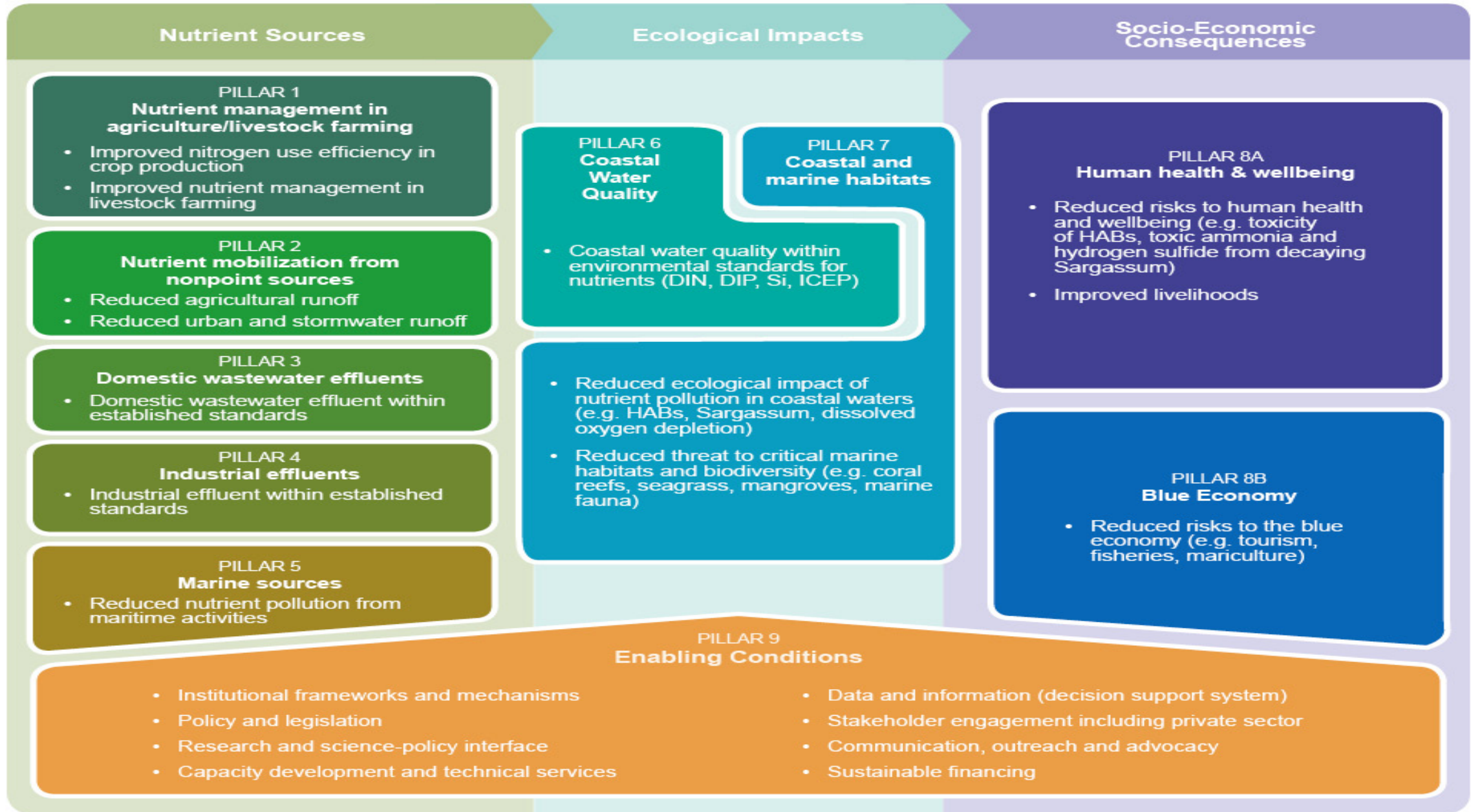
Alignment with relevant national, regional and global policies, frameworks and targets

Strategic, preventative actions at source

Engagement of all key stakeholders

Adaptive management

STRATEGY STRUCTURE: PILLARS AND OBJECTIVES



Pillar 1: Sustainable nutrient management in agriculture

Objective 1.1. Improved nitrogen (nutrient) use efficiency (NUE) in crop production

Target	Indicator
Halve nitrogen waste from all sources by 2030 (Colombo Declaration)	% reduction in N waste; NUE
SDG 2.4: Sustainable food production systems and resilient agricultural practices	Proportion of agricultural area under productive and sustainable agriculture; UNECLAC complementary indicator: Fertilizer use intensity
SDG 12. Production-based nitrogen emissions: Long-term objective is a value of 2 by 2030.	
Post-2020 Global Biodiversity Framework, Target 17: Eliminate harmful subsidies by 2030	Potentially harmful elements of government support to agriculture (environmentally harmful subsidies) as a percentage of GDP

BMP examples: '4Rs' approach (right fertilizer, right rate, right time of application, right placement); nutrient recovery and recycling (BMP Compendium)

Pillar 3: Domestic wastewater effluent

Objective 3.1. Domestic wastewater effluent meeting standards for nutrients

Target	Indicator
Regional criteria and limits for N and P in domestic wastewater effluent, and associated target(s) to be established under the LBS Protocol, in consultation with member states	% discharge compliant with N and P effluent standards. N and P loads and concentrations in wastewater effluent.
SDG 6.3: Improve water quality by reducing pollution, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	% domestic and industrial wastewater flows safely treated. Long-term objective for this indicator is 100 % of wastewater treated. % of water bodies with good ambient water quality.

BMP examples: Nature-based solutions in combination with hard engineering, recovery of N and P from domestic wastewater , reuse of treated sanitation waste (e.g., fertilizer, irrigation, biogas production)

Pillar 6: Coastal water quality

Objective 6.1. Coastal water quality meeting environmental standards

Target	Indicator
SDG 14.1. By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including nutrient pollution	Index of Coastal Eutrophication Potential (ICEP)
SDG 6.3. By 2030, improve water quality by reducing pollution....	% of bodies of water (rivers, groundwater and coastal waters) with good ambient water quality
Regional targets to be established: e.g. Coastal waters (Class I and nutrient hotspots) restored to 'good' status (or natural levels of N and P) by 2030. Note: Criteria and standards for 'good' status to be developed and approved by member states	<ul style="list-style-type: none">• Concentration of DIN, DIP, Chl-a, TSS, DO (bottom water)• DIN, DIP, Si loads at river mouths (NEWS model)• Proportion of marine area meeting standards

BMP examples: Restoration/ protection of coastal vegetation, ecosystem-based approaches (integrated watershed and coastal area management, marine spatial planning) in combination with BMPs to address nutrient pollution sources

Pillar 8: Human wellbeing and the blue economy

Objective	Target	Indicator
8.1. Reduce risks to human health and wellbeing	SDG 3.9. By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	<ul style="list-style-type: none"> -SDG 3.9.2. Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene. -Number of persons affected/ type of illnesses per year. -Annual cost of addressing human health impacts. -Number of advisories for polluted water per year. - Number of shellfish beds and fisheries closures per year.
8.2. Reduced risk to livelihoods	No loss of livelihoods linked to nutrient pollution (TBD)	<ul style="list-style-type: none"> - Number of persons affected per year. - Average loss in income per year.
8.3. Reduced risks to the blue economy	TBD	<ul style="list-style-type: none"> - Economic losses per year by sector. - Job losses per year by sector. - Opportunities created. - Economic cost of mitigating nutrient pollution/addressing impacts.

Pillar 9: Enabling conditions for addressing nutrient pollution

Objective 9.1. Establish enabling conditions for addressing nutrient pollution and its impacts in the WCR

Targets

- Enhance institutional frameworks and mechanisms
- Promote policy and legislative reforms
- Improve data and knowledge base and decision support system
- Improve science-based policy and decision-making
- Strengthen capacity
- Increase stakeholder involvement, buy-in and awareness
- Promote development of sustainable financing mechanisms

Implementation

- The RNPRSAP is to be implemented primarily through actions at the national level.
- Alignment of the strategy with the 2030 Sustainable Development Agenda, CBD Post-2020 Global Biodiversity Framework, Colombo Declaration & UNEA Declarations; Cartagena Convention LBS Protocol & other relevant MEAs.
- The RNPRSAP also aligns well with the UN Decade of Ocean Science, UN Decade on Ecosystem Restoration, and the UNEP-CEP Marine Habitats Strategy.
- Coordination across all levels & strategic partnerships will be imperative for cost-effective and efficient implementation.

Institutional implementation framework

Level	Organizations/Stakeholders
Global	UNEP, FAO, UNDP, IMO, GPA, GPNM, PAHO/WHO
Regional	UNEP CAR/RCU Cartagena Convention Secretariat (responsible for coordinating implementation supported by the LBS RACs and RAN, LBS Protocol STAC and Monitoring and Assessment Working Group), GPNM-Caribbean, CLME+ ICM.
Sub-regional	CARICOM, SICA/CCAD, OECS, and ACTO - Support implementation of the strategy among member states, by integrating the strategy and action plan into their relevant programmes; and facilitating stakeholder engagement and awareness raising.
National	Countries (Cartagena Convention and LBS Protocol Contracting and Non-Contracting Parties) will be responsible for implementation at the national and local levels. Increased ratification of the Convention and LBS Protocol will greatly contribute to achieving the objectives of the strategy.

Partnerships with technical and programmatic stakeholders from civil society, the **private sector** and academia, among others, and engagement with financial institutions will be critical to support roll out.

Action framework: Line of Action & Activities

Regional

- Menu of actions from which countries can select according to their specific context/needs.
- The RNPRSAP must be adapted to the local/national contexts including the main source(s) of nutrient pollution and priority watersheds or coastal areas.
- Actions must be prioritized and targeted to ensure that limited resources are allocated where they are most needed.

Action framework- Lines of Action & Activities

National

- Institutional frameworks and mechanisms
- Policy, legislation, and regulatory frameworks
- Stakeholder engagement/communication/public awareness
- Characterize and prioritize watersheds/sources
- Screen and classify coastal waters
- Research
- Criteria and standards
- Monitoring, data collection, assessment
- Capacity building
- Incentive programmes
- Sustainable financial plan
- Nutrient reduction targets and allocation of total allowable pollution loads
- National nutrient pollution reduction action plan (watershed action plan) – based on regional strategy
- Implement action plan
- Monitoring and adaptive management

Activities are included for each line of action

Action framework: Timeframe

The 2021-2030 timeframe for implementation is aligned with global targets (SDGs, Post-2020 Global Biodiversity Framework, and Colombo Declaration), although the response time of the system to interventions is unknown at this time.

The timeframe is divided into two blocks of 5 years each:

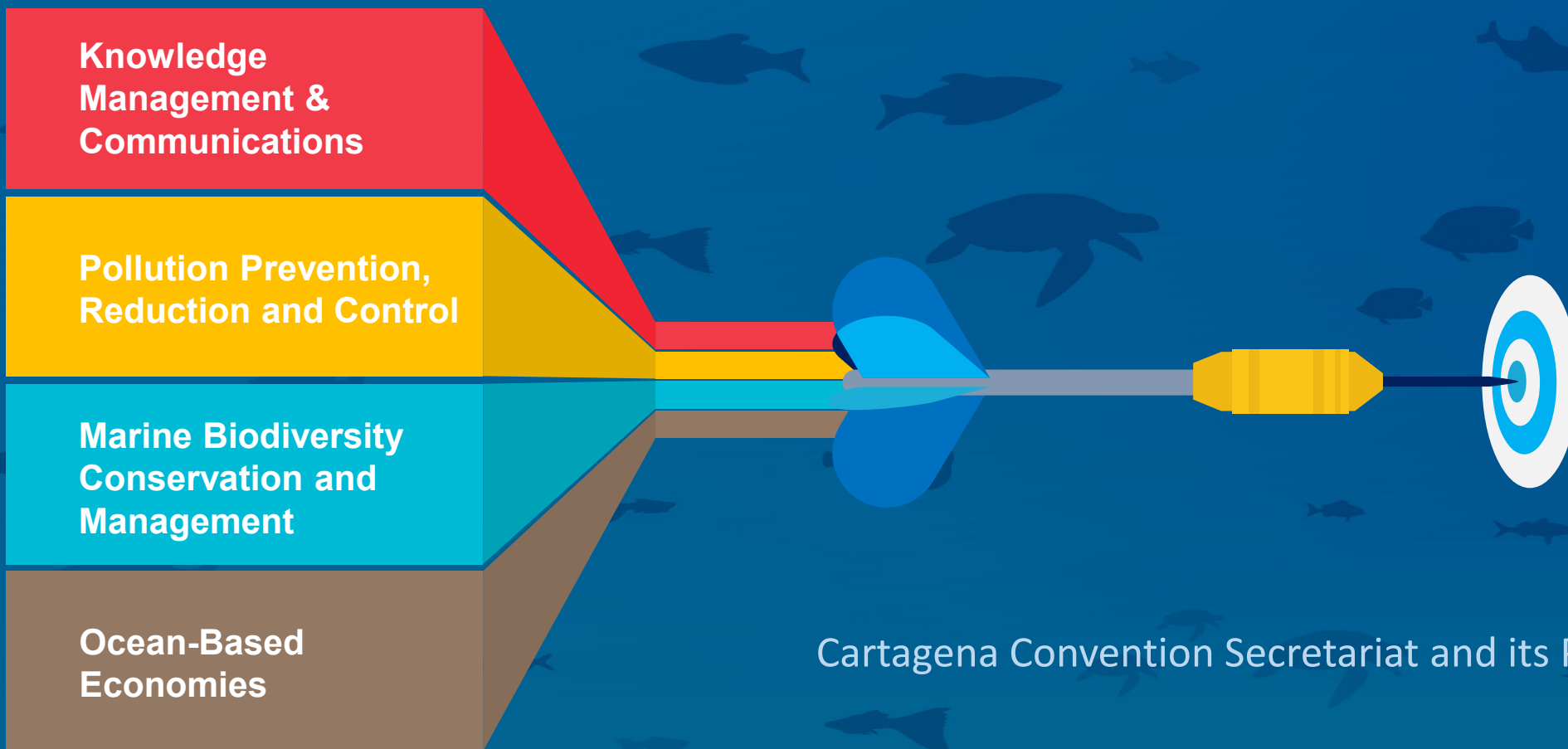
- 1st time period focuses on establishing enabling conditions and other preparations
- 2nd time period focuses on on-the-ground implementation. Provisions must be made for differences in capacity, institutional and policy frameworks, etc. among the countries, with some countries requiring more time to implement the strategy than others.

Annex 5.2: Strategies & Best Management Practices Compendium
Describes strategies and best management practices (BMPs)

Annex 5.4: Monitoring Framework

Proposed monitoring framework incorporating global and regional targets and indicators, for each objective

CEP Strategy 2021-2030



Cartagena Convention Secretariat and its Protocols

Component I



Institutional, policy, legislative and regulatory reforms for Integrated Water and Wastewater Management (IWWM)

Component II



Sustainable and tailor-made financing options for urban, peri-urban and rural IWWM

Component III



Provision of innovative small-scale, local, rural, peri-urban and community-based solutions for IWWM

Component IV



Knowledge Management and Advocacy on the importance of IWWM in order to achieve the Sustainable Development Goals

Activity 2.3.1	Convene national/regional capacity building meetings & workshop(s) involving at least 10 non-Contracting Parties to the LBS Protocol on pollution.
Activity 2.3.2	Develop national pollution reduction action plans for at least 5 Contracting Parties to the LBS Protocol with a priority focus on national marine litter/plastics reduction (at least two), domestic wastewater and <u>nutrients reduction strategies and action plans</u> .
Activity 2.3.3	Implement local/national Ecosystem-based Management (EBM) projects promoting an integrated approach to pollution reduction and habitat restoration in at least two selected countries who are parties to both the LBS and SPAW Protocols. (Suriname and Guyana)
Activity 2.3.4	Develop/Update national legislation and/or regulations on <u>wastewater effluent discharges</u> in at least 6 Contracting Parties to the LBS Protocol.
Activity 2.3.5	Implement innovative decentralized, rural community based interventions for wastewater management in at least 4 Contracting Parties.

5th LBS STAC May wish to consider Recommendations to :

- Endorse the RNPRSAP & recommend Approval by the 5th LBS COP
- Establish a sub-group(s) of the Monitoring & Assessment WG to support implementation of the Strategy (*monitoring and assessment strategy, targets & indicators, Ecological quality etc*)
- Facilitate sharing of experiences among Parties of the Convention e.g. USA in nutrient pollution action plans for Gulf of Mexico; Colombia/INVEMAR in coastal monitoring and with other Regional Seas Programmes e.g. European water framework directive in setting ecological objectives.
- Use the UNEP GPA GPNM Framework to facilitate further training and capacity building
- Prioritize needs and actions at the national and regional levels, determine associated timeframe including addressing data and capacity gaps as well as identifying/ adapting targets and indicators
- Consider issue of Nutrients in any review of the text or Annexes to the LBS Protocol

5th LBS STAC May wish to consider Recommendations to :

- Identify and/or use existing opportunities to ‘test drive’ the strategy (e.g., pilot projects) including identifying priority areas for action (hot spots) for nutrient reduction & habitat restoration. This should consider the pollution reduction and habitat restoration investment plans developed by the Secretariat with support of the CLME+ project.
- Identify new funding opportunities including private sector partnerships
- Identify opportunities through the Decade of Ocean Science and UN Decade on Ecosystem Restoration to establish/strengthen enabling conditions
- Implement Advocacy / stakeholder engagement efforts in collaboration with regional partners to ‘sell’ the strategy and get buy-in and prepare the ground for uptake and implementation.
- Prepare plan for (incrementally) rolling out the strategy at national and regional levels

THANK YOU/GRACIAS/MERCI

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and Cartagena Convention Secretariat

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