World aquaculture production and challenges
FAO's work for a sustainable growth

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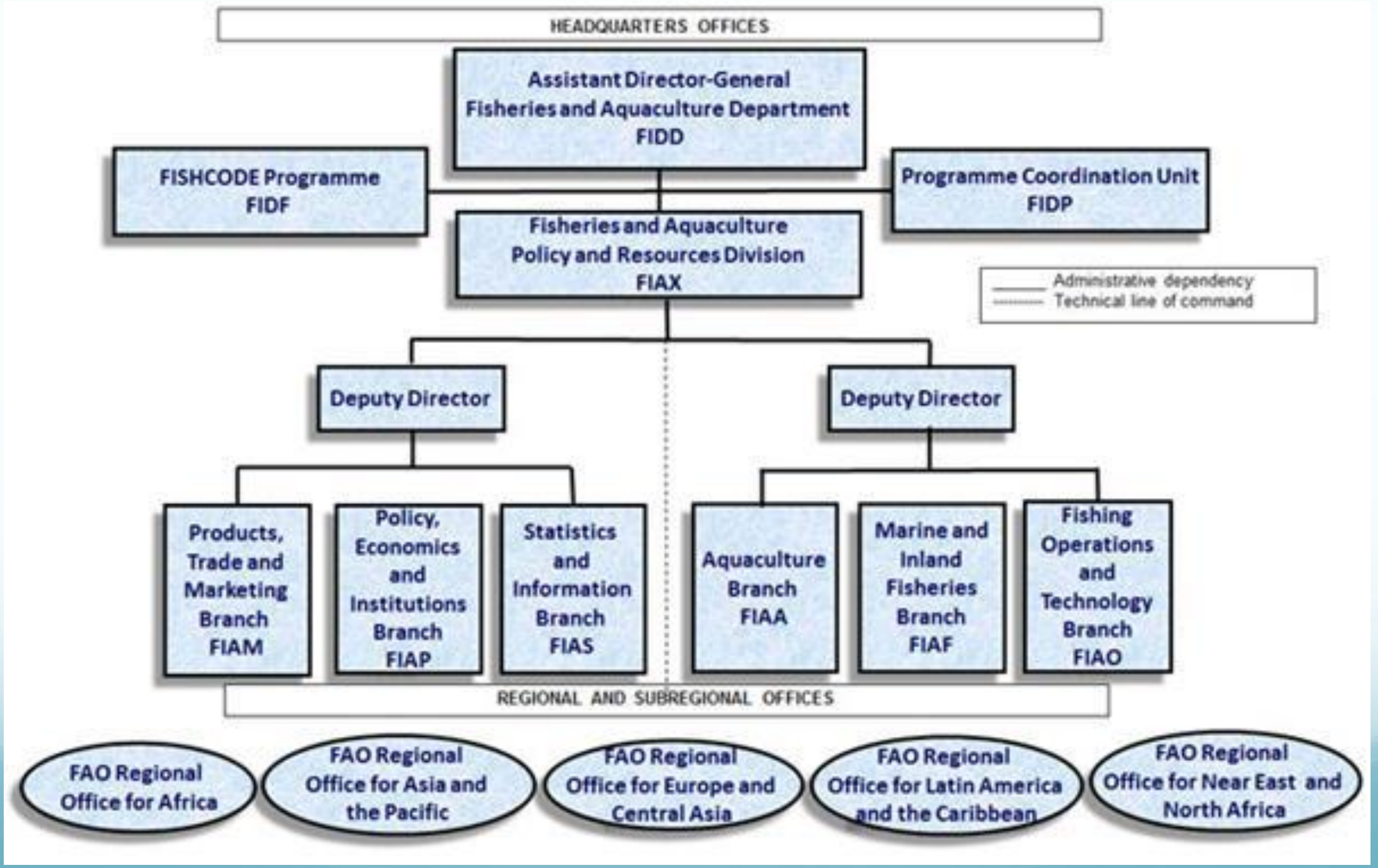
HEADQUARTERS OFFICES
Assistant Director-General
Fisheries and Aquaculture Department
FIDD
FISHCODE Programme
FIDF
Programme Coordination Unit
FIDP
Fisheries and Aquaculture
Policy and Resources Division
FIAX
Administrative dependency
Technical line of command
Deputy Director
Deputy Director
Products, Trade and Marketing Branch FIAM
Policy, Economics and Institutions Branch FIAP
Statistics and Information Branch FIAS
Aquaculture Branch FIAA
Marine and Inland Fisheries Branch FIAF
Fishing Operations and Technology Branch FIAO
REGIONAL AND SUBREGIONAL OFFICES
FAO Regional Office for Africa
FAO Regional Office for Asia and the Pacific
FAO Regional Office for Europe and Central Asia
FAO Regional Office for Latin America and the Caribbean
FAO Regional Office for Near East and North Africa

Food and Agriculture Organization of the United Nations

The FAO Fisheries and Aquaculture Department (FI)

- Responsible for the development of policies, strategies and guidelines;
- Provision of technical services to FAO members
- Management, economics and policy, information and statistics, products and industry, conservation and sustainability, operations and technology and emergency and rehabilitation activities in the field of fisheries and aquaculture
- In the context of FAO's Strategic Framework and Objectives.

Food and Agriculture Organization of the United Nations

The FAO Fisheries and Aquaculture Department (FI)

- Vision: A world in which responsible and sustainable use of fisheries and aquaculture resources makes an appreciable contribution to human well-being, food security and poverty alleviation.

- Mission: To strengthen global governance and the managerial and technical capacities of members and to lead consensus-building towards improved conservation and utilization of aquatic resources as well as the well-being of fishing communities.

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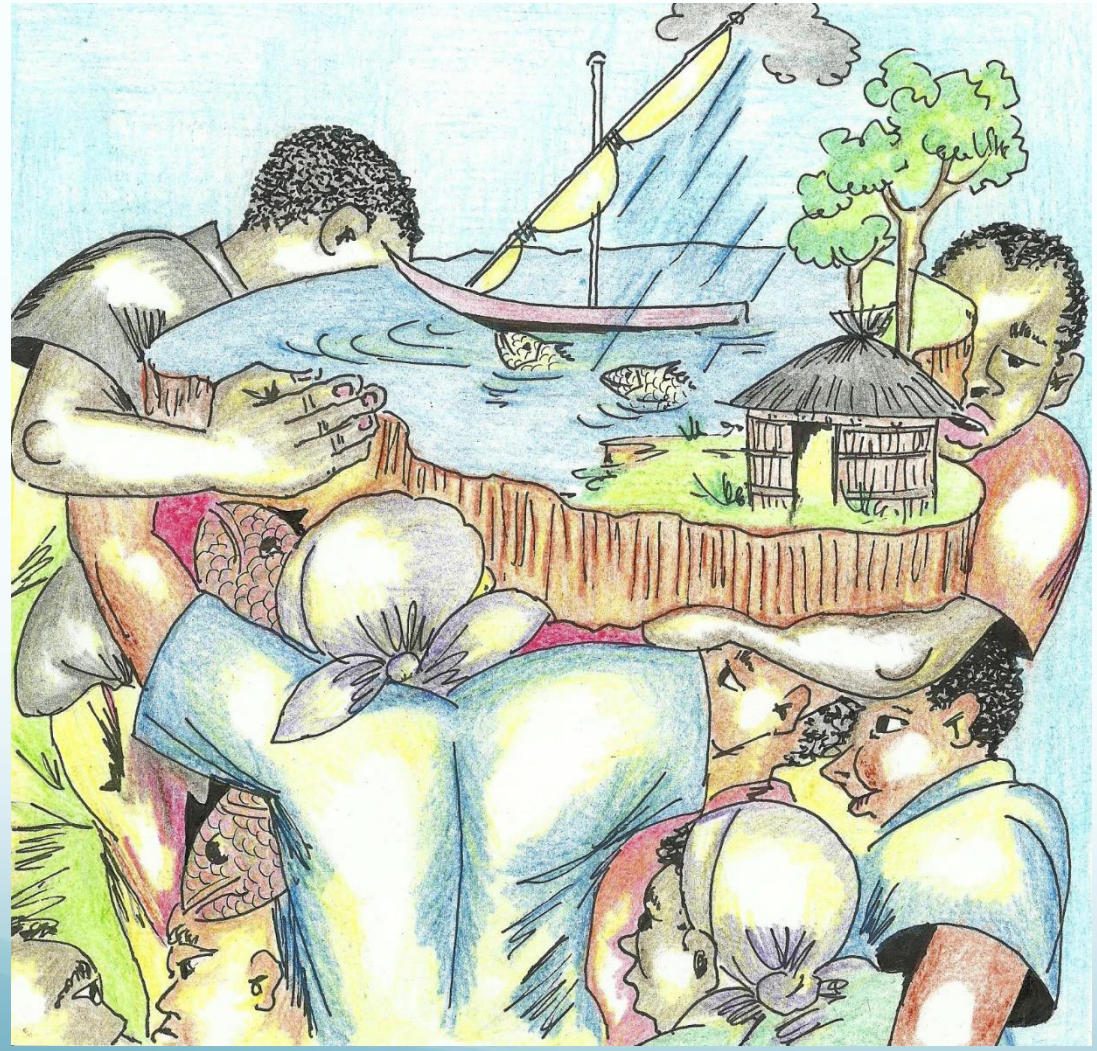
Facts and Figures



Oceans, coasts, lakes and rivers provide:

- 17% of global protein (>50% in Pacific SIDS)
- 12% of world population with a living
- Employ 56 million in primary sector (c. 14% are women)
- Fishery net export revenue of developing countries > than meat, tobacco, rice, sugar combined

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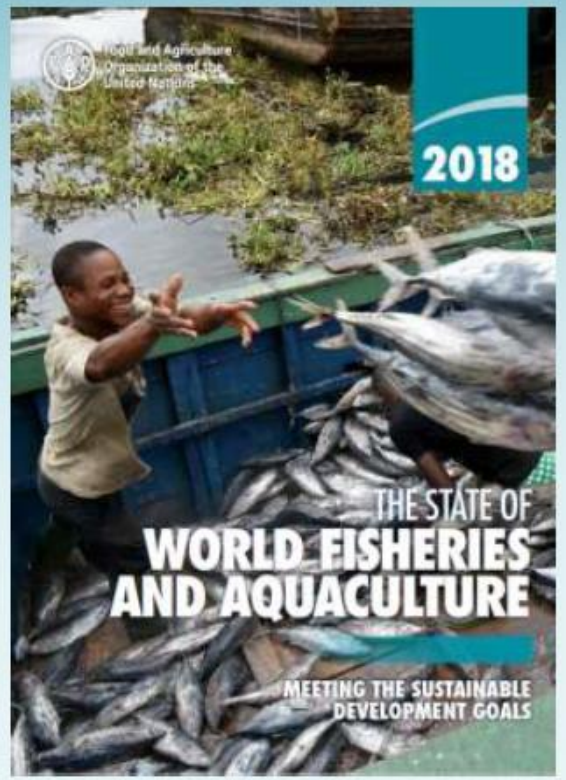
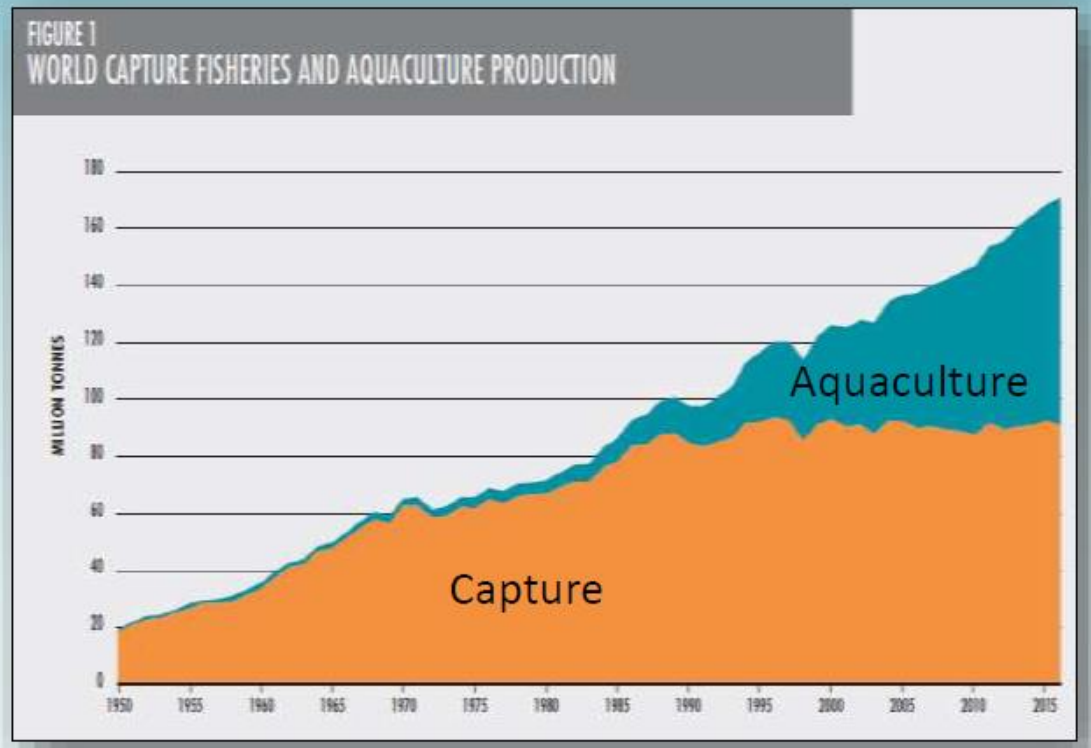
Global Total Fish Production





Note: Excludes aquatic mammals, crocodiles, alligators and caimans, seaweeds and other aquatic plants

- In 2016, reached an all-time high of 171 million tonnes
- 88 % utilized for direct human consumption

Owing to:

- Stable capture fisheries production
- Reduced wastage
- **Growth of Aquaculture**

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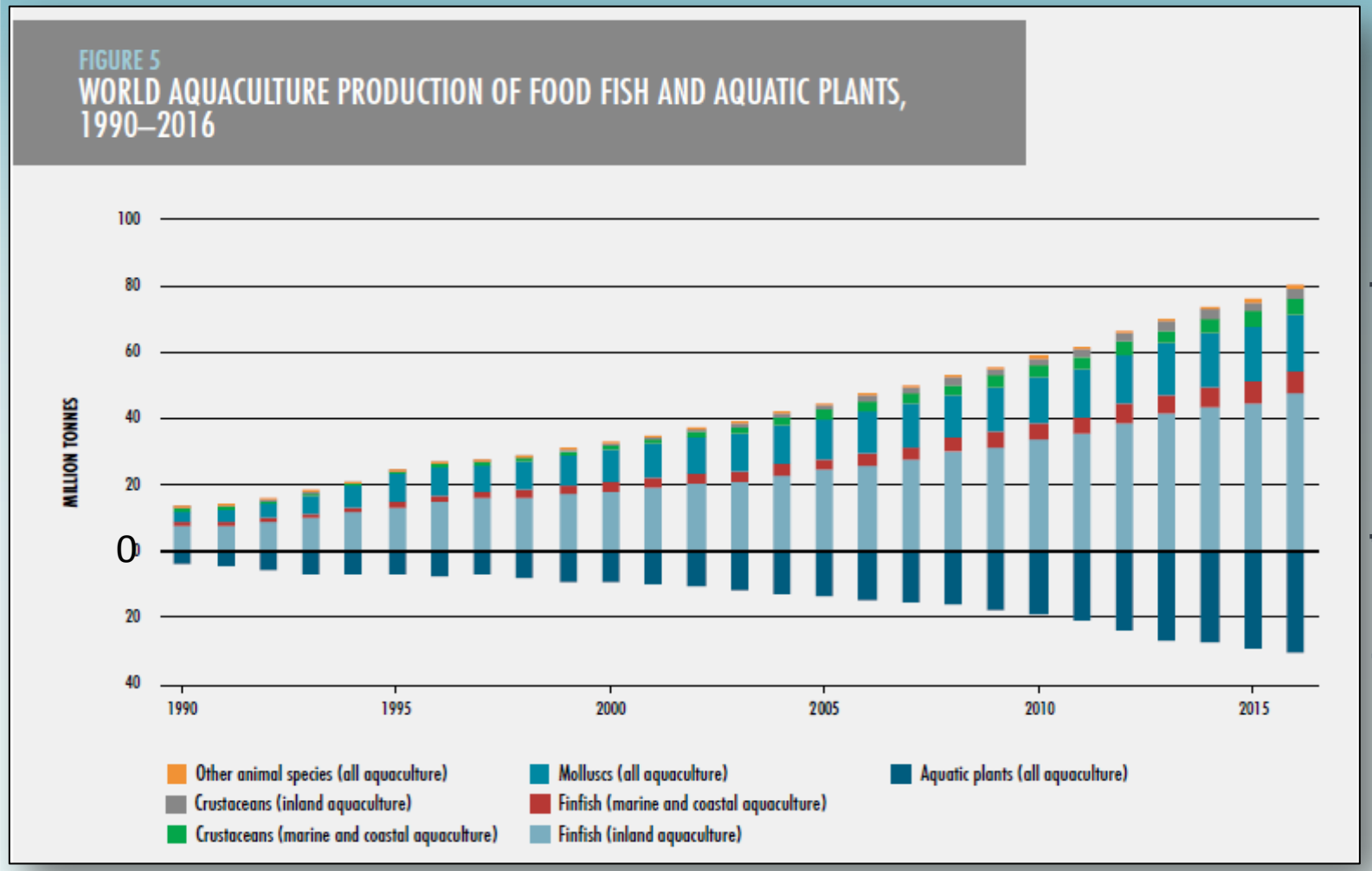
Global Aquaculture Production



In 2016

80 million tonnes of food fish (53% of total food fish)

30 million tonnes of aquatic plants

5.8 percent annual growth rate during 2001-2016

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Diversity of Systems and Species

Earthen ponds

Raceways

Pens

Cages

Plastic/Fiberglass tank

Concrete tanks

Bivalve culture

Seaweed culture on lines

Category	Number of Species Items Recorded by FAO (2016)
Finfish	369
Molluscs	109
Crustaceans	64
Amphibians & Reptiles	7
Other invertebrates	9
Algae/Seaweed	40

Insert pic of SoW AqGR Report

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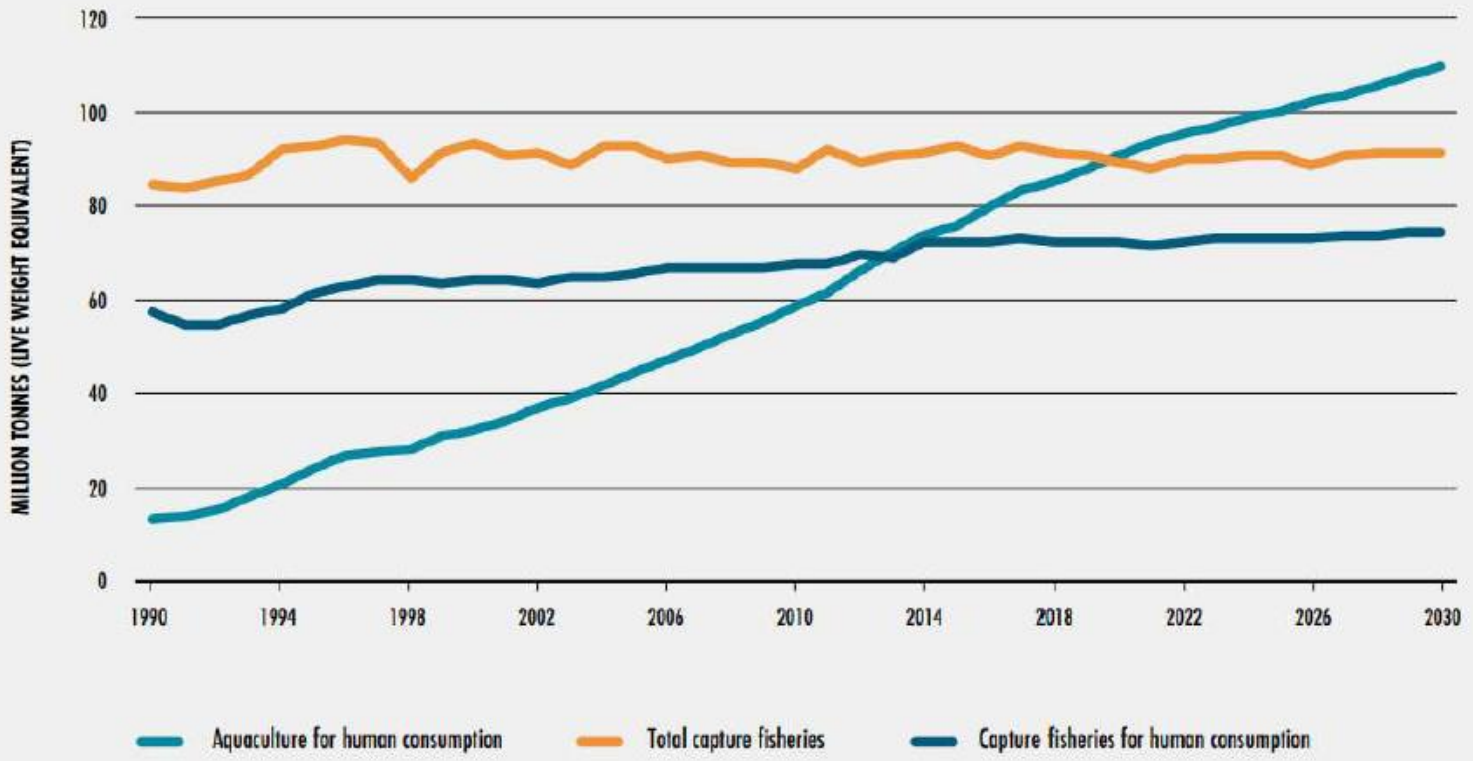
Projected Growth of Aquaculture

FIGURE 50
GLOBAL CAPTURE FISHERIES AND AQUACULTURE PRODUCTION, 1990–2030



- World fish **production, consumption and trade expected to increase**
- Aquaculture expected to **fill the supply–demand gap**
- Most of the production growth for fish will take place in **developing countries** and in particular in **Asia**
- Food fish **supply will increase in all regions**, while per capita fish consumption is expected to **decline in Africa**, which raises **concerns in terms of food security**

Source: FAO SOFIA 2018

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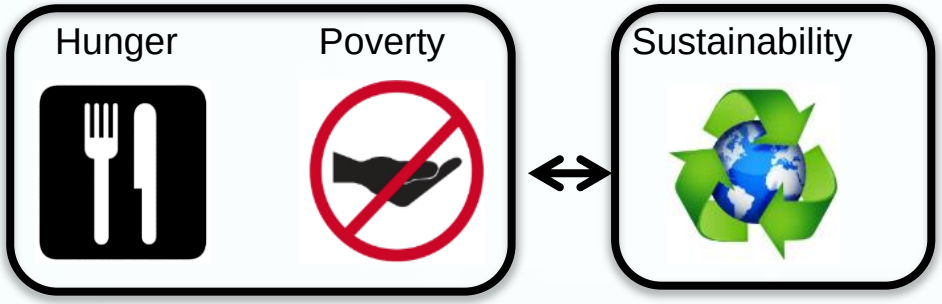

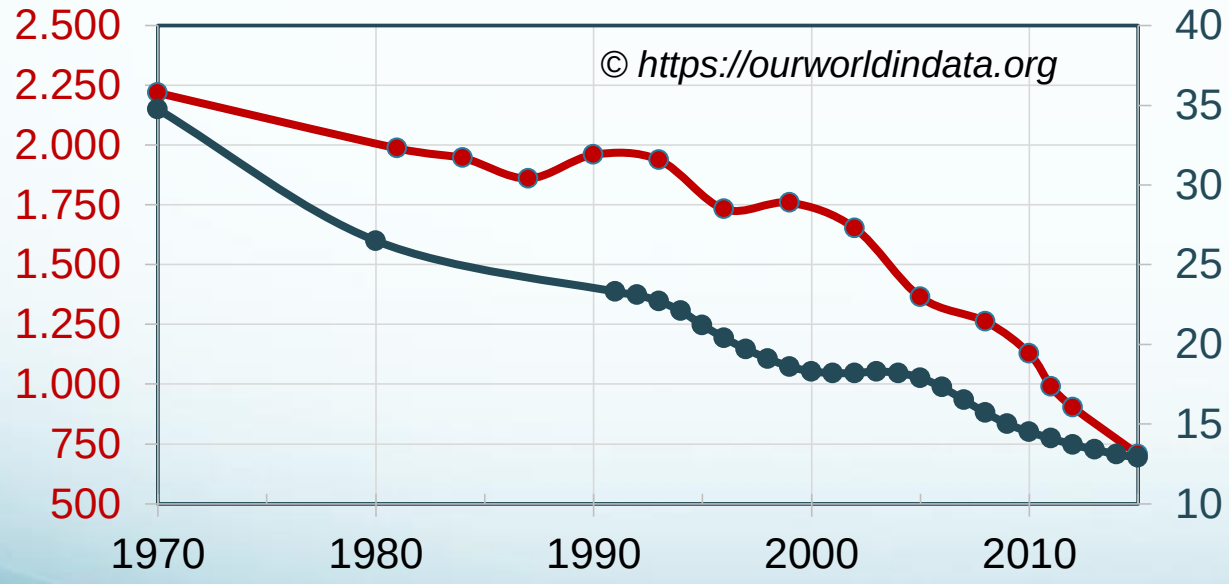

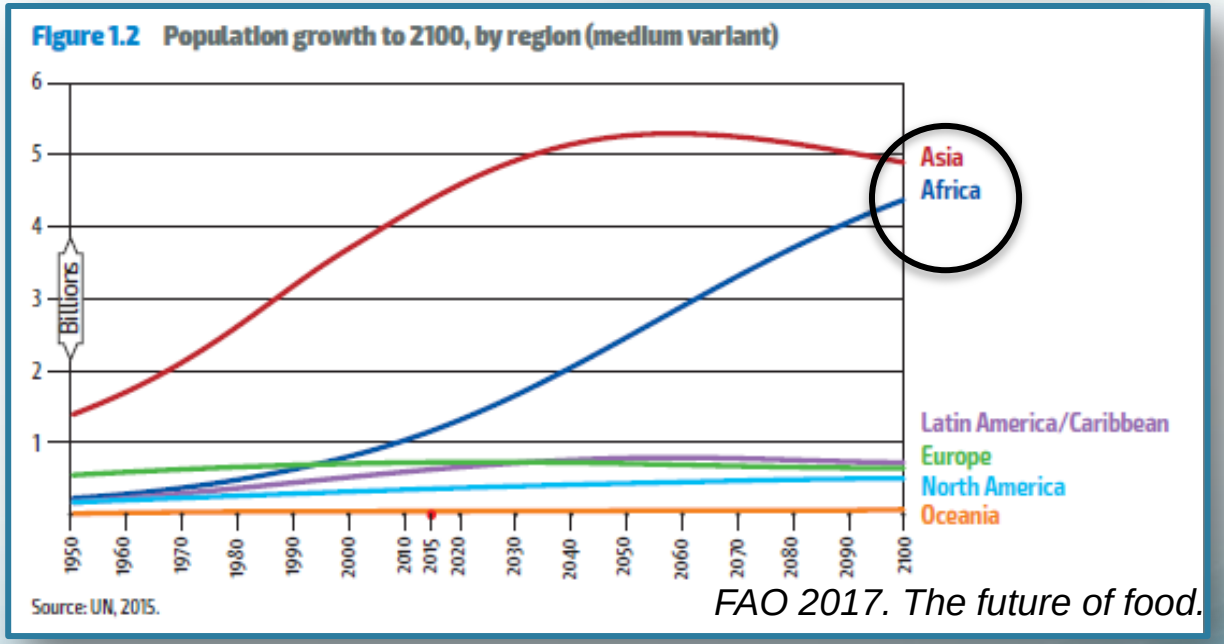

FAO 2017. The future of food.

"By 2050 we will need 50% more food than today…"
"50 million new mouths to feed per year"

Marine fish demand-supply gap in the early 2020s

- Supply: 550,
- Demand: 11
- Demand-sup
  10.7 mio t

- Current grow
  <4 %
- Needed grow
  >40 %

Source: Figure 31 in FAO Fisheries and Aquaculture Technical Paper 607 – Short-term projection of global fish demand and supply gaps

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Farming the ocean – Blue Growth

Unfed aquaculture

Fed aquaculture

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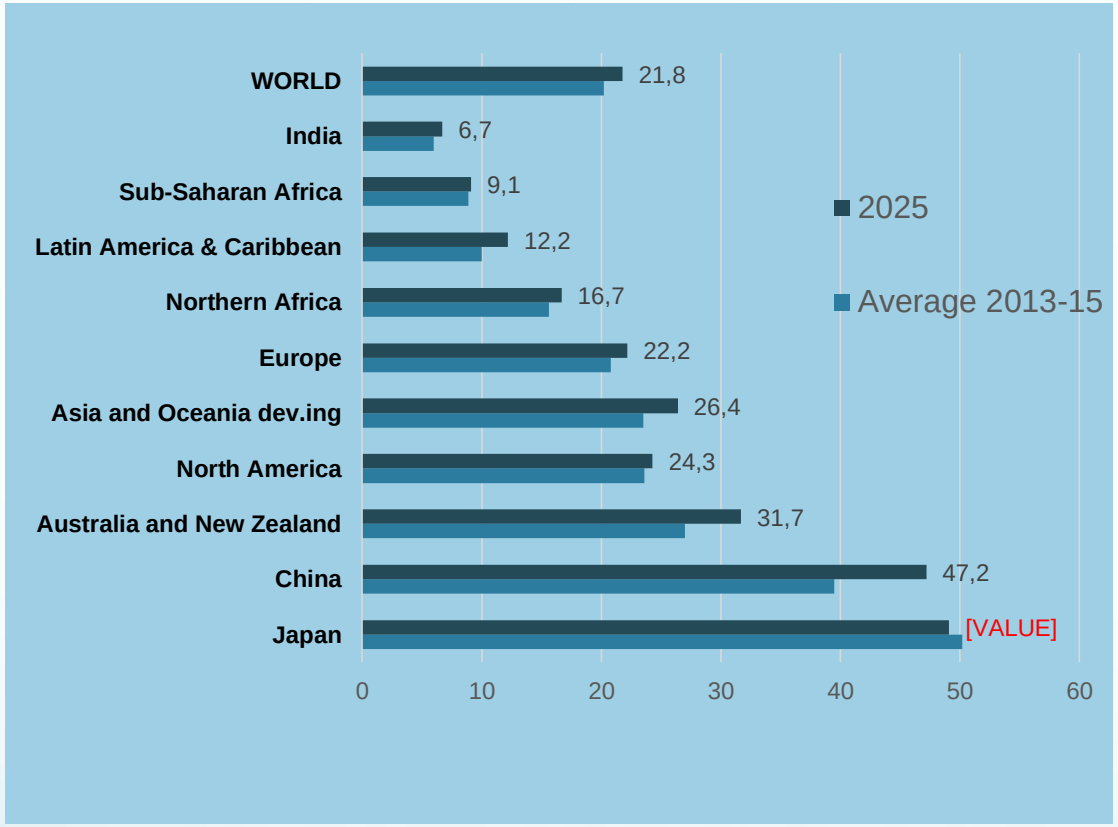
Fisheries per capita consumption



Source: OECD-FAO Agricultural Outlook 2016-2025 / Organisation for Economic Co-operatio1n and Development)
Countries/regions ranked by per capita fish consumption in 2013-15 average.
Countries/regions with declined per capita fish consumption highlighted in red.

Country/ region	Fish Demand (2030)		Total fish prod. (2012, mil. tonnes)	S-D gap 2030 (col. 4 minus col. 3)
	kg/cap.	Total (mil. tonnes)		
WORLD	**29.1**	**261.2**	**156.5**	**-104.7**
S.S. Africa	10.8	15.1	6.9	-8.2
L.A. & C.	12.2	18.3	14.8	-3.4
N. Africa	12.9	3.7	2.8	-0.8
Europe	27.3	23.4	16.0	-7.4
N. America	29.8	12.9	6.7	-6.1
Oceania	31.9	1.8	1.4	-0.3
Asia	37.0	186.3	107.8	-78.5

Source: Estimation of FI/FAO (preliminary results)
Main assumptions: 1) Per capita fish demand affected by income growth.
2) Fish price unchanged. 3) Preference over fish unchanged

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Food and agricultural systems are facing an unprecedented confluence of challenges

Natural resources are over-exploited, degraded, and their productivity declines

- water scarcity and pollution
- land degradation,
- deforestation
- biodiversity and ecosystem services losses
- overfishing and IUU fishing

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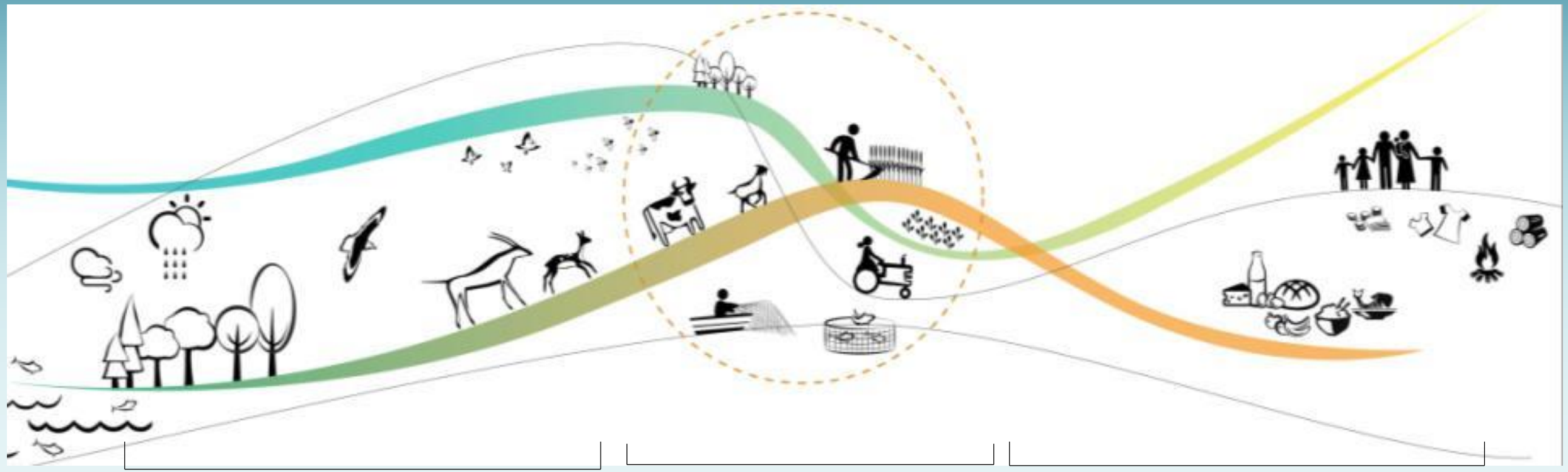
Common Vision for Sustainable Food and Agriculture



Conserve, protect, and enhance **natural resources**

Enhance the **efficiency of resource use**

Improve & protect **livelihoods** and human well-being

Enhance the **resilience** of people, communities and ecosystems

Promote and improve effective **governance**

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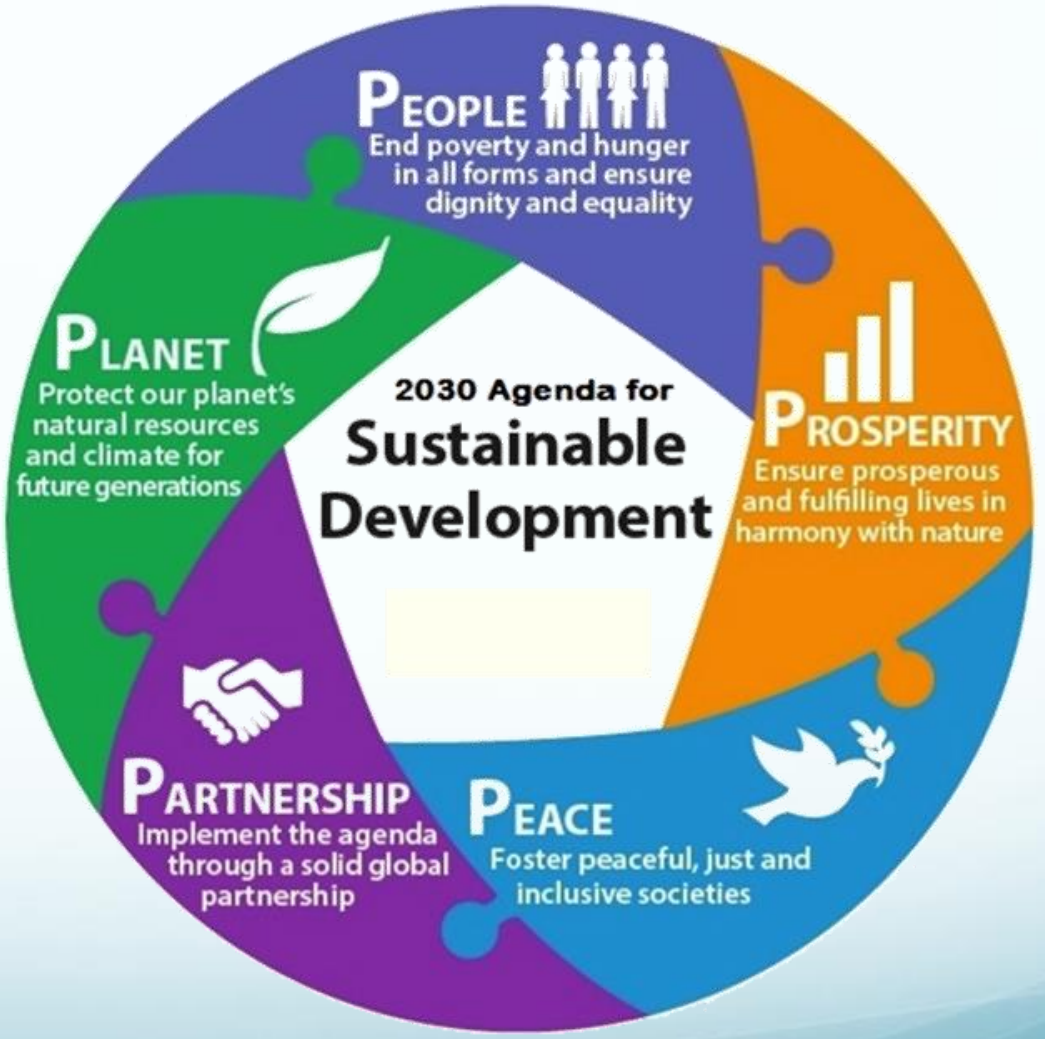
- 17 SDGs and 169 targets integrated and indivisible
- Equality & non-discrimination at the heart of sustainable development
- **Leaving no one behind**
- Ambitious – 2030 horizon
- Country-driven
- Paris Agreement on Climate Change
- Addis Ababa Action Agenda on Financing for Development



Leaving no one behind

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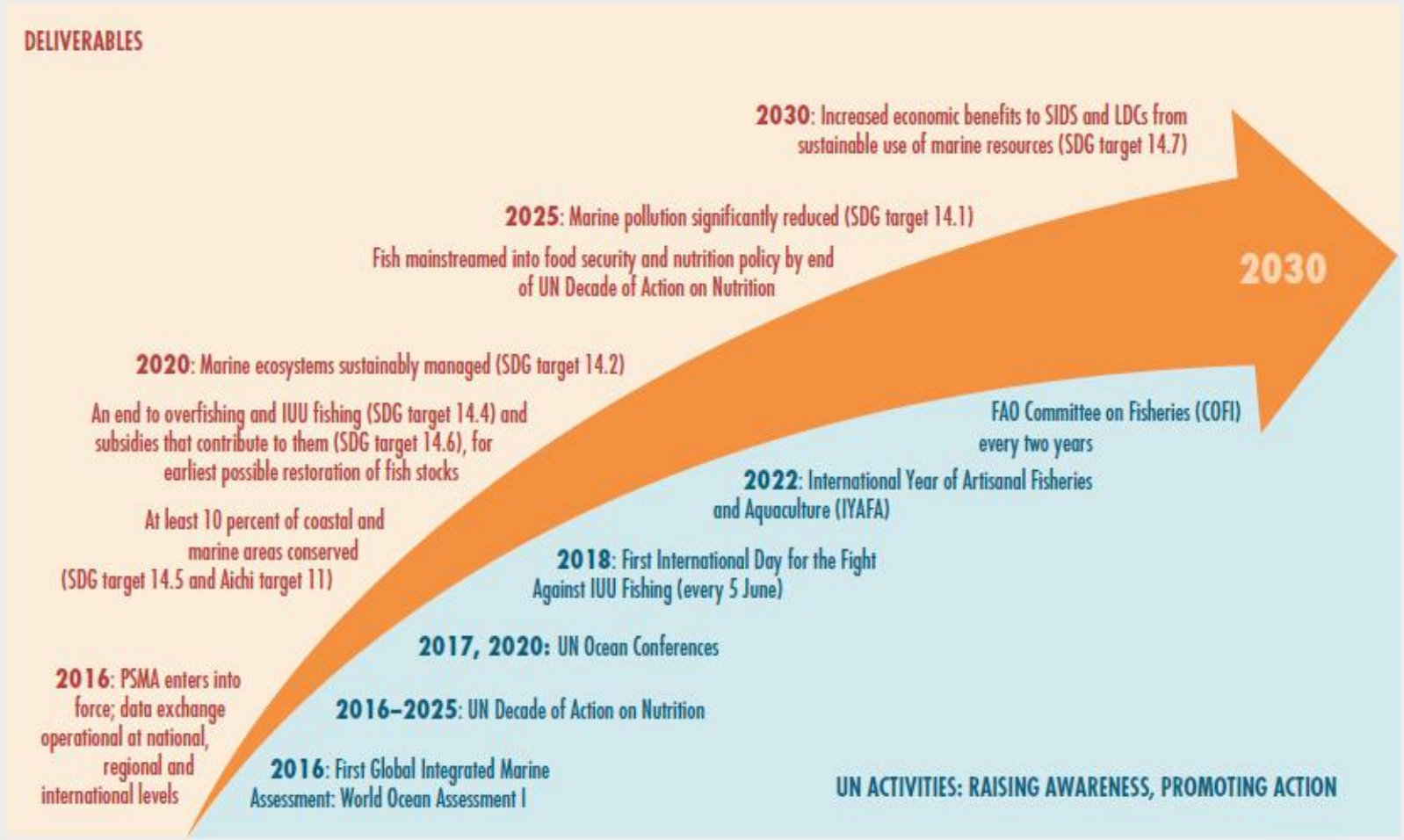
Meeting the Sustainable Development Goals

FIGURE 32
KEEPING MOMENTUM TO ACHIEVE THE 2030 AGENDA



Many SDGs are directly relevant to fisheries and aquaculture,

in particular SDG 14

‘Life under water’

SUSTAINABLE DEVELOPMENT GOALS

14 LIFE BELOW WATER

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SDGs: Key FAO messages

- ✓Food and agriculture are key to achieving the entire set of SDGs
- ✓Investment in food and agriculture will drive change across the SDGs
- ✓To leave no one behind, we must address the needs of rural people
- ✓We can reach zero hunger if we work together
- ✓FAO - Ready to support

- FAO's strategic framework is broadly aligned with the SDGs, promoting an integrated approach to poverty and hunger eradication, and sustainable management of natural resources. We are doing sustainable development, and are ready to align our work to better serve countries.

http://www.fao.org/3/a-i7454e.pdf

Leaving no one behind

Common Vision for Sustainable Food and Agriculture

Five key principles

- Increase productivity, employment and value addition in food systems
- Protect and enhance natural resources
- Improve livelihoods and foster inclusive economic growth
- Enhance the resilience of people, communities and ecosystems
- Adapt governance to new challenges

Key considerations for action

- Country ownership and leadership
- Cross-sector, integrated approaches and policy coherence
- Multi-stakeholder approaches and partnerships
- Alignment of investments, public and private
- Focus on actions with measurable results

Leaving no one behind

Engaging agriculture, forestry and fisheries in the 2030 Agenda:
20 actions to achieve the SDGs through Sustainable Food and Agriculture

TRANSFORMING FOOD AND AGRICULTURE TO ACHIEVE THE SDGs

FAO Guidance for decision-makers

5 principles for sustainable food and agriculture

12 steps to engage food and agriculture in the SDGs

20 Actions organized around five key principles

Toolkit with over 100 to most relevant FAO resources related to the topics

http://www.fao.org/3/I9900EN/i9900en.pdf

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20 Actions

1. Facilitate access to **productive resources**, **finance** and **services**
2. Connect **smallholders** to markets
3. Encourage **diversification** of **production** and **income**
4. Build producers' **knowledge** and develop their **capacities**
5. Enhance **soil health** and restore **land**
6. Protect **water** and manage **scarcity**
7. Mainstream **biodiversity conservation** and protect **ecosystem** functions
8. Reduce **losses**, encourage reuse and **recycle**, and promote **sustainable consumption**
9. Empower **people** and fight **inequalities**
10. Promote **secure tenure rights**

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20 Actions

11. Use **social protection tools** to enhance **productivity** and **income**
12. Improve **nutrition** and promote **balanced diets**
13. Prevent and protect against shocks: enhance **resilience**
14. Prepare for and respond to **shocks**
15. Address and adapt to **climate change**
16. Strengthen **ecosystem resilience**
17. Enhance **policy dialogue** and **coordination**
18. Strengthen **innovation systems**
19. Adapt and improve **investment** and **finance**
20. Strengthen the **enabling environment** and reform the **institutional framework**

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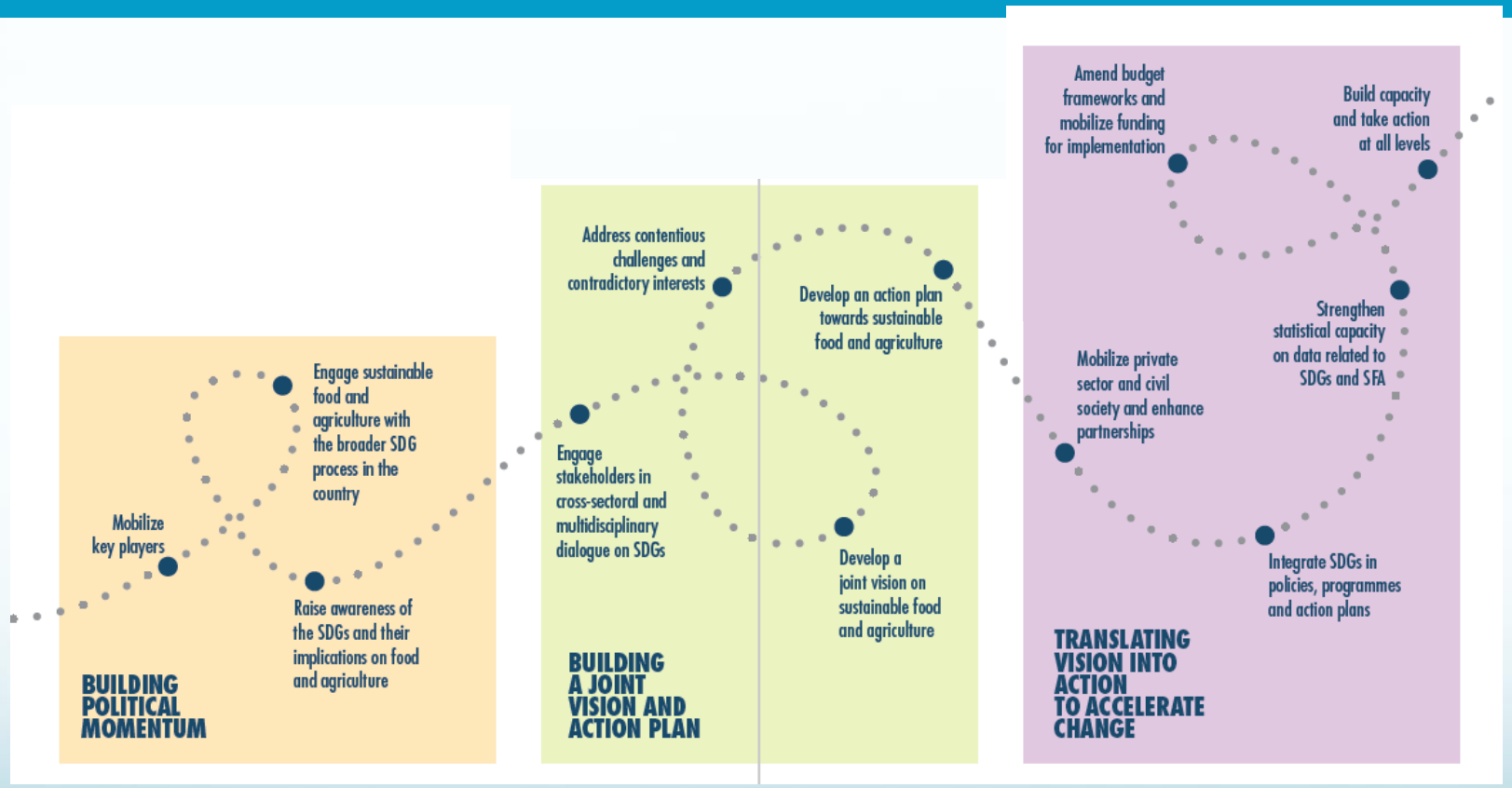
Mainstreaming food and agriculture



Leaving no one behind

Agenda 2030 and the SDGs

Some challenges and opportunities for fisheries and aquaculture

- Poverty in fisheries sector, especially in small scale fisheries and fish farming as well as in fish processing
- Explicit commitment to “leaving no one behind”
- Empowerment of weaker fish stakeholders and fish workers
- Overfishing, IUU fishing, ecosystem approach in fisheries and aquaculture
- Fisheries weak sector, often not recognized
- Political commitment, institutional support and financial investment in processes to achieve SDGs in fisheries, aquaculture and fish value chains
- Need for more coherent policies and integrated institutional frameworks for fisheries and aquaculture (overcoming sectorial thinking; integration of food systems perspective and new actors and institutions)

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FAO Custodian of SDG 14 Indicators

14.4.1 Proportion of fish stocks within biologically sustainable levels

14.6.1 Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated (IUU) fishing

14.7.1 Sustainable fisheries as a percentage of GDP in Small Island Developing States (SIDS), least-developed countries and all countries

14.b.1 Progress by countries in adopting and implementing a legal/regulatory/policy/institutional framework that recognizes and protects access rights for small-scale fisheries

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FAO Custodian of SDG 14 Indicators

- Use of CCRF survey responses to SDG 14 indicator specific questions (SDG 14.6 & 14.b)
- Indicator methodology development (SDG 14.7)
- Reporting and Monitoring Guidelines for indicator 14.4.1
- Development for methodologies applicable in data poor situations and in stock status determination, and capacity building in data collection on catch, effort and biological data
- E-learning and specific training on SDG14 indicators

FAO capacity development initiatives

- ❑ to enable countries to produce these indicators and report on them according to internationally agreed methodologies and standards.
- ❑ global and regional training workshops
- ❑ guidance for national monitoring through guidelines and e-learning courses
- ❑ identification of reporting systems,
- ❑ software (CCRF questionnaires, Global Record of Stocks and Fisheries),
- ❑ using existing partnerships (e.g. FIRMS) and innovative technologies.

Key role of RFBs and RFMOs in supporting SDG14 reporting !

SDG14: Life Below Water

- **Implementation of SDG 14 targets will support sustainable fisheries**
- Conservation efforts will benefit fishery resources and fisheries by reducing impacts of pollution and biodiversity degradation
- Range of international norms and instruments exist but will need coordinated facilitation to ensure strong delivery to the commitments with these agreements:
  - Fisheries – CCRF, UNFSA, PSMA etc.
  - Rights – VGSSF, VGGT, etc.
  - Environment – CBD, etc.
- Improved spatial planning is essential for coexistence of different types of ecosystem uses
- Future growth in demand for fish will have to be met primarily by aquaculture production

SDG 14.1 - 14.2: Environmental management - integration

- Application of ecosystem approach to development plans and policies for fisheries and other sectors
- Institutional capacity development for coordination of work and information among concerned agencies (fisheries, agriculture, environment, food safety, public health, etc.) and private institutions for improved resource and area-based management
- Need for ecological and human health risk assessment and planning associated with pollution

SDG14.5: Marine conservation areas

- Develop spatial information and planning system for sustainable fisheries and biodiversity conservation
- Apply full range of existing instruments covering interactions between fisheries and ecosystems e.g. SSF guidelines, Tenure Guidelines, ecosystem approach to fisheries and aquaculture
- MPAs may benefit fisheries especially when stakeholder needs and other management approaches have been considered

SDG17: Partnerships for the goals

- Realizing and advancing the new role of FAO working with partners of the international community including HLPF, WHO, Codex, UNCTAD, ILO, IFCs, et al.
- **Opportunities for collaboration and partnerships (including PPP) and enhanced investment and trade in international and national fisheries contexts**
- **Key role of RFBs and RFMOs**
- Recognizing and strengthening stakeholders:
  - **Aquaculture cooperatives and industry associations, regional aquaculture networks, and knowledge institutions can contribute to strategic partnerships**
  - Small scale fisheries organizations and cooperatives
  - **Seafood industry including fisheries value chain actors**
  - Fish workers' unions

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Paris Climate Agreement

The 2015 Paris Climate Agreement recognizes the need for effective and progressive responses to the urgent threat of climate change, through mitigation and adaptation measures, while taking into account the particular vulnerabilities of food production systems.

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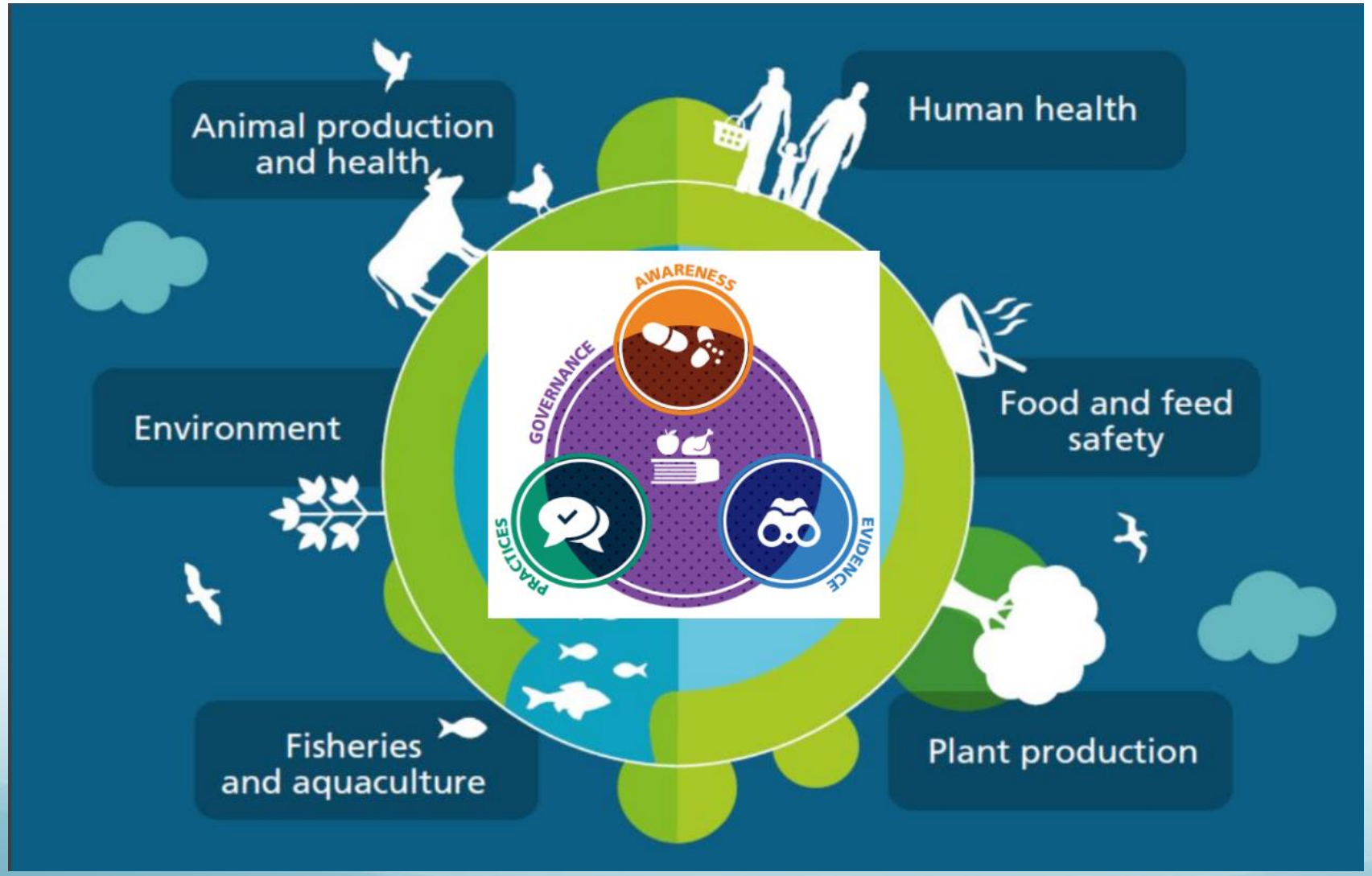
Antimicrobial resistance



FAO's work:

- **Awareness**
- **Evidence**
- **Practices**
- **Governance**

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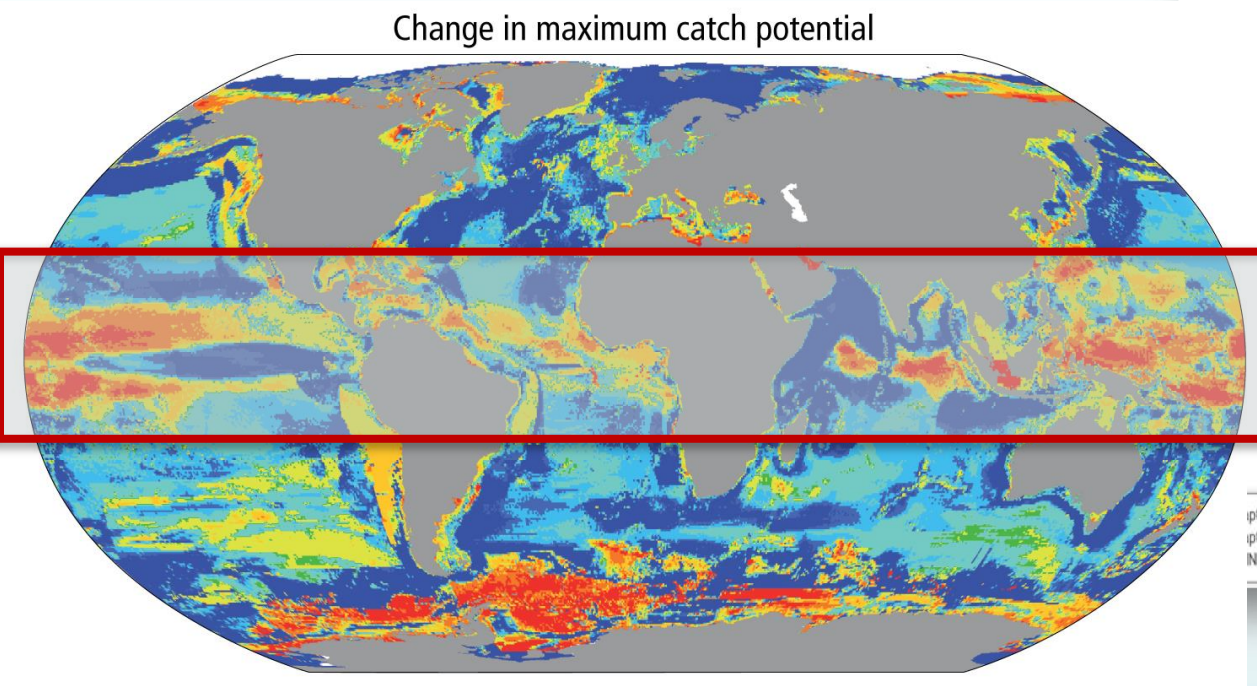
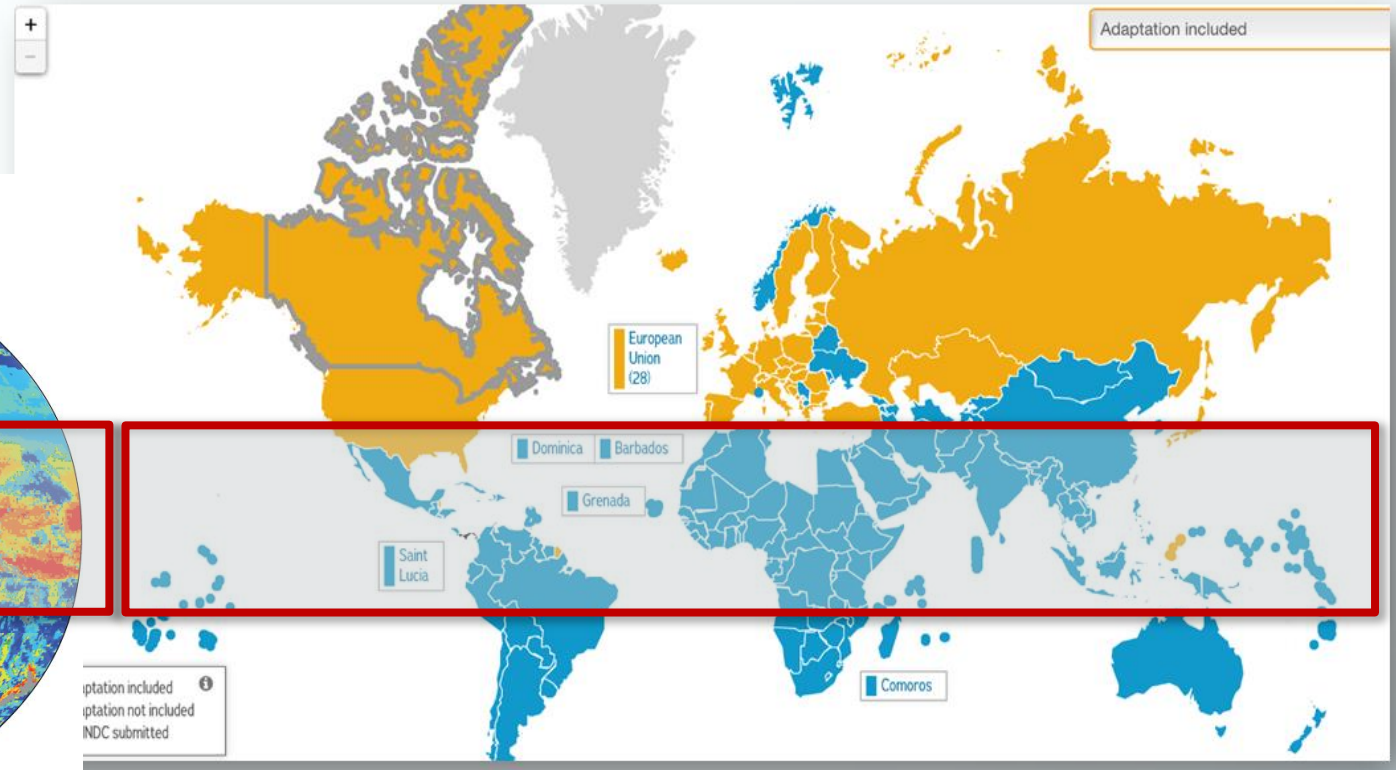
The case for Adaptation

Where is Adaptation needed most?



IPCC AR5 based on Cheung et al. 2010



Is adaptation included in countries NDCs?

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What / When/ How to Adapt

CLIMATE

ECOSYSTEMS

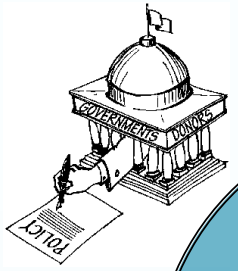
INDIVIDUALS | DISTRIBUTION | HABITAT

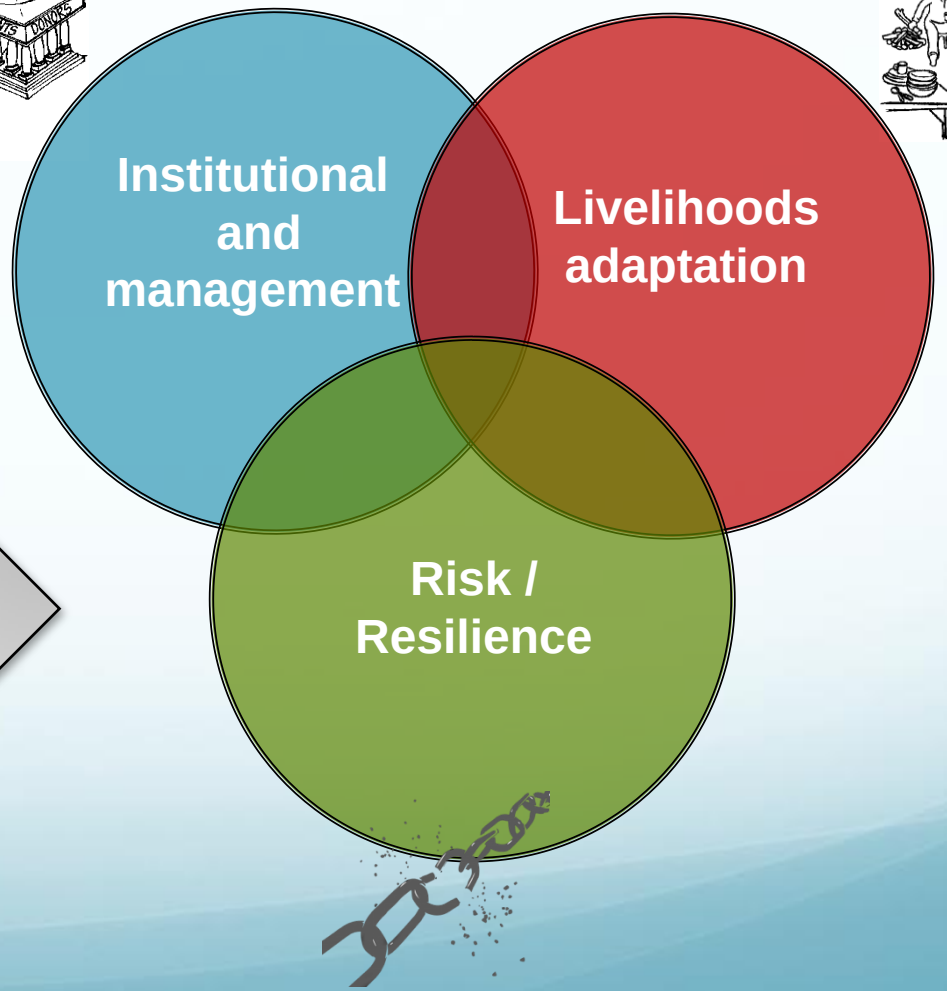
FISHERY (Aquaculture dependence)

SIZE AT FIRST CAPTURE | BIODIVERSITY | REDUCED YIELD, CHANGES IN CATCH

FOOD/ JOBS/ TRADE

Adaptations





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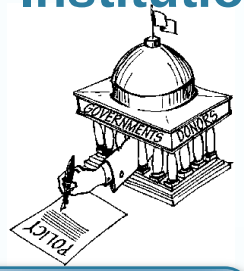
SUSTAINABLE DEVELOPMENT GOALS

Fisheries Adaptation Toolbox

Institutional



- Planning
  - Mainstreaming EAF
  - Tenure & Access Rights
  - Adaptation plans
  - Vulnerability Assessment
- Management Measures
  - ICZ Management
  - Management Flexibility
  - Incorporate Climate science
- Allocation
  - Seasonal Rights
  - Area Measures
  - Redistributed spp rights

Livelihoods

- Within Sector
  - Market diversification
  - Post-harvest measures
  - Seasonal migration
- Outside Sectors
  - Diversify investments
  - Livelihoods portfolio
  - Cross-sectoral integration

Risk/ Resilience

- Pooling/ Risk sharing
  - Adjust Insurance Markets
  - Private insurance
  - Public insurance
- Early Warning
  - EW systems
  - Anticipatory services to market shocks
- Prevention
  - Safety at sea
  - Infrastructure provision
- Preparedness & Response
  - Post-disaster recovery
  - Rehabilitation
  - Compensation

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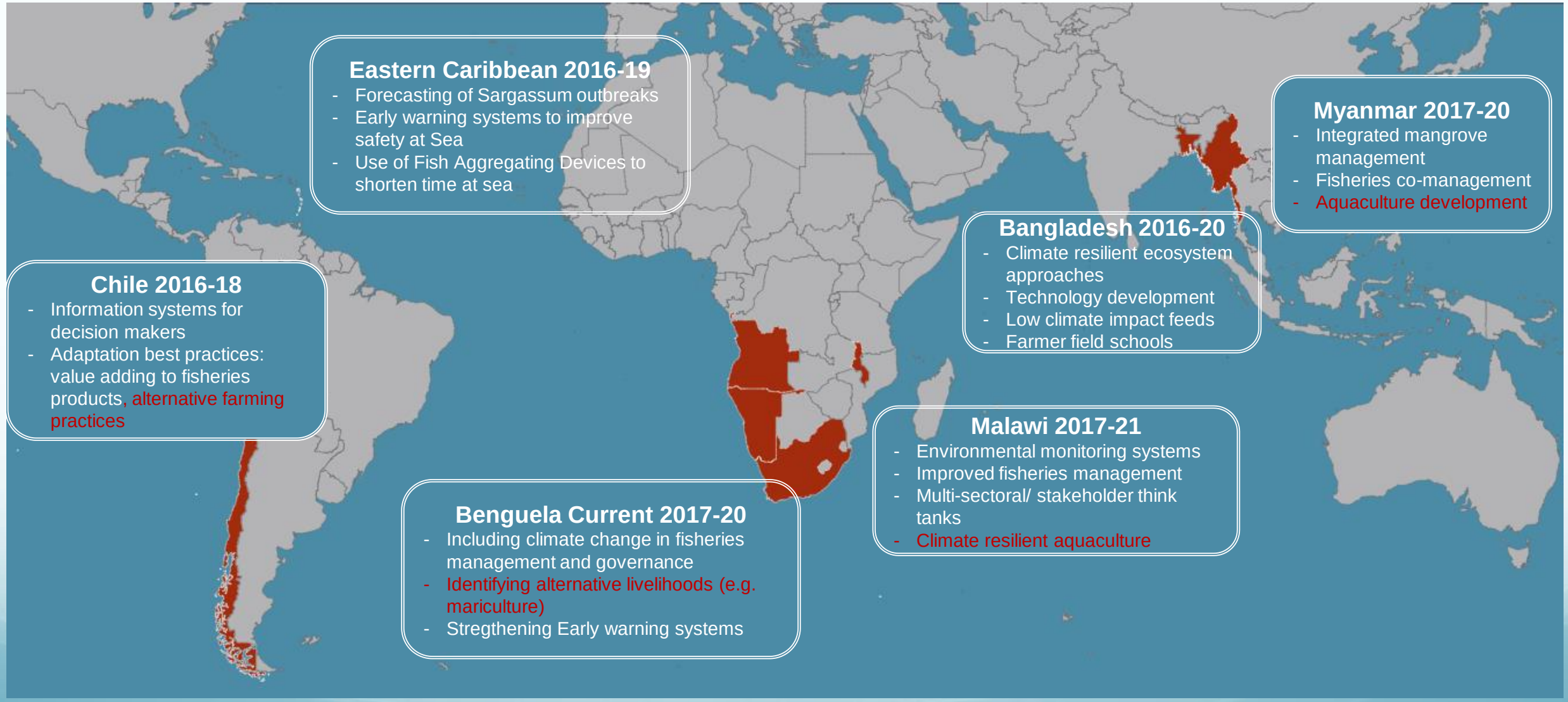
FAO- GEF Adaptation programme



Eastern Caribbean 2016-19
- Forecasting of Sargassum outbreaks
- Early warning systems to improve safety at Sea
- Use of Fish Aggregating Devices to shorten time at sea

Myanmar 2017-20
- Integrated mangrove management
- Fisheries co-management
- Aquaculture development

Bangladesh 2016-20
- Climate resilient ecosystem approaches
- Technology development
- Low climate impact feeds
- Farmer field schools

Chile 2016-18
- Information systems for decision makers
- Adaptation best practices: value adding to fisheries products, alternative farming practices

Malawi 2017-21
- Environmental monitoring systems
- Improved fisheries management
- Multi-sectoral/ stakeholder think tanks
- Climate resilient aquaculture

Benguela Current 2017-20
- Including climate change in fisheries management and governance
- Identifying alternative livelihoods (e.g. mariculture)
- Stregthening Early warning systems

Disease situation in aquaculture

From largest aquaculture-related disease epidemics

White spot syndrome virus (WSSV), Epizootic ulcerative syndrome (EUS)
Infectious salmon anemia virus (ISAV), Koi herpresvirus, Infectious myonecrosis virus,
Acute hepatopancreatic necrosis virus, Tilapia lake virus (TILV), etc

Disease	Diagnostic	Reporting	Vaccination	Control	Disease freedom
The development of an unknown disease in a farm	The development of a diagnostic test	The reporting and communication (national and OIE)	Development of an effective vaccine or other containment measures	Effective diseases control implementations (cost-benefit)	

PMP | The Progressive Management Pathway for Aquatic Biosecurity to support Sustainable and Resilient Aquaculture

- PMP focuses on **building management capacity** through a bottom-up approach with **strong stakeholder involvement** to promote the application of **risk assessment and management** at producer level as part of the national approach
- Useful tool to establish a **National Biosecurity Management System**
- Capable to generate **early warning information** from monitoring and surveillance activities contributing to the notification to OIE (WAHIS)

What is a Progressive Control Pathway (PCP)?

Step-wise approaches are increasingly used for the **reduction**, **elimination** and **eradication** of a range of major livestock and zoonotic diseases including:

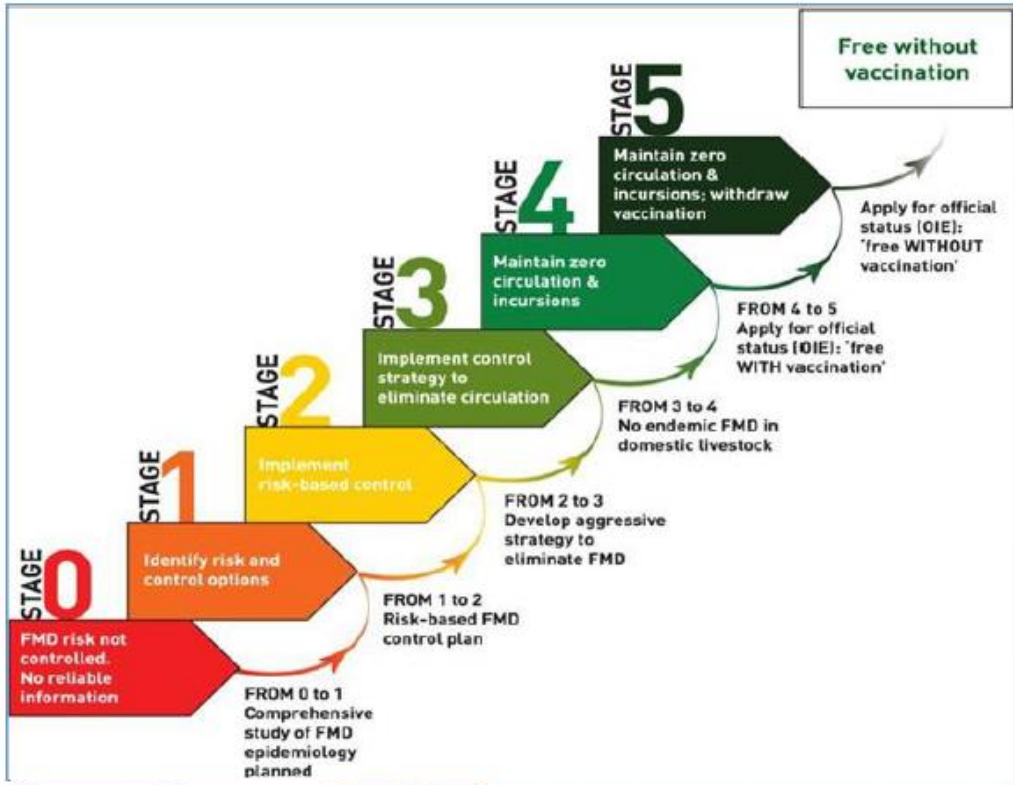
- **Foot and Mouth Disease (FMD)**
- **Peste des Petits Ruminants (PPR)**
- **Rabies**
- **African Animal Trypanosomosis (AAT)**

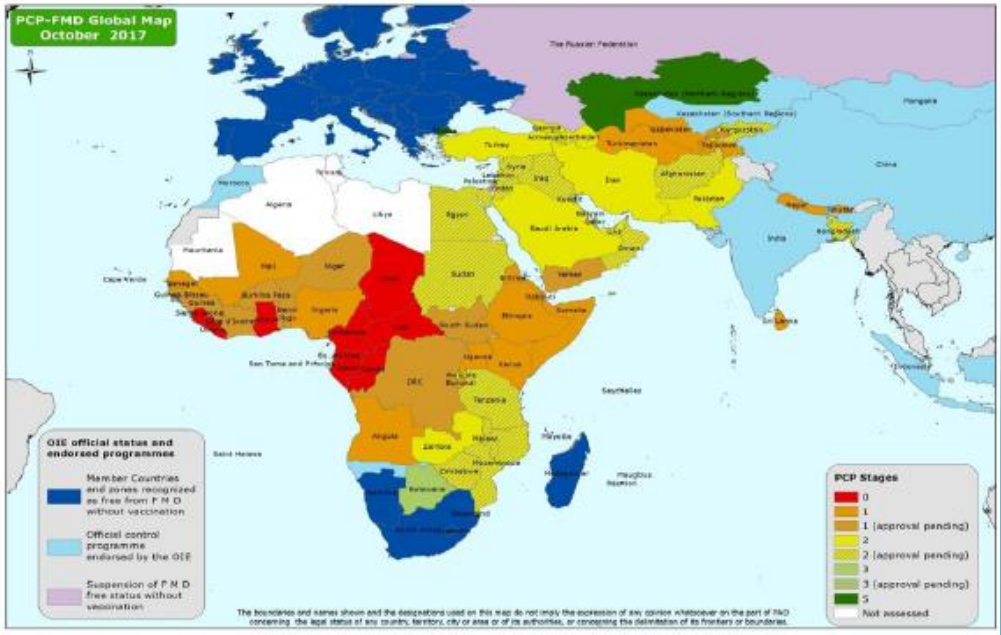
PCPs provide systemic frameworks for **planning** and **evaluating** field interventions and **enable** realistic disease control objectives to be defined and achieved.

PCPs have been used since 2008 by FAO and become adopted as joint tools with the OIE (FMD, PPR) , or developed/owned by global alliances (rabies, AAT)

PCP - FMD

- Developed by FAO and EuFMD in 2008
- 5 stages that progressively increase the level of FMD control
- Consist of set of activities focused on identifying and addressing the risk for FMD introduction and spread
- Intended to assist FMD-endemic countries to progressively reduce the impact and burden of FMD





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Development through partnerships

1. UN Agencies
2. Financial institutions
3. Research and Academia
4. Private sector / CSO / NGO
5. Networks

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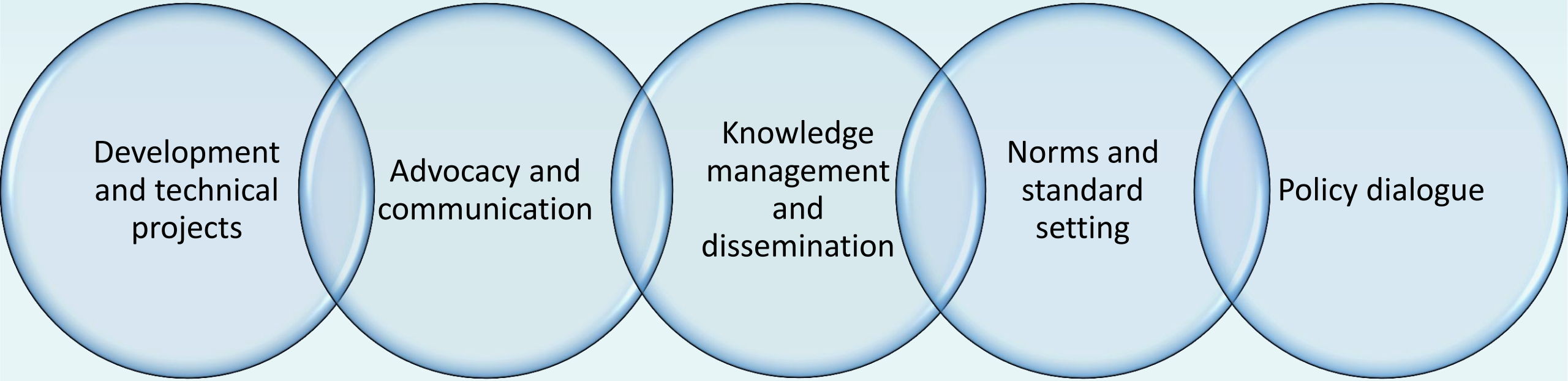
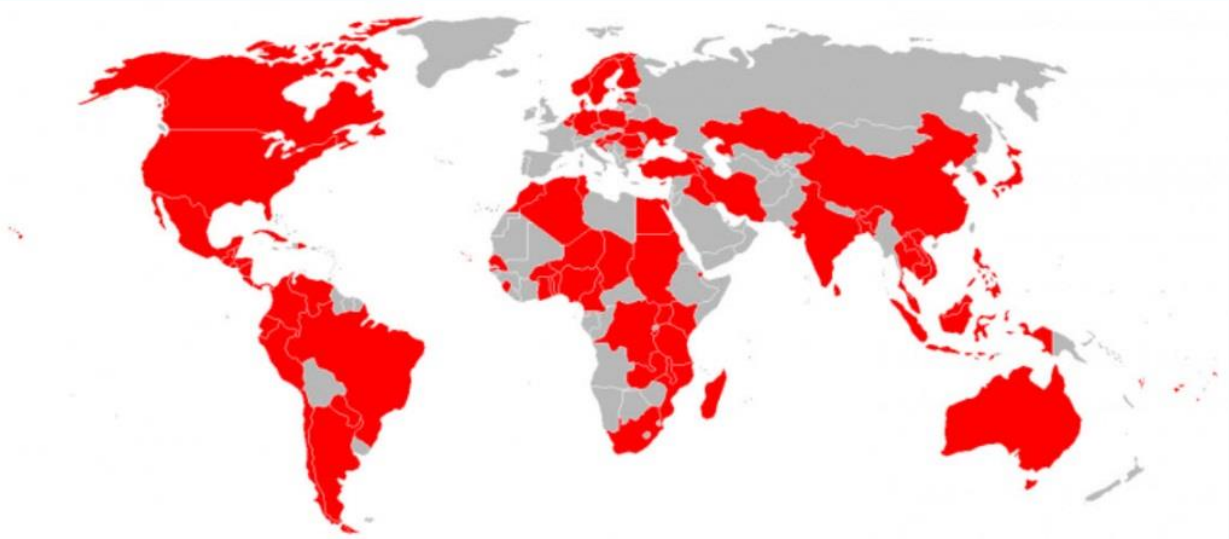
Global Aquaculture Advancement Partnership Programme

With 5 areas of engagement for partners:



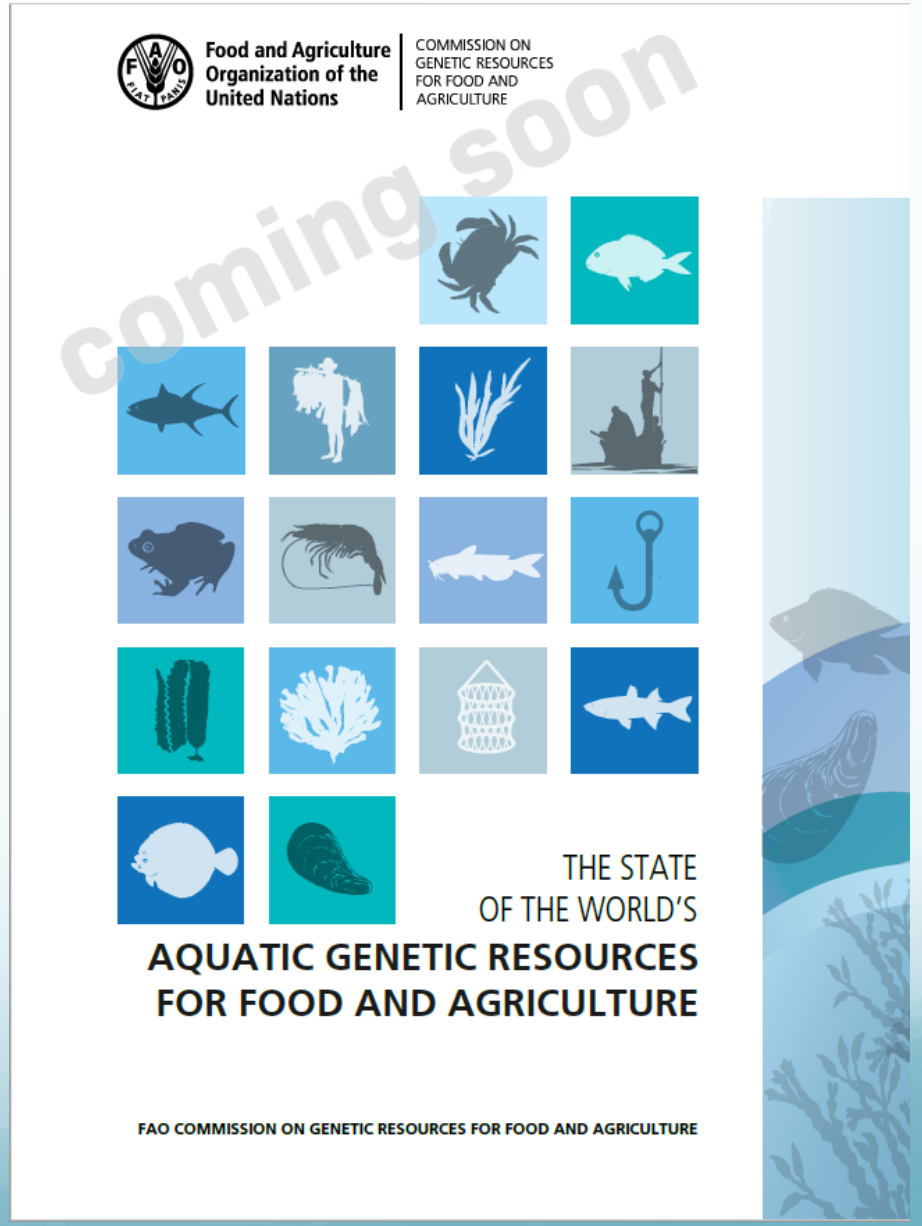
Aquatic Genetic Resources for Food and Agriculture



92 countries reported

>96% of aquaculture production

>80% of capture fishery production



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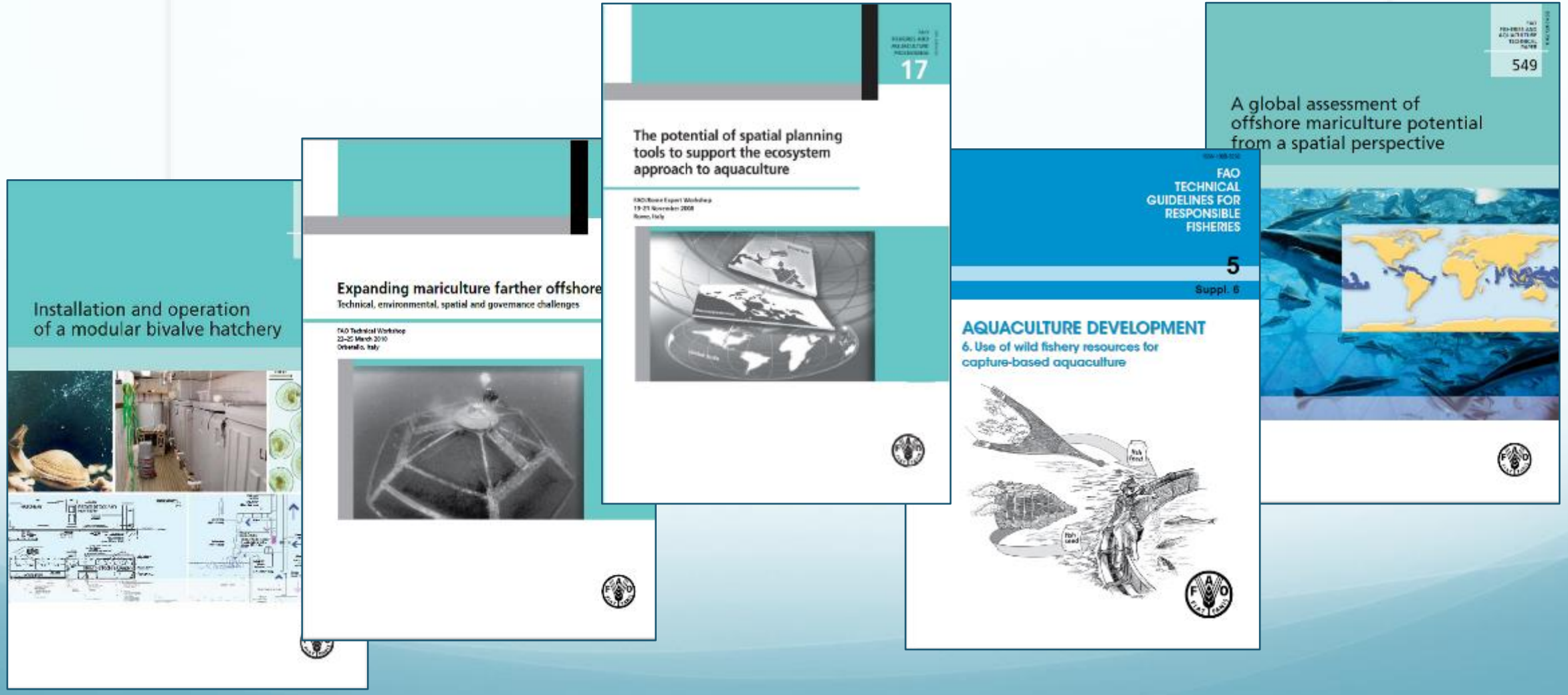
Fisheries and Aquaculture Department



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SUSTAINABLE DEVELOPMENT GOALS

Thank you for your time and attention.

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ABCC
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