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CLIMATE SMART FISHERIES AND AQUACULTURE

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In addition to sustaining human well-being and livelihoods, conserving ecosystems, and offering priceless natural services, aquatic systems are home to an extensive number of species.

Communities that are close to freshwater and the seashore especially need these systems. It provides them food and employment in sectors like transportation, recreation, fishing, and aquatic farming. 10–12 percent of people on the planet are guaranteed a living because of this industry.

Over 71 percent of our globe is covered with water, which includes:

• Maritime resources, such as seas, deltas, and oceans
• Freshwater assets, such as lakes and rivers

International recognition of the significance of freshwater and marine resources has been established.

Humans also benefit significantly from the natural services that aquatic systems provide, such as:

- Oceans are the main climate regulators and a significant sink for greenhouse gases.
- Sea grass and phytoplankton, microscopic marine algae, which reside on the water's surface and in its column, help to produce oxygen.
- Since the 1980s, the seas have probably absorbed 20–30% of all anthropogenic carbon dioxide (CO_2) emissions.
- Freshwater and coastal regions serve as home to a wide range of aquatic creatures, including fishery resources.

- Mangrove forests lessen the effects of storms and create natural barriers in coastal areas, which help to prevent natural disasters.

Many populations, especially those in developing nations and Small Island Developing States (SIDS), rely heavily on the marine, coastal, and freshwater ecosystems for their livelihoods and food security.

Many internationally agreed-upon development targets have been created to address SIDS vulnerabilities and to build resilience and sustainability since SIDS were defined as a unique group during the 1992 Earth Summit.

Security of Food And Nutrition Employment & Economy

Millions of people worldwide rely on fisheries and aquaculture for a significant portion of their food security. With the exception of aquatic plants, the sector's total global production reached a peak of 172.6 million tonnes in 2017, with 46% coming from aquaculture and 54% from capture fisheries.

Food fish consumption increased from 9.0 kg in 1961 to 20.3 kg in 2017 per person. In many coastal, riverine, insular, and inland regions, fisheries and aquaculture activities provide a vital source of income. Fisheries and aquaculture constitute the primary sector, employing an estimated 60 million people. Approximately 19% of workers in the primary sector are women, and if the secondary sector is included, the percentage rises to over 50% notably enhancing the security of food globally. Transportation, the extraction of oil and gas, dredging for ports and other facilities, and the tourism and recreational industries are some of the other economic sectors that depend on aquatic systems for employment.

Subsectors of Fisheries And Aquaculture

1) Inland capture fishery- The practice of harvesting out of living aquatic creatures from artificial or natural inland waters and includes dams, inland canals, lakes, rivers, brooks, streams, ponds, and other landlocked freshwater bodies.

2) Aquaculture- Raising aquatic life in freshwater or saltwater through aquaculture. Aquaculture products that are commonly farmed include fish, crustaceans, molluscs, and aquatic plants.

3) Marine capture fishery- The act of extracting living aquatic organisms from marine waters which include adjacent saltwater areas and oceans however, certain countries classify coastal lagoons or deltas as inland waters.

Value Chain

All economic endeavours and subsectors that either directly or indirectly support the fisheries and aquaculture industry are included in the value chain.

- Pre harvest- Activities include building boats, making gear, and producing fish feed before fish are harvested or captured.
- Harvest -Activities that are done when harvesting, capturing and landing fish.
- Post harvest -Activities carried out following the harvesting, capturing, and landing of fish, such as:

• Processing: This category includes tasks like freezing, salting, filleting, smoking, and cleaning.

• Marketing: This category includes retail and sales activities.

However, the global mean temperature has significantly increased over the last 150 years, along with modifications to precipitation patterns and an increase in the frequency and severity of extreme weather events which is referred to as Climate change.

The ultimate consequence of rising greenhouse gas (GHG) concentrations in the atmosphere as a result of human activity intensifying the greenhouse effect, the increased sun heat is held in reserve warming the Earth's surface and atmosphere.

Effects of Climate Change

Earth's global temperatures rise as a result of global warming which affects oceans, coastal regions, and inland areas, including air and sea surfaces hydro bodies leading to melting glaciers, increasing average sea level worldwide, modifications to river discharge and hydrology, modifications to the patterns of precipitation that result in droughts or floods, an increase in the frequency of extreme weather events like tropical cyclones

Numerous ecosystems, both inland and marine, are consequently being impacted.

In marine waters, sea water warming and acidification which leads to coral reef bleaching and increasing the rate of fish mortality. While in inland waters, the increase in temperature leads to changes in habitat and reproduction.

Climate change also harshly impacts the vulnerable people and threatens the food security of the nation. The population of the world is predicted to reach 9.7 billion by 2050. According to FAO estimates, there will be a 50% increase in agricultural demand by 2050 compared to 2013.

Climate Smart Agriculture (CSA)

In order to effectively support sustainable development and ensure food security in the face of climate change, food production systems must be transformed and reoriented. This is achieved through the use of the CSA approach. Increased productivity, climate change adaptation and mitigating or eliminating greenhouse gas emissions are the three challenges that CSA tackles.

Four Sustainable Development Goals (SDG) are associated with CSA

- End poverty in all its forms everywhere
- End hunger, achieve food security and improved nutrition, promote sustainable agriculture
- Take urgent action to combat climate change and its impacts
- Conserve and sustainably use the aquatic resources for sustainable development

Climate Smart Strategies

In order to implement CSA, an environment that is conducive to change must be established. This can be done by implementing sound policies, building strong institutions, securing funding, and disseminating contextually appropriate practices and technologies. As a result, strategies are built upon a mix of:

- Local initiatives like raising fish that are more resilient to environmental change
- Landscape and value chains like Integrated crop-fisheries systems
- Enabling environment , for instance, social safety nets and water tenure

Thematic Areas

The goal of CSA is to minimize any potential negative trade-offs between the related factors of climate change adaptation, mitigation, and increased productivity and income. The three primary thematic areas of climate-smart agriculture are listed below:

- Reducing and/or removing emissions of GHGs, where possible
- Adapting and building resilience to climate change
- Sustainably increasing agricultural productivity and incomes

Future Development and Challenges

Good practices and instruments are still being developed and adjusted to account for climate variability and change. As these continue to be refined and more knowledge about climate-smart practices and policies is acquired, more detailed instructions will be given.

Nonetheless, creating quick fixes for climate change in the fishing and aquaculture industries and integrating climate-responsive methods is an important operational and strategic move.

A number of limitations frequently prevent the creation of useful advice including

- Insufficient data and information to support specific decisions.
- Traditional methods of confirming evidence won't always work.
- Requirement for developing experience via an action-based, adaptive management process
- Learning involving many participants and information exchanged between stakeholders.
- To investigate the nature of climate change vulnerability in more detail.

Facilating The Transition to CSA

The general routes and mechanisms for advancing towards more robust and resilient systems are known, notwithstanding the uncertainties and lack of experience with CSA practices, as mentioned below:

- Capacity-building
- Multisectoral incentives

- Long-term planning
- Low-cost local adaptations
- Market support
- Public and private investment
- Improved management

Conclusion

Both freshwater and marine aquatic ecosystems support coastal ecosystems and processes and are essential to many vulnerable communities' food security and means of subsistence, especially in developing nations.

However, the production of food is impacted by these systems due to climate change including the dependent communities' security, health, and incomes. Therefore, it is imperative to offer sufficient responses to the threat posed by climate change. Furthermore, fisheries are vital for trade, food, and livelihoods, but their potential is limited by the condition of the resource base.

The goal of Climate Smart Agriculture (CSA) is to create policies that will effectively support sustainable development and guarantee food security in the face of climate change by transforming and reorienting food production systems. It comprises of establishing change-friendly conditions (such as financing and policy), as well as the propagation of regional customs

The implementation of these strategies with diligence will lessen the effects of climate change, enhance the sector's potential for mitigation, and boost the resilience of producers, supply chains, and communities. However, it should be noted that optimizing all CSA variables simultaneously is unlikely to be feasible, and it might not even be necessary. The context and goals of the fisheries and aquaculture sector in a particular area, as well as the production system overall, will determine which actions should be prioritized. Practical measures must be developed to guarantee that the most vulnerable states, production systems, communities, and individuals have the ability to develop and implement sound CSA approaches.

References

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