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Responsible Fisheries Management and ICT -A pragmatic approach towards Challenges and Pathways ahead

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Information and Communication Technology (ICT) has a significant role to play in Responsible fisheries management in India. In this lecture the concept of Responsible Fisheries management based on the FAO Code of Conduct for Responsible Fisheries is briefly touched upon before throwing some light on the ICT opportunities and pathways that emerge in the context of attempts to promote an ethos of responsible fisheries management among the different stakeholder constituencies.

Responsible fisheries management, for all practical purposes of the term, is conceived of the following dimensions

a) Promotion of the FAO Code of Conduct for Responsible Fisheries as the guideline that define our approaches to fisheries management
b) The appreciation of the fundamental role of the State in ensuring management of fisheries resources in a sustainable manner
c) Empowerment of different stakeholders to become responsible stewards/trustees in the management of common pool resources
d) Elucidation of ways to bring the market also as an active management stakeholder

The FAO Code of Conduct for Responsible Fisheries (FAO CCRF) is considered as a landmark document symbolizing the international consensus achieved on the necessity for providing guidelines to ensure sustainable utilization of fisheries resources of the world.

Why the Code?

That the sustainability of marine capture fisheries at the current level of harvesting is at stake is no longer a moot point. It is being realized that fisheries anywhere in the world is more a socioeconomic process with biological constraints than anything else. The open

access nature of the resource coupled with unregulated penetration of advanced, but not necessarily ecofriendly, harvesting technologies (a phenomenon called *technological creep*) has enacted a virtual "tragedy of the commons" in our seas. Making the issue still more complex, especially in the context of the Millennium Development Goals, is the rampant poverty existing among our fisher folk though the capture fisheries makes significant foreign exchange contribution in our country.

Foundations of the Code

If there are no technological magical bullets for the current impasse what is the way out? This is precisely the question the FAO code is trying to answer. "*The right to fish carries along with it an obligation to do it responsibly*" is the cardinal principle of the code. This principle is built on the foundation of what is known as a Precautionary Approach. Precautionary approach, which originally was proposed as Principle 15 of Agenda 21 the Rio Earth Summit meeting in 1992, enunciates that "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation". While in simple terms the precautionary approach means "better safe than sorry", it clearly recognizes that changes in fisheries systems are only slowly reversible, difficult to control, not well understood, and subject to changing environment and human values. It involves the application of prudent foresight. It is about applying judicious and responsible fisheries management practices, based on sound scientific research and analysis proactively rather than reactively to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future as well as current generations.

Taking account of the uncertainties in fisheries systems and the need to take action on incomplete knowledge, it requires, *inter alia:* **a.** consideration of the needs of future generations and avoidance of changes that are not potentially reversible; **b.** prior identification of undesirable outcomes and of measures that will avoid them or correct them promptly; **c.** that any necessary corrective measures are initiated without delay, and that they should achieve their purpose promptly, on a timescale not exceeding two or three decades; **d.** that where the likely impact of resource use is uncertain, priority should be given to conserving the productive capacity of the resource; **e.** that harvesting and processing capacity should be commensurate with estimated sustainable levels of resource, and that increases in capacity should be further contained when resource productivity is highly uncertain; **f.** all fishing activities must have prior management authorization and be subject to periodic review; **g.** an established legal and institutional framework for fishery management, within which management plans that implement the above points are instituted for each fishery, and **h.** appropriate placement of the burden of proof by adhering to the requirements above.

The reversal of burden of proof means that those hoping to exploit our marine resources must demonstrate that no ecologically significant long-term damage will result due to their action. Or in other words human actions are assumed to be harmful unless proven otherwise.

Contents of the Code

The code provides a necessary framework for national and international efforts to ensure sustainable exploitation of aquatic living resources in harmony with the environment. It is achieved through 12 articles covering areas like nature and scope of the code (article 1) objectives of the code (article 2), relationship with other international instruments (article 3), implementation, monitoring and updating (article 4), special requirements of developing countries (article 5), general principles (article 6), fisheries management (article 7), fishing operations (article 8), aquaculture development (article 9), integration of fisheries into coastal area management (article 10), post-harvest practices and trade (article 11), and fisheries research (article 12).

Characteristics of the Code

The most salient feature of the code is that it is *voluntary* in nature. Unlike other international agreements like UN Agreement to Promote Compliance with International Conservation and Management Measures by Fishing vessels on the High Seas or the Straddling Stock Agreement,1995, it is not legally binding and violation of the code cannot be challenged in a court of law.

It would be tempting to castigate it as an Achilles' heel and thus futility of the code. But it should be remembered, "open access imbroglios'' can not be resolved through attempts that fail to recognize altruistic spirit of the human actors. In a situation where "you and your enemy belongs to the same system, solutions must be found in managing relationships". It doesn't mean that the code is impractical or ineffective. A fundamental objective of CCRF is "to serve as an instrument of reference to help states to establish or to improve the legal and institutional framework required for the exercise of responsible fisheries and in the formulation and implementation of appropriate measures." The policies of the state for managing the fisheries resources should be based on the provisions of the code.

If world fisheries are to be sustainable in the long term, structural adjustment within the fisheries sector is required. Although policy decisions in this regard must be made by national governments, effective implementation of the code requires the participation and cooperation of a wide range of stakeholders, including fishers, processors, NGOs and consumers. Implementation of the code is primarily the responsibility of states. The code will require regional and sectoral implementation in order to address the particular needs of fisheries in different regions or sub-sectors.

The Code and CMFRI Initiatives

It is in this context that the actions and initiatives being taken by CMFRI, mainly through an NATP funded research project titled "Designing and validation of communication strategies for responsible fisheries –a co-learning approach" become relevant. A Responsible Fisheries Extension Module (RFEM), which consists of 13 tools including a Malayalam translation of the code, animation films in all maritime languages etc. developed have been widely used to create awareness among the fisherfolk. A statewide campaign on Responsible Fisheries was launched and the RFEM was released for further scaling up by the respective State Fisheries Departments. These mass

communication tools have the potential to reach almost 85 % of the fisher folk and other stakeholders in the country. It is reasonable to conclude that CMFRI has made a pioneering initiative in the cause of popularization of the concept of Responsible Fisheries in India.

Though the voluntary nature of the code has been necessary in getting the all-nation agreement when it was drafted in the early 1990s, attitudes to the oceans have changed (Pitcher *et al.,* 2009). There is now widespread scientific consensus on the ecological impacts of continued over-fishing and the threats to seafood security and broad agreement on policy issues such as curtailing illegal catches and minimizing the impacts of fishing on marine ecosystems. The basic requirement for adoption of Ecosystem Approach is a dynamic knowledge base on stock assessment. The stock assessment knowledge base generated and continuously maintained by CMFRI is a unique achievement among the developing tropical context countries. But the utility of this Knowledge base in translating into management praxis is less appreciated. There still exists a communication divide between the research system and the fisheries management system in the country.

Though the communication tools and strategies already developed by the institute have been useful in creating awareness on the need for sustainable /responsible fisheries there is a need to develop and scale up specific communication interventions to sensitize the stakeholders in making a transition towards ecosystem based approaches that ensure responsible management of our waters. Fisheries management is fisher management and participatory approaches informed/initiated by a proactive research system taking place in a democratic and decentralized civil society space is globally accepted as the key to Ecosystem Based Fisheries Management. The future is decided by the capacity we build today amongst the different stakeholders responsible for sustainably utilizing the marine fisheries resources of our country. It is with this objective that we are continuing the efforts in this line through a new institute funded research project "Capacity Development for Ecosystem Based Responsible Fisheries Management in India - A Co-Learning action research" (FISHCMFRISIL201202200022**)** during 2012-17.

Sustainable Management of resources is no different from fisheries development. They are no longer considered as dichotomous. There will be no fisheries development if there is not enough fish in the sea. There won't be enough fish in the sea if human beings, both as harvesters and consumers, do not act in a precautionary manner which is nothing but to nurture a feeling of "better safe today than sorry tomorrow". It means to understand clearly the limits to which nature can be tapped. The requirements of both the present generation and future generation are to be given equal importance. It is also about respecting the co-evolutionary culture of a fisheries-resource dependent community. Thus Responsible Fisheries management takes place at the dynamic interface between the behavior of man and that of fish. So it is a convergence of biology, socio-politics, ecology , economics , engineering, law and communication. The aim of fisheries management is to ensure optimum utilization of a common pool resource without jeopardising the inherent regenerative ability of the resource leading to livelihood security of the dependent community.

ICT and Responsible Fisheries Management

Much has been said about rights-based fisheries, fisheries co-management and ecosystem-based fisheries management with fisheries managers, policy-makers, scientist and researchers racking their brains about the meaning of each of these fisheries management approaches. In trying to find definitions and formulating "how-to" guidelines and handbooks on such fisheries management approaches, their essential ingredient often is overlooked, namely dialogue. Whether talking of co-management and partnerships between fisheries stakeholders or of the adaptive nature of ecosystem-based fisheries management the fundamental nature of any fisheries management effort is the communication process among its various protagonists. Neither a partnership between fishing communities, fisheries managers, researchers and other stakeholders, nor the merging of the development goals of human well-being with that of ecological well-being through an ecosystem-based fisheries management approach would be possible without free-flowing information among the various partners in the management process.

These communication processes can take many different forms and can be designed according to a diversity of purposes: (1) to meet specific fisheries management objectives, needs and aspirations for the fisheries sector; and 2) to generate new information about local fisheries systems through participatory (eg.catch-reporting) mechanisms. The experiences from these activities should encourage fisheries managers, scientists, and fishing communities to actively seek such dialogue and information exchange as a basis for improving fisheries management on a ecosystem approach.

The efforts to engender a scientifically informed fisheries management or governance regime are always challenged by the inherent uncertainty that characterizes the epistemology of fisheries science. The complexity of an otherwise resilient tropical marine ecosystem adds fuel to the fire. And on the Human dimension we have a plethora of challenges despite promising perspectives from Hardin to Ostrom.

It is here that we need to fully appreciate the multitude of challenges we face in a precautionary and participatory framework. We have the instruments /tool box . But the credo of responsible fisheries is yet to become part of the community ethos. What could be the reasons and how we can overcome the barriers? Can we resort to the scintillating opportunities thrown open by the new vistas in Information& Communication technology to address our specific problems? As a concerned stakeholder each one of us has a responsibility to be part of a collective process to not only decipher the answers but also translate them into pragmatic ameliorative strategies.

What this winter school has tried to offer is such a platform-a platform to share and learn in a liberating atmosphere of participatory co-learning . Remember , we no longer hail a banking system of pedagogy in our school. It is the way the fish in water is… dynamic and dialectic. However the areas we cover during the course under three major modules namely a) RFM-the resource and technological perspective, b) RFM- the Human dimension and c) RFM- the ICT perspective include: Concept ,philosophy and logic of Responsible Fisheries, National and international instruments, Epistemological and historical perspectives, Resource Perspectives on Responsible Fisheries Management (Pelagic, demersal, molluscan and crustacean), Introduction to stock assessment and monitoring,

Fisheries management /governance tool box, Sociological ,Political ecology and Economic perspectives of NRM, Property rights regimes, Alternative Livelihood Options especially Mariculture, Human dimension and Gender issues, ICT theory and praxis, Responsible Fisheries Extension, Co-management, Fisheries policy, Emerging issues like Climate change and Ecosystem approaches.

ICT pathways – a prelude

The term ICT is taken as the convergence of different communication technologies like mobile phones, remote sensing, internet, radio, and TV . ICTs can be defined as "technologies that facilitate communication and the processing and transmission of information by electronic means"

It is interesting to note that the hybridity of ICT should fit well with the kind of hybridity demanded for a system of responsible fisheries management. Let us see how this is made possible .

The following table analyses how the various challenges that emerge in this context offer opportunities as ICT pathways.

Table 1: Challenges, Opportunities, ICT pathways and outcomes in Fisheries sector

Challenge	Opportunity	ICT pathway	outcome
A) Epistemological divide	Participatory Stock Assessment Combining indigenous knowledge Chlorophyll based validation of Potential Yield	Inputting of Real time data through ICT enabled devices (Video based assessment)	Better data- better science; better decisions cost saving Better partnership and trust by fishefolk in Science based management
B)Communication divide a) Science and management	Management advisories	Delivery through ICT platforms (Information kiosks)	Informed managers
b) Science and Policy	Scientific decision making	Knowledge platforms for sharing and negotiation (Video conferencing)	Informed policy making; Co management

c) Management and stakeholders -Fisherfolk	PFZ advisories Awareness on regulations rights and responsibilities Energy management Vessel monitoring On line registration of vessels Weather forecasts Climate change adaptation Market intelligence Experience sharing	Satellite based and GIS based data delivery Use of mobile phones Use of internet kiosks M Krishi E Choupal models Fishwatch (CMFRI) Internet based platform can be developed (similar to Australian one)	Reduction of carbon footprint Better compliance of regulations Better implementation of CCRF Better Monitoring of management interventions Less exploitation by middlemen Better sea safety Documentation of tacit knowledge
-Fisherwomen	Post harvest niche market opportunities	Internet based gadgets, mobile phones	Empowerment
-Young fishers	Education on stewardship Empowerment on alternative livelihood options	Tailor made Educational programmes on interactive mode; CD roms Career guidance	
-Traders	Market intelligence ICT enabled auction places can be developed E -commerce	Mobile phones Dutch clock system combined with e –commerce Eg.Lonxanet Spain	Transparent transactions, less middlemen exploitation Fishing better not fishing more
Processors	Quality intelligence	internet	
-Consumers	-Responsible consumption -Sustainable sourcing -Price information -Nutrition	Internet marketing	

	information		
C) Coastal Zone Management	Spatial planning of coastal infrastructure including fisherfolk's dwellings Pollution watch	GIS supplemented by PRA	Better management and monitoring
D) Disaster management	sea safety, sea rescue operations Reducing Cross border fishing causalities	GIS+ mobile phones	Better coordination
E) Resource augmentation	Deployment of FADs, MPAs, open sea cage culture	GIS mapping	Better monitoring
H) Traceability, quality	Labelling the fishery products	internet	Quality assurance, value chain monitoring

Concluding remarks

It is obvious that the opportunities are immense in making use of ICT platforms not only as delivery points but also as "bridging devices" that could reduce the disconnect existing between the different stakeholder constituencies. The table captures the potential areas in general. Some are generic opportunities. The application of specific ICT pathways is a function of the problem context as well as resource endowments of the community including the social capital. Extension organizations being boundary organizations should take the initiative to harness the emerging ICT opportunities.

Our marine resources need careful protection and stewardship. In this regard, it is worth noting that CMFRI, through its multifaceted research activities and outreach programmes for the last five decades, has been committed to promote the idea of responsible fisheries in the country. The winter school has been an attempt to revisit the epistemological foundations and thus assimilate cognitive energy to reorient our pragmatic efforts through ICT enabled platforms of continuous dialogue as well as capacity building. Nevertheless when the school comes to an end I feel, as the famous novel by Nikoz Kazanzsakis ends "*He made a cry ….a triumphant cry "It is accomplished!" and it was as* though he had *said:* "*Everything has begun*!"

Further reading

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