Second Draft for Discussion

Policy Guidelines & Framework for Fisheries and Aquaculture Development in India

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PREPARATION OF THE DOCUMENT

This is a revised and enlarged version based on comments received on the first Draft Document on 'Policy Framework for Fisheries and Aquaculture Development in India - Draft for Discussion and Comments, 2009' circulated among stakeholders. The first draft was an outcome of a stakeholder consultation process conducted across the country as part of the research cum advocacy project on 'Developing a Policy Framework for Fisheries and Aquaculture Development'. This has resulted from the five Zonal Workshops on Fisheries and Aquaculture Policy conducted across the country between December 2006 and October 2007 followed by a series of participatory review cum expert consultation including a Synthesising Workshop to extract policy inputs for specific issues and concerns impinging upon fisheries and aquaculture. It is our hope that this document would be of use to all the stakeholders particularly the policy makers and development planners in different States and the Centre. Comments and suggestions on the draft document or on issues related to fisheries policy are welcome at the earliest. The same may be addressed to Director, CIFE or emailed to director@cife.edu.in

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Policy Guidelines for Fisheries and Aquaculture Development in India

1. Context and Rationale

Historically, fishing has been a major source of livelihood for coastal and inland fishing communities as well as a source of healthy food for humanity at large. In India, fisheries and aquaculture are vibrant economic activities, and has been one of the fastest growing food production systems during the last three decades. Their significance and contribution towards agricultural (4.6 per cent GDP) and national economies (1.3 per cent GDP), livelihood and nutritional security, employment generation (11 million people) and foreign exchange earnings (over Rs.8000 crores) have been enormous though understated so far.

Before modernisation and large scale development of fisheries sector in India, the colonial government viewed fisheries as a source of revenue, and in order to ensure its continuous revenue, developed measures to conserve it from 'illegal' and 'destructive' fishing. The Indian Fisheries Act, 1897 became a central legal instrument to achieve this policy objective. Hence, in many States, fisheries related activities were under the domain of Revenue Departments though in few cases it was with Forest Departments. After Independence, though community and agricultural development were given due priority along with industrialisation, fisheries became an object of 'development' only in 1960s, particularly the mechanisation in marine fisheries sector, followed by growth in aquaculture sector during 1980 and 1990s. However, these developments took place in a policy vacuum as most of the Departments of Fisheries were still mandated and oriented to their revenue generation, regulatory and conservation roles as against the need for using the natural resources for 'development'.

Things began to change for the better since late 1990s. The increasing demand for fish and fish products in international market and its potential to earn significant foreign exchange, boom and burst of coastal shrimp aquaculture, stagnating marine fish production along with its associated crises, availability of underutilised and unutilised water resources in inland region, etc have forced the policy makers to come out with certain interventions, though passive and defensive, in the form of promotional and segmental policies and legislations. Promulgation of State Marine Fishing Regulation Acts in States, Coastal Aquaculture Authority Act, Marine Fishing Policy and the establishment of National Fisheries Development Board are some of the prominent examples.

In recent years there has been increasing realisation among planners and policy makers that fisheries sector has adequate potential and a tangible opportunity to provide employment and reduce poverty in rural areas by creating sustainable fisheries based livelihoods. It is a fact that Indian fisheries and aquaculture sector has been growing at a

faster rate (8% per year) than crop and livestock sectors. But, the review of the policy and regulatory environment at the national level has brought out the lack of and inadequacies in the present fisheries and aquaculture policy framework which is a *necessity* to bring about holistic development of the sector. On the other hand, the international policy scenario is encouraging with FAO's Code of Conduct for Responsible Fisheries providing framework that can inform positively the individual nation's policy. There are still vast underutilised and untapped resources in India having potential for development, which is being limited greatly by the absence of an overarching policy framework at the Centre and comprehensive policy at State levels. Policy support and institutional innovations would be prerequisite for sustainable and equitable growth. In addition, the federal structure of Indian polity mandates that while some water resources are managed by States, some are managed by the Centre necessitating the overarching policy at the Centre and harmonizing policies at the States. Also, in this era of participative democracy and planning, such policies need to be evolved through bottom up approach by involving all the stakeholders at different levels to ensure and voluntary compliance.

In this context, Central institute of Fisheries Education, (Deemed University under ICAR), Mumbai has taken a lead role in facilitating the drafting the outline of an overarching Fisheries and Aquaculture Policy Framework by organising five consultative workshops at different levels across the country involving all the stakeholders since December 2006. After the five workshops, a series of participatory review cum expert consultation including a synthesising workshop was conducted at CIFE to extract specific policy inputs and prepare a draft policy framework for different sub sectors of fisheries and aquaculture. Proceedings of the five Zonal Policy Workshops and the Synthesis Document were released by Shri Sharad Pawar, Hon'able Union Minister for Agriculture, Consumer Affairs, Food and Public Distribution on 8nd November at Mumbai. A significant spill over effect has been that the States such as Bihar, Assam and Rajasthan have shown interest in developing their own Fisheries Policies and CIFE has started actively supporting them in the endeavour.

The output and recommendations of the six workshops provided essential ingredients and guidelines that would assist the Centre in developing an overarching policy and the States in developing holistic State specific fisheries policies. The workshops have also brought out several cross-sectoral issues confronting the fisheries sector and their interdependent nature. Some of the core and essential guiding principles that shall inform the Policy are outlined below:

- Resource owners (Central and State Government and its various agencies) and resource users (fishers and fish farmers) *shall work together as partners* for sustainable development, management and conservation of fisheries resources and

associated ecosystems taking into account economic, social and ecological considerations.

- Objectives of fisheries and aquaculture development shall be clearly defined, while as far as possible prioritized with respect to livelihood development, food and nutritional security, revenue generation including export earnings, and conservation of aquatic biodiversity and natural resources.
- The policy shall address not only the resource specific issues like marine capture, inland capture and culture fisheries, coastal aquaculture, *but also* more importantly the components of processing and value addition, marketing and trade, extension and service delivery system, human resource development, institutional reforms, and fishers livelihoods and welfare. It shall become a comprehensive and all encompassing policy.
- It shall address some of the fundamental but unattended cross sectoral issues like right of minimal water for fisheries, control and management of pollution, adverse impact of infrastructural development programs on fisheries resources, fisheries management in inter-State rivers, reconciling conservation centric Forest Act and Wildlife Act with objectives of sustainable fisheries development, etc.
- The policy shall endeavour to mainstream / internalize the guidelines contained in FAO's Code of Conduct for Responsible Fisheries (CCRF). This would not only help realise the policy objectives of sustainable fisheries development but also ensure India's obligation as a member country, though voluntary, to implement the global code.

This is a revised and enlarged version of the first Draft Document on 'Policy Framework for Fisheries and Aquaculture Development in India -Draft for Discussion and Comments, 2009'. This document **'Draft Policy Guidelines and Framework for Fisheries and Aquaculture Development in India'** is an outcome of the long drawn consultation exercise. It was widely circulated to all stakeholders - all State and Central Fisheries Departments, NFDB, MPEDA, CAAI, NGOs, FISHCOFED, ICAR fisheries institutes, fisher and fish farmer associations, industry, experts, workshop participants and resource persons. Comments and feedback have been received from several of them and the document has accordingly been revised. This document would form a basis for discussion at the national level Symposium on **Policy Framework for Fisheries and Aquaculture Sector in India** being organised as part of **Indian Aqua-Invest Congress and Expo-2010** being held during **26-28 May at CIFE**, Mumbai. Once the draft is finalised the next steps would be to develop Strategies, Approaches and Guidelines for its implementation. You are encouraged to approach this document critically and offer constructive comments and suggestions.

2. Policy Objectives

Policies shall have clearly defined goals and objectives that would provide inspiration, underscore priorities, and give appropriate directions so as to infuse life and pragmatism to various elements of the proposed policy.

What shall be the policy objectives for fisheries and aquaculture policy?

Four broad objectives can be thought of that will subsume many related but more specific objectives. Though all of them would be considered important, it would be essential to prioritise them explicitly in order to provide focus as well as balance some of the competing components embedded in the policy.

i. To sustain and generate additional fisheries based sustainable livelihoods
   (employment generation and poverty reduction can be subsumed under this objective)
ii. To enhance the fish production and productivity through development of vast underutilised and unutilised aquatic resources and bringing them under the fold of responsible management for sustainable resource use.
   (it may include the objective of aquaculture development and conservation of aquatic biodiversity)
iii. To ensure food and nutritional security for all by making quality fish available to all at affordable price (as nutritional supplement)
   (domestic marketing may be subsumed under this)
iv. To increase the export earnings from fisheries exports by making Indian fish and fish products more competitive
   (value addition / reduction in post harvest loss / quality control and safely can all be subsumed under this)

Options and Implications

It is incumbent upon the policy makers and planners to prioritise / order the objectives listed above. Though all the objectives do not necessarily conflict with each other, prioritising one over the other will have different implications. Experiences from within India and from neighbouring countries would provide some insight in this regard.

Tripura Experience: The goal of attaining self sufficiency in fish production coupled with generating small scale aquaculture based livelihoods has yielded tangible dividends during the last 6 years. Focus on empowerment and self help concept has meant that the development process is self sustaining.

Andhra Pradesh: It has been the site of aquaculture revolution (both freshwater and brackish water) in India during the 1980s and 1990s. Though the predominantly

'developmental thrust' has lead to impressive aquaculture development with resultant socio-economic upliftment of farmers in the region, the oversight of potential biodiversity loss and negative ecological and social impacts in certain areas have already raised concerns This underscores the need for balancing development imperatives with long term conservation and sustainability objectives.

Rajasthan: Thanks to the 'revenue based model' of reservoir / tank leasing policy, Rajasthan has the highest lease revenue from reservoir fisheries while the productivity is also among the highest. But this open auction model has systematically failed to generate large scale rural livelihoods as it favoured few large contractors who exploited wage labourers. It underscores the need to balance / prioritise livelihood generation vs. revenue generation.

India: Open access regime in marine fisheries has lead to over exploitation of fisheries resources. Lack of clearly defined policy objectives and regulatory vacuum for fishing in EEZ has also contributed to the present imbroglio. Conflict between ensuring livelihood of fishers and sustaining fisheries resources on the other is still a challenge for policy makers. But choices need to be negotiated and priorities redrawn for sustaining both livelihoods and resources.

Thailand and Vietnam: From the mid 1990s, both countries have embarked upon very focused aquaculture development in their coastal areas both in small scale and commercial sectors. Their policy encouraged huge inflow of FDI in setting up on vertically integrated shrimp farms and processing plants. It not only boosted their production, but thrust on value addition has made their products internationally more competitive. Besides, these countries have also put adequate emphasis on sustainability of coastal aquaculture as well as development of small scale aquaculture (SSA) for poverty reduction and local level food and nutritional security.

3. Policy Issue: Water Use and Management Policy

Water has multiple and increasingly competing use. Drinking water, domestic usage, crop irrigation, fisheries/aquaculture, navigation, industry usage (both secondary & tertiary sectors), urban usage are the major claimants to water. Growth in demand is likely to outstrip the growth in supply. Water has been predicted to be most scarce commodity in future and would fierce battles would centre on water issues. This scenario shall envisage a comprehensive and equitable water policy that balances fairly the competing demands. The recent water usage policy does not clearly recognize the minimal right to water for fisheries and aquaculture. It must be clearly recognized that usage of water in fisheries *is non-consumptive in nature.* It means the net intake or loss is very minimal compared to both crop irrigation and industrial usage. Fish, as part of aquatic eco-system, shall be viewed as an ecological player and its upholding/ continuation and culture as a way to improve the aquatic eco-system and conserve biodiversity.

Policy Option and Outcome:

The present water usage policy shall be amended with enlarged scope that clearly recognizes the ***minimal right to water for fisheries and aquaculture*** as against the residual status being accorded now. The policy shall also ***envisage a regulated market for water in the long term to balance the competing demands***. However, this shall not be interpreted as privatization of public water resources but rather as a tool to efficient and effective use of public water resources while minimizing the conflicts. It will be a win-win situation as it would significantly promote fisheries activities in potential areas thus improving the livelihood and nutritional security while minimizing conflict among multiple stakeholders. This is a cross-sectoral issue and hence deserves cross-sectoral dialogue for its resolution.

4. Aquaculture

4.1. Policy Issue: aquaculture not at par with agriculture

At present, all types of aquaculture activities are treated as an industrial activity especially since the intervention of Supreme Court in 1997. In India, more than 70% of aquaculture farms, both under fresh water and brackish water culture systems have area less than 1 ha, while majority of aquaculture in eastern and North-east India are family based operations in homestead ponds of few hundred square meters only. This scenario is very similar to agriculture. As a result, aquaculture activities discriminated against in terms of higher taxation, higher energy / power tariff, higher interest rates, higher water charges, higher cargo charges, etc thus thwarting the fisheries development.

Policy Option and Outcome:

Aquaculture and fisheries are allied to agriculture and be treated at par with agriculture and social forestry in terms of credit, taxation of income, energy charges, water tariff and land allocation owing to the similar characteristics of the two sectors (primary, rural and small scale), resource use pattern and its importance in providing food and livelihood to the rural poor. However, commercial scale aquaculture activities, as in commercial plantations or industry scale agriculture, may be differentially taxed. Bihar has already taken policy initiative to treat aquaculture at par with crop and livestock sectors to give greater thrust to fisheries development. Centre has to bring a policy decision so that States can follow suit. Such policy direction will promote development of integrated farming and optimizing input use efficiency.

4.2. Policy Issue: *Multiple ownership and management of inland water bodies*

Water resources are of both publicly and privately owned. All the reservoirs, natural lakes and wetlands, majority of irrigation tanks, flood plains and village ponds across the country are under the *public domain* and have potential for fisheries. Among others, multiple ownership - village ponds by PRIs, temple ponds / tanks by Religious Endowment Dept. / Temple trusts, some ponds and tanks by DoF, some by Irrigation Dept., some by Dept. of Forests, some by Revenue Dept., some flood plains are also owned by a large number of individuals, etc, and the lack of coordination and conflicting interests among them have lead to utilisation of *only 45% of the 6.1 million ha* for fisheries and aquaculture.

Policy Options:

Multiple ownership of public waterbodies shall be accepted as an inevitable fact under the increasingly decentralized democratic governance structure in India. However, it's strongly recommended that a ***distinction shall be made between ownership and management rights*** for fisheries development. While respective agencies will continue to be the owner of those resources the **leasing and management rights of all waterbodies for fisheries development** shall be transferred and vested with Department of Fisheries. *This shall not be misunderstood as transfer of ownership rights, but only the leasing and fisheries development rights to DOF as they are the only technical agency with competency, capacity and mandate to develop them for fisheries.* However, the policy may provide for sharing of lease revenue among the owner agency and DOF as per their mutual agreement.

The other policy option would be to continue the *status quo* wherein most of the State DoF do not have any rights over many of the public waterbodies and as a result have not been brought under fish culture or enhanced fisheries. States like Himachal Pradesh already has a similar policy in place and brought most of the public water resources under enhanced fisheries / fish culture. Evolving institutional mechanisms for regular and effective inter-agency / departmental coordination at local, district and State level may pave the way for bringing all the potential area under culture / enhanced fisheries development.

Encouraging and supporting the owners of multiple owned private property resources which are common to flood plains to get organized and resort to collective resource use through seasonal / perennial use of resources for crop/fish production.

Policy Outcome / Implication:

Transferring all public waterbodies to DOF for fisheries development would help in maximum utilisation of all the potential water resources for scientific and sustainable fisheries and aquaculture development. This would lead to both increase in production as well as generation of fisheries based livelihoods in rural areas. Besides, this will also result in increased fish production and local availability of fish to rural communities. Continuing the *status quo* would mean foregoing the opportunity of creating many such livelihoods, while the potential aquatic resources continue to be mismanaged.

4.3. Policy Issue: Leasing of public water bodies for aquaculture

Only few States have comprehensive leasing policies and enabling legislation for lease of waterbodies at present. GOs and ad hoc rules govern the leasing process and procedures in most of the States. These were rather contingent responses to meet certain exigencies over the period of time. As a result there are large variations both within and across the States in terms of minimum leasing period, conditions of lease, lease rent, priorities and preferences as whom to lease, allotment procedures, conditions of renewal, rights of the lessee, responsibilities of Fisheries Dept., etc. While diversity of resources and their characteristics would warrant variations in lease procedures across States, lack of certain minimum desirable norms and terms has only meant limited development of potential resources. It has also been found that leasing guidelines in many States are not development-oriented but rather regulation and revenue oriented resulting in many smaller but potential water resources remaining underutilized.

Policy Option and Outcome:

A comprehensive leasing policy for the leasing of all public water bodies irrespective of ownership shall be developed in each of the State. *There shall be a balance among the four often competing models namely development model, livelihood model, welfare model, and revenue model with greater weightage given to the first two models*.

The minimum lease period for all types of resources shall be for 8-10 years in order to ensure long term development of resource and provide sustainable livelihood. This would also ensure adequate resource / credit mobilisation by the lessee. First priority to lease shall be given to group of individuals from communities living in close proximity to the resource like fishers' cooperatives or association / self help groups / producer companies / group of educated unemployed youth, professional fisheries graduates, etc. Competitive bidding through open auction may be encouraged only when there are no takers from local communities. Fair and transparent procedure to be adopted in determining minimum lease rent and shall take into account both present fish production trend as well as the potential. There shall be a single window system for leasing both at district and State level. Sustainable utilisation of resource in the long term shall be the prime consideration as against short term production and revenue gain.

4.4. Policy Issue: Diversification of aquaculture

Aquaculture in India is still dominated by IMC in freshwater culture systems and shrimp culture in brackish water culture systems, though off late culture of many other alternative species are being sought to be promoted. This monoculture like scenario increases the risk and uncertainty for both the producer and the consumer due to disease outbreaks, market failures, etc. There are many indigenous fish species suitable as candidate species for culture and have high preference in domestic market. However, technological limitations in seed production as well as culture practices, besides lack of policy thrust have limited this diversification process.

Policy Option & Outcome

The policy shall give a major thrust on diversification of culture systems in both freshwater and brackish water systems especially with suitable indigenous fish species. The R&D policy shall place greater emphasis on developing breeding, hatchery and grow-out technology for identified alternative species suitable for pond aquaculture. Best Management Practices shall become part of this strategy to diversify aquaculture practices including poly culture. Diversification by promoting catfish culture, giant freshwater prawn culture, ornamental fish culture, would not only reduce the risk for both individual farmer and society but would ensure that the available water resources and market opportunities are used optimally. Priority for propagate of different site-specific integrated farming systems of crop-livestock-fish shall become important.

4.5. Policy Issue: Certification of seed and feed quality

Quality seed and feed are the most critical inputs in aquaculture and it's still a major limiting factor in most of the States. The aquaculture input sector is both highly unorganized and unregulated though the industry has higher concentration in specific pockets. Lack of both product as well as process standards have given rise to sub-standard and dubious seed and feed in the market putting the individual producer at the receiving end. Lower average productivity is also partially attributed to poor seed and feed quality. Except in few states like Andhra Pradesh and Assam, most of the States do not have policy or legislation to regulate them.

Policy Option & Outcome:

Quality inputs are non-negotiable and producers shall be assured of this in order to produce quality outputs. In order to ensure this, policy and legal instruments shall be put in place with mandatory provisions for registration of all the seed producers (hatcheries, seed rearers /growers), feed manufacturers as well as suppliers / traders as well as certification of the seed and feed quality through quality control and checks all through the value chain. The recently circulated Model Bill on Inland Fisheries and Aquaculture seeks provides for these aspects.

4.6. Policy Issue: Sustainability of aquaculture

Many lessons have to be learnt from the impressive development and boom of shrimp farming in 1990s. The unregulated growth has lead to many ecological and socio-economic externalities caused by changes in land use pattern, conversion of paddy fields, unscientific farming practices leading to environmental degradation, outbreak of viral diseases, salinisation of ground water resources, destruction of mangroves, flooding of villages. Similarly, intensive freshwater culture practices around Kolleru lake region are becoming increasingly unsustainable from both economic and ecological points of view. The challenge is how to ensure growth and development of aquaculture with minimal impact on ecosystem so that it becomes sustainable in the long run.

Policy Options & Outcome

Long term sustainability shall be comprehensively addressed by the policy and regulatory framework. Policy shall encourage adoption of Best Management Practices and other CCRF guidelines on aquaculture development through an appropriate incentives structure coupled with training, monitoring and strict enforcement of regulations. Policy shall promote organically grown and labeled fish in clusters as it has emerging niche market. Mandatory labeling and certification systems are already driving the shift towards BMPs. The policy and programs shall balance the competing claims of productivity maximisation vs. optimisation. Cluster approach to development, permissibility of aquaculture in the proposed different CMZs, review of CAA rules to account for variations in land use / ecosystems across States while ensuring strict implementation of CAA guidelines by all States shall be given due consideration.

4.7. Policy Issue: renovation of public waterbodies

Infestation of aquatic weeds like hydrilla, water hyacinth, Ipomoea, etc is a common problem in most of public waterbodies especially the small perennial ones. This significantly reduces productivity of the water resource while hampering many aquaculture operations. Control and eradication of weeds is essential though difficult. Also, many of the waterbodies are heavily silted reducing the depth of water. It is important to deepen them to make them suitable for fish culture.

Policy Option & Outcome:

Deweeding and desilting of public waterbodies shall be given proper policy attention so that major programs are formulated with this objective. That such program can be converged with other rural development programs like NREGA and RKVY is obvious. But this convergence needs to be institutionalized at planning level itself through proper policy guidelines. This will not only help to restore the aquatic ecosystem for aquaculture production but will also have positive effect on public health and hygiene besides creating additional source of rural employment.

5. Inland Fisheries

5.1. Policy Issue: Scope and objectives of the inland fisheries policy

At present, there is no comprehensive policy and legislation to sustainably utilize and manage the inland fisheries resources (riverine fisheries, reservoir / enhanced fisheries, other open water bodies like lakes, flood plains). The obsolete Indian Fisheries Act of 1887 has mere 7 sections and deal only with regulation of indiscriminate fishing, poisoning, etc in certain water bodies which has hardly been amended substantially during last 123 years. Diffused nature of resources, inter-sectoral problems as well as sectoral conflicts, and less organised nature of resources and resource users meant low level of priority to this sector. Any exercise in developing the policy shall take into account the questions like whether separate policies are required for fisheries development in reservoirs, ponds / tanks and riverine systems or single comprehensive policy for all inland open water resources would suffice; whether it will confine to leasing policy or a broader fisheries development policy with management options, institutional options, and technological options embedded into it; and whether it would be applicable to only those owned/managed by fisheries dept. or for all water bodies under State ownership.

Policy Options & Outcome

There shall be a comprehensive and a single policy that encompasses fisheries development and management in all public owned inland open water resources irrespective of ownership, but would address the ecological diversity of inland aquatic resources besides accounting for different property regimes and the specific requirements of communities deriving their livelihood from these resources. The scope of the policy has to be broader that extends beyond leasing / licensing procedures and encourage community based management regime. The ecosystem approach to fisheries (EAF) that accommodates fishers livelihoods shall be the overarching framework within which other policy elements has to be based. Relevant provisions of CCRF shall be made integral part. It is also essential to define categories of fishers and fish workers, legally recognise their customary property rights while reiterating the responsibilities in relationship with other stakeholders and the resource per se.

5.2. Policy Issue: Management of riverine fisheries

The capture fisheries in open-waters of rivers, wetlands, backwaters and lakes has declined over last four-five decades alarmingly with productivities dropping by 50% or more in major rivers like River Ganga, River Brahmaputra, River Yamuna, River Narmada, primarily due to lowered water regime following high abstraction of water upstream, industrial and urban pollution, increased fishing pressure, indiscriminate and unregulated fishing and ineffective enforcement machinery. Hence, conservation of the ecosystem should be the primary concern and major priority in designing any policy interventions in riverine fisheries as they are the source and last abode of aquatic biodiversity as well as fisheries broodstock. The more specific conservation related issues are ensuring minimum environmental flow in rivers to sustain the aquatic biodiversity as construction of dam and other developmental activities disrupt the habitats aquatic fauna; issue of involving fishing communities dependent on the rivers in planning and decision making process in riverine management; control of pollution; including fisheries in inter-state river management authorities, etc

Policy Options & Outcome:

The policy objectives shall be conservation of indigenous fisheries resources; enhancing the productive / regenerative capacity of the riverine ecosystem; and to improve the livelihood of subsistence /small scale fishers. Though the ownership right of the riverine resources should remain with the State government, fishing rights be allocated to traditional local communities/less privileged groups by organizing them into SHGs, fishers association and other co-operative societies. The licensing system shall ensure that the practices are directed towards conservation and habitat restoration while providing livelihood support. The policy shall provide for minimum environmental flow in rivers for restoration of aquatic system while fish pass /migratory routes for the free movement of the fish may be provided in dams. While pollution abatement rather than control would be a pragmatic approach, the policy shall place emphasise on zero discharge of urban sewage and industrial effluents without treatment and application of polluters pay principle. It shall establish linkages with several other policies and legislation that already exist. Policy shall provide for initiation of major program for seed stocking and ranching in rivers.

An *inter-State river management authority* may be conceived for the effective riverine resources including fisheries management. Bringing uniform period of closed season, prohibition of destructive fishing practices and mesh size regulation have to be evolved and implemented in consultation with fishing communities by judiciously linking the incentive structures with the regulation. Establishment of sanctuaries on specific riverine stretches / lakes in some States like Himachal Pradesh can be encouraged.

5.3. Policy Issue: Development of Reservoir Fisheries

The Reservoir fisheries in spite of some significant growth after carp breeding and hatchery technologies provided higher seed availability in 1970s and 1980s, the productivity still remains very low while many of the medium and small reservoirs are yet to be brought under scientific fish culture programs. The present fisheries management model in reservoirs would require a major revision in terms of ownership and development rights, leasing system, technological options, management practices, investments, community and stakeholder involvement, etc. Though NFDB has put in place a major program for reservoir fisheries development, it shall be supported by a well articulated policy that goes beyond production enhancement.

Policy Options & Outcome:

The policy shall encourage co-management of reservoirs for sustainable utilization of reservoirs for fish production while maintaining the ecological balance and ensuring sustainable livelihoods for communities living on the periphery of the reservoirs. The rights of fisheries development in the reservoir shall be transferred to Departments of Fisheries in all States. Appropriate reservoir fisheries management plan for different categories / types in each of the States that balances production enhancement, equitable livelihood development and revenue realization shall be given top priority. Policy shall provide for development of basic infrastructure in the existing irrigation projects to facilitate fishing activities in the reservoir such as approach roads, provision for seed production units, fish landing centers, training centre, etc. The welfare of the displaced and affected persons needs to be inbuilt into the planning process in construction of large reservoirs. The technological options shall necessarily include *in situ* rearing of seed through establishment of nurseries, pen culture and or cage culture methods especially in medium and large reservoirs so as to ensure availability of adequate and quality seed of stockable size at the local level. Government shall facilitate development of seed banks in private sector / public - private partnership mode for ensuring *round the year availability* of quality seed at local level. Incentives shall be given for yearling production.

5.4. Policy Issue: Special attention for cold water fisheries

The unique nature of aquatic resources, geographical and climatic features in high altitude & hilly regions - Himalayan and sub-Himalayan zones in the north and watersheds draining the southern slopes of Deccan plateau (Western Ghats) that has about 258 fish has different challenges and requires special focus and attention in terms of policy, legislation and development / conservation programs. Fisheries development in these regions / states is not comparable to other States in the plain. Relative lack of policy, R&D support for hill fishery has to be rectified to realize the potential in a sustainable and eco-friendly manner as coldwater fishery can contribute to food and nutrition security in hills and remote regions. Therefore, in the planning process the fishery in hills needs to be given due importance in terms of financial, infrastructure and modern institutional back-up facilities. In hills the fishery development through aquaculture, sport and conservation should be promoted and supported, in order to introduce crop-fish diversification, so that natural resource management becomes economically sustainable activity.

Policy Options & Outcome:

Specific policy options for cold water fisheries shall encompass the following aspects. a) practically all the water resources suitable for hill fisheries in the state are owned by the forest/irrigation department. For implementation of fisheries development program there is a need to place them under the management of fisheries department; b) construction / renovation of existing fish farms and hatcheries on a priority to promote aquaculture activities; c) policy shall encourage eco-tourism based sports fisheries along innumerous hill streams / rivers with community and private participation. Linkages with tourism department involving creation of angling facilities, ranching of mahseer and trout in streams shall be integral to this; d) breeding grounds should be declared as sanctuaries and prohibited for fishing during the breeding season; e) scientific evidence suggests that dams and reservoirs have dramatically and negatively affected distribution and abundance of native fishes in mountain streams of India (change in migration route, reduction in native fish population, etc) as well as local fish communities. It's also true that introduction of exotic carps in certain reservoirs has increased production / productivity. Hence, the policy shall encourage a more cautious and balanced approach in future with adequate conservation and management measures in place; f) Special Development Agency for Fisheries Development in Himalayan and NE States to address specific challenges and promote generation of livelihoods around angling, eco-tourism, sports fishing, etc besides utilizing potential areas for aquaculture.

6. Marine Fisheries

6.1. Policy Issue: Scope and Objectives of Marine Fisheries Policy

Currently, there are several statues and regulations, enacted over the years and cutting across the ministries that either directly or indirectly impinges upon fishing and fisheries management in the Indian marine sector. While MFRAs in every coastal State seeks to regulate fishing in territorial waters, centre has specific regulations only for deep sea fishing and not for the entire EEZ thus leaving a regulatory vacuum. The Marine Fishing Policy 2004 also has several policy gaps and unaddressed implementation issues. The fundamental issue is that there is no comprehensive policy covering the entire spectrum of Indian marine fisheries with clearly defined objectives.

Policy Option & Outcome:

Marine fisheries policy shall be part of the overarching National Fisheries and Aquaculture policy. Specific objectives shall be sustainable utilisation and management of fisheries resources by following a ecosystem based approach to fisheries management; ensuring livelihood security of traditional fishing communities in an equitable manner; create a unified system to manage marine fisheries in India that ensures compatibility between state and central legislations, between different central laws and between different central departments; has clearly defined linkages with relevant constitutional provisions as well as international instruments especially FAO's CCRF, UNCLOS, etc.

The scope should cover fisheries of both territorial ('State waters') as well as EEZ ('National waters') including deep sea fishing, and address all issues ranging from vessel registration and capacity reduction, resource allocation among different competing fisher groups, specific stock conservation and management measures, issues related to sea and labor safety including women in fisheries, capacity building and empowerment, the institutional process of fisheries management, etc.

Otherwise, any policy with limited scope and mandate will only aggravate the current crisis of sustainability in Indian marine sector while increasing the inequities in resource access rights.

6.2. Policy Issue: *Open access* to *managed access* regime

Marine fisheries resources are common property resources notionally owned by the government. Absence of clearly defined property rights with the traditional fishing communities having only customary rights as against legal ownership, it has become 'free for all' and 'open access' fisheries over the years. Here, exclusion (or control of access) of potential users is problematic in a limited supply scenario. The crisis of sustainability is mainly attributable to the perverse incentive structure created by open access regime and the resultant excessive fishing capacity. This has lead to economic as well as biological overfishing as individual choices have gained over collective social and ecological rationales. The limited interventions by the State have at best remained only notional and lacked legitimacy (hence poor enforcement and implementation) among the resource users due to top down approach and their exclusion in decision making process.

Policy Option & Outcome:

The only viable way out in the long term would be to move towards a ***'managed access' regime*** following the Ecosystem Approach to Fisheries (EAF) which encompasses all the three broader economic, social and ecological components in a holistic perspective that goes beyond the conventional focus on only 'fish and fleets'. This transformation is both vital and inevitable in order to ensure *sustainable fisheries* as well as sustainable *livelihoods*. This shall be guided by certain central principles namely resource allocation namely *matching the capacity and effort with the resource*, application of the *principle of subsidiarity* (resources that can be caught by smaller / less powerful units should not be caught by the larger / more powerful units) appropriately, starting the fleet regulation at the top end (from large vessels / gears to smaller ones), making distinction between owner-operators and absentee fleet owners as well as ceiling on boat ownership akin to land reform policies, priority access to traditional fishers, consideration of value-chain and gender impacts of resource allocation policies, reciprocal sharing of resources with neighbouring countries. Management Plans at different levels (state, regional, national, stock/area specific, etc) can be thought of as overall framework and as vehicles to give effect to these principles.

6.3. Policy Issue: Fisheries regulation and management in territorial waters

The State MFRAs are the major that regulate that fishing operations in territorial waters in respective nine coastal states. Vessel registration, mess size regulation and closed seasons are the three principal instruments through which MFRAs sought to regulate fisheries. Only closed seasons / seasonal ban has been partially successful in attaining the stated objective. As MFRAs' scope is narrow and lack clarity on resource allocation and access rights, its unable to address many of the crucial issues namely the increasing conflict between fishers of artisanal and mechanized vessels, between those of small and large mechanized vessels, and between fishers of two States; alarming increase in fishing capacity in spite of ban on new permits in many States, and increased use of destructive fishing practices and gears as evidenced by depletion of many stocks beyond sustainable limits.

Policy Options:

Though it's the prerogative of respective States, it's in their interest that uniform policy is put in place by Centre for suitable *adaptation* as many issues cut across States and overlap with managing fisheries in EEZ (national waters). Such a common policy for *State waters* shall be within the 'managed access' regime as outlined above. Policy shall seek to prepare state specific comprehensive Marine Fisheries Management Plans in conformity with National Marine Fisheries Management Plan. It has to be followed by a comprehensive legislation replacing the present MFRAs that may be called Marine Fisheries Management Act (MFMA). More specific policy elements shall consist of registration of all vessels irrespective of their size and capacity, restrictions to be placed on numbers of each kind of fishing units, controls on fishing operations like zonation, seasonal bans, gear specifications including mesh size, horse power controls, etc., provisions governing the crew, sea safety, etc., ban on capture of any species and or declaration of Marine Protected Area, creation of alternative employment opportunities etc. The policy shall place major emphasis on the *'process'* of evolving management plans which is *as important as the plan* itself. All stakeholders have to be made essential part of creating such plans following co-management approach to *ensure process ownership and higher compliance levels* as resource users become responsible 'resource owners' and develop a vested interest in sustainable resource use. Government-fishermen negotiations mediated through CBOs/ NGOs/ research institutions shall become integral part of this process.

6.4. Policy Issue: Fisheries regulation and management in Exclusive Economic Zone

The recent draft Marine Fisheries Regulation and Management Bill 2009 by GoI was a welcome step aimed to regulate and manage the hitherto 'unregulated' fisheries in the India's Exclusive Economic Zone. The draft Bill has created heated debate among many stakeholders and the consultation process is on. This shall become an opportune time to put in place a more comprehensive policy and legislation after a wider and intensive consultation with primary stakeholders and others rather than put in place a limited legislation with many uncertainties unaddressed. Regarding resource allocation and their effective management in EEZ, the policy may seek to classify three categories of fleets namely State fleet I that fish only within State waters, State fleet II that may fish in both State and National waters, and National fleet that may fish *only* in National waters. States shall be fully responsible for management of first category, while the second category will be managed by States in consonance with national policy and management plans. National fleets have to be managed by Centre through appropriate agency like FSI or any other.

The development of national and regional management plans that's evolved through consultation across states and between states with scientific inputs shall become the central framework within which thorny Issues such as usage of fishing ports, movement of fishing vessels, fish marketing, coordination during disasters and sustainable fisheries management can be addressed. A national authority (Marine Fisheries Management Authority) may be conceived to integrate all stakeholders, approve management plans, adjudicate inter-state relations, etc with representation from all stakeholders.

The policy shall encourage increasing exploitation of the relatively underexploited deep sea fishing resources specifically by reducing the pressure from the more destructive trawl fisheries. As a principle, the first right to exploit deep sea resources shall be given to fishing communities in India as they can be equipped in terms of financial and other support systems and market linkages.

7. Mariculture

Policy Issue: Mariculture policy

In spite of the potential available for mariculture and its successful practice in some of the countries, no comprehensive policy for its promotion has been put in place. Mariculture has to be seen as one of the ways to reduce the excessive fishing pressure in the capture fisheries sector though it may be considered as an independent economic activity as well. This has meant that only sporadic and limited attempts at few locations. While indigenous technologies may be limited in number and may require time for standardization, no organized attempts have been made to look at the feasibility of borrowing certain proven technologies and adapt them to Indian conditions. Recently the Govt. of Tamil Nadu has initiated the process of developing a Mariculture Policy which if evolved through stakeholder consultation and consensus can become a model. Recent decision by State Ministers Conference asking NFDB to initiate pilot projects on mariculture in all coastal states on priority while resolving to formulate mariculture policies in each States for allocation of rights in coastal waters is a progressive step.

Policy Options:

Considering the stagnation in marine capture fisheries production and the feasibility of promoting mariculture in backwater, near shore areas and even in open seas, there shall be a comprehensive mariculture policy. It shall encompass identification and demarcation of suitable areas for mariculture, terms of leasing of those demarcated areas to fishers and entrepreneurs, safety requirements, technological and management options, recognition of local traditional rights of fishing communities, etc. This would also require extensive consultation among various stakeholders as any fresh policy initiative is bound to disrupt the existing arrangement in marine fisheries sector. It is a very complex process as any unilateral approach has potential to be perceived *as privatisation* of the hitherto common property resource.

8. Post Harvest, Processing and Value Addition

Policy Issues:

Fish is a highly perishable food material and spoils within 12-20 hr depending on species and capture method. Indian scenario is very dismal with respect to hygienic handling, maintenance of minimum quality and safety standards on-board fishing vessels, at 150 major and 3000 plus minor fish landing centres, at pre-processing sheds and processing firms. Thus, post harvest loss is estimated to be 15-20 of total production (1.4 mn tons). The issues are of three types: i) lack of awareness, training, capacity building, and unfavourable attitude towards hygiene and quality; ii) infrastructure limitations; iii) poor value addition.

Policy Options:

There shall be a comprehensive policy on post harvest management including processing and value addition. It shall author a major country wide program for creation of awareness and capacity building among both fishers and DoF staff that may build on NETFISH coordinated programs involving DOF, ICAR/COF, CBOs and NGOs. The policy shall address the constraints arising from multiple ownership / (mis)management of fishing harbours and landing centres. While required additional infrastructure (berthing facility, water supply, drainage, fish handling devices, ice supply, cold storage, motorable roads) shall continue to be created and upgraded, greater focus shall be on ***'user management'*** of these facilities through levy of service charges for long term viability and effectiveness. Subsidies and other incentives shall be linked, both to States and users, to compliance of the quality norms. Development of a network of 'waste' collection and its process / management, on lines of economically remunerative municipal waste management, shall be given priority attention.

Similarly, a major program on value addition, especially of *low value* fish would reduce post-harvest loss significantly as buyer driven market has already forced better handling of commercially more important fishes. Generation of awareness and quality consciousness among consumers in domestic market can drive this process more successfully. Effective implementation of recent Food Safety and Standards Act and an Authority with HACCP/GMP comparable standards would go a long way in improving quality in domestic markets.

As increasing cost of compliance and shortage of raw materials are forcing many small scale processing units turn sick, existing licensing policy shall be revised to limit no. of processing units while import policy shall be further liberalised to encourage export oriented processing and value addition. Existing welfare schemes shall be widened to cover unorganised women workers and their working conditions and wages shall be made to comply with ILO guidelines.

9. Fish Markets and Trade

Policy Issues:

Most of the fish markets are in very bad shape as they lack basic and minimal infrastructure as well as suffer from the systemic malaise of their improper management. The urban fish markets are predominantly owned and managed by municipalities with little stake and resources for strengthening infrastructure and proper upkeep. Other major issues are the highly unorganised and inefficient domestic fish market structure, negligible private and public investments, lack of systematic and reliable market / price information, weakened marketing cooperatives and their federations, etc. Major issues with respect to export markets are greater dependence on EU, US and Japan markets, increasing trade restrictive measures by importing countries especially resort to non-tariff measures like linking of trade with environment and labor issues, highly subsidised fisheries industry in developed countries.

Policy Options:

The policy objective shall be to ensure that the primary producer gets greater share in consumer rupee, consumer is assured of safe and quality fish at affordable price, and the market intermediaries get an equitable margin. To achieve this, market reorganization shall be given top priority. Policy shall encourage establishment of modern *producer and user managed* wholesale and retail fish markets in urban centres of consumption on lines of successful farmer *mandis* for crop produce and promotion of chain of modern standalone fish retail outlets with supply chain linkages. Regular training and capacity building programs with exposure visits to model markets, incentivising self enforced quality standards, strengthening district and state level producer led fish marketing federations, promotion of value addition of low value fish, sharing and strengthening of food grade cold storage facilities, creation of specialised intelligence cell within AGMARKNET for fish products with countrywide network, promotion of fish as wholesome health food by NFDB among public on lines of egg and tea by NECC and Tea Board shall be given priority attention.

While strengthening the domestic markets to reduce dependence on export markets, increased attention shall be given for product and market diversification in export markets by moving up the value chain. Emulating the examples of Thailand and China in this case would pay greater dividends. Policy interventions and skillful WTO negotiations shall go hand in hand with improvements in sustainable and CCRF compliant fisheries management and improvements in labour standards. While rationalising and targeting domestic subsidies for fisheries sector, developed countries shall be forced to account for all types of fisheries subsidies and their subsequent reduction shall be given sufficient priority.

10. Human Resource Development

Policy Issues:

State Departments of Fisheries are the primary agencies of development while SAUs/ICAR generate and upgrade professional human resources. Several systemic issues constrain function and performance of the DoF. Issues that require policy attention are inadequate and ill equipped technical staff with 20-60% vacancy positions in many states, lack of parity with staff of agriculture and veterinary departments in most states, lack of proper human resource assessment in the fisheries sector, poorly defined roles and responsibilities that are at present oriented towards disbursement of subsidies and collection of revenues, involvement in non-technical and non-developmental work, absence of independent and full fledged Fisheries Departments and Ministries in many States and the Centre, relative neglect of fisheries directorates as evidenced from posting preferences, frequent transfers and budget allocation, non-technical persons as head of departments in many states due to absence of professional cadre based service rules, lack of adequate delegation of power and autonomy (financial, executive) to middle and senior officers, rigid bureaucratic norms and delay in fund availability and utilisaion, weak state level training centres in most states, professional fisheries education still oriented towards generation of while collar job seekers, and disproportionately less number of women officers and staff in DoF.

Policy Options:

The major policy intervention would be reconsidering the freeze on fresh recruitment in many states and fill the vacant posts immediately while simultaneously evolving innovative mechanisms to employ field level technical staff on contractual basis on lines of *matsya mitras / para extension workers* and collaborate with NGOs and CBOs. Redefining roles and responsibilities of DOF staff keeping in mind developmental needs and expectations of the sector, state specific national level assessment of human resources required at different levels, instituting cadre based service in DoF in all States along with parity with other development departments with preference to professional degree holders in recruitment, encouraging technical persons to head the state DOF, strengthening training infrastructure in DoF and Colleges of Fisheries in terms of faculty, infrastructure and library facilities, regular and compulsory capacity building including adequate field exposure both on technical know hows, societal skills and development management, creating separate Fisheries Departments if not separate Ministry at the centre and in states, making DoF and other institutions an equal opportunity institution with more participation of women and other disadvantaged sections as they would bring fresh perspectives and sensibilities shall be addressed by the policy.

11. Service Delivery System

Policy Issues:

Extension and service delivery system is the crucial but weakest link between technology generation and client systems. Though the main mandate of fisheries development and extension rests with State Departments of Fisheries, they are involved more in regulatory role than the extension / developmental role due to the nature of property regime in fisheries sector as well as lack of policy support and clearly defined roles. Lack of coordination among DoF and other development agencies like financial institutions, NGOs, other development departments, etc and the resultant failure to bring convergence are major issues.

Policy Options:

DoF shall have two distinct wings, one for fisheries extension with concerted community based co-management approach to implement conservation and sustainability measures for optimal resource utilization in marine / riverine sector and aquaculture extension with farmer led extension approach for speedy and effective adoption and diffusion of appropriate technologies. Thus, participatory aquaculture extension and fisheries co-management shall become the major paradigms of extension for the two sub-sectors respectively. At the same time extension system shall be conceived of providing bundle of services ranging from technical training and support, input mobilisation including credit and insurance, market facilitation, conflict resolution instead of just conventional transfer of technology.

DOFs shall develop, through FFDAs, district and grassroots level linkages for effective convergence and complementarity among PRIs, departments of rural development, irrigation, agriculture, forest, tourism, pollution control board etc, while at the State and national level institutional mechanisms shall be evolved and strengthened by NFDB/DAHDF.

Absence of authentic database on fisheries resources and fishers / fish farmers has limited more appropriate policy and planning exercises. The policy shall encourage and incentivize collection of authentic data base by DOF staff. Innovative mechanisms shall be devised wherein stakeholders / resource users volunteer to supply reliable data through CBOs / PRIs / NGOs.

12. Fishers' Livelihood and Welfare

The CSS on fishermen welfare including subsidization of diesel are not effectively targeted but available to all the 'fishermen' who are mostly defined by caste for all practical purposes in most of the States rather than by occupation. Thus, the limited budgetary provision and coverage under the welfare schemes by default has excluded really needy in its ambit for example the migrant fish workers. There are no comprehensive studies so far on these aspects. The welfare policy shall be based on sound and reliable scientific study / survey and shall be targeted based on income / poverty levels. That recent State Ministers Conference called for such comprehensive study by ICAR is a welcome initiative. All the CSS and SSS programs shall be thoroughly reviewed in terms of its impact on target groups and accordingly revised during the next Plan period both in form, coverage and adequacy of support. For example many States felt that adequacy of financial support under saving cum relief Schemes shall be increased to Rs. 3000 / two lean months / fisher family, etc.
Livelihood generation and poverty reduction has to be the focus for the fishers. Recognizing and developing potential of the poor, increasing their productive capacity and reducing barriers limiting their participation in society. Focus has to be on improving the social, health, nutritional, economic and environmental conditions of the poor and their access to decision-making. Targeted programs for poor to reduce the disparity and gap between rich and poor. Increased access to and control over productive assets (especially water, land, capital and credit) and other basic services for poor and women. Greater access to and control over credit, training and services for women entrepreneurs. Social security schemes should be introduced.

Increased recognition of local men and women's knowledge of the natural environment, ITKs and increased decision-making role for them in natural resource management and sustainable development.

Fisheries and related livelihood opportunities be created. Alternative livelihood opportunities for men and women be created during closed season, conservation programmes and also as an alternate option for them. Ensuring participation of women in all activities of fisheries and aquaculture. Gender equity, economic equity and inclusive growth be ensured. Gender based auditing of all programmes be done.

Fisheries be integrated with NREGS. Relief during closed season based on economic status of individuals not households. Pension for men and women and poor in particular be provided.

Fishing communities are vulnerable to disasters and other health risks. So Community Based Disaster Management has to be given emphasis. Fisheries insurance has to be introduced as it is a high risk job. Insurance should be there for natural calamities, against threat of life/accident, economic loss, to crafts and gears. Security measures for the workers be provided. Improve well-being and ease workloads by facilitating access to basic rural services and infrastructures.

Empowerment of fishing communities is necessary, recognizing poor and women as a target group deserving special attention should be emphasized. Expanding poor and women's

access to and control over fundamental assets – capital, land, knowledge and technologies . Participatory decision-making role in community affairs and representation in local institutions.

Development initiatives should incorporate the priorities and needs of both women and men and give them equal opportunities to access benefits and services. Address the structural inequalities that prevent poor and women from realizing their potential as human beings and producers. Providing education, health care, nutrition, access to basic services as per the UN indicators of HDI, GDI, GEM. Drinking habits of fishers and the economic loss to the family be addressed.

Facilitation of poor women's and men's access to credit and other microfinance products be addressed. SHG and enterprise development be encouraged. Fisheries sector be recognized as priority sector for the purposes of credit. Suitable variant of kisan cards be introduced. Saving habits be inculcated.

Strengthening of cooperative societies and participation of credible NGOs is needed with strengthening women's representation in community-based organizations (CBOs). DOF should work with the rural development programs and PRIs. Strengthening democratic system and bringing equitable distribution of benefits.

Reforms in Co-operatives

To ensure greater degree of accountability of the fishers' co-operatives, strengthening democratic system and bringing about equitable distribution of benefits, following measures shall be initiated: all societies shall have joint account preferably in nationalized banks; all members shall have photo ID cards and the list to be available for public scrutiny; incentives and awards to best performing societies based on overall production as well as socio-economic parameters; power of registration of societies and settlement of their disputes to be given to Dept. of Fisheries as in other States like MP, UP, and WB; all transactions be made only through cheque/DD and no cash transaction; extension of lease period be given based on performance; and regular independent survey of socio-economic status of members about the impact of co-operative societies.

To bring professionalism in the fishers' co-operatives and make them main vehicles of promoting livelihood development through scientific aquaculture, technical and promotional cells in apex fisheries federations shall be promoted. Secretaries of co-op societies shall be minimum matriculate pass (UP govt. has recently made this) and preference to fisheries graduates / persons having knowledge in fisheries. To encourage education among fisher communities, preference as office bearers shall be given to fishers whose children are school going or educated. Compulsory primary education for all fishers' children by 2012 shall be a major policy objective.

Empowerment

- Recognizing poor and women as a target group deserving special attention. Expanding poor and women's access to and control over fundamental assets – capital, land, knowledge and technologies. Participatory decision-making role in community affairs and representation in local institutions.

- Development initiatives should incorporate the priorities and needs of both women and men and give them equal opportunities to access benefits and services.
- Address the structural inequalities that prevent poor and women from realizing their potential as human beings, producers and agents of change
- Different roles and needs of women and men to be taken into account in project design and implementation, development interventions.
- Shift in paradigm by empowering stakeholders, organsiing stakeholders and organsiational development.

Human development

- Providing education, health care, nutrition, access to basic services as per the UN indicators of HDI, GDI, GEM.

Basic Human Needs:

primary health care, family planning, nutrition, water and sanitation, and shelter.

- Increased access to and control over primary health care services for poor, women and girls. Understanding of diseases such as malaria, HIV, AIDS and occupational health. Increased access to a broad range of reproductive health care services for women and men.
- Increased access to and control over water, sanitation and other basic services.
- Increased access to and control over decision-making by women in the design, management and maintenance of water and sanitation services.
- Housing facilities

Credit, Microfinance and SHGs

- Facilitation of poor women's and men's access to credit and other microfinance products; Crop insurance, SHG development
- Fisheries sector be recognized as priority sector for the purposes of credit. Suitable variant of kisan cards be introduced.

Saving habits be inculcated

Annexure

i. Policy Framework for Marine Fisheries Sector

Licensing and registration

Considering the current annual marine fish yield by capture is of the order of 3 million tons which is close to the maximum potential yield in the currently fished grounds and in view of the fact that about 65% of marine fish landings in the country are taken by the mechanised vessels particularly trawlers, introduction of additional vessels to the fleet is neither feasible nor desirable. It is hence recommended that the concerned state governments do not permit additional vessels in the grounds. As agreed in the Conference of State Fisheries Ministers, replacement of existing fleets rather than addition of new vessels would be a less harmful option.

At present, only mechanised vessels are registered as a practice, not all the vessels irrespective of their size and capacity. This scenario needs to be changed. Every fishing vessel intending to operate in the territorial waters and beyond should have obtained license for operating in the specified area. Some States have initiated this process but all shall follow suit. No vessel other than one that is registered shall be entitled for license to fish. License limitation is one of the attempts to control over fishing particularly as applied to controlling the number and power of the fishing units.

Declaration of closed season

Declaration of closed season for fishing is known to be one of the ways of rebuilding overexploited stocks. At present States have varying periods of closed season for fishing in territorial waters while the Centre has stipulated one uniform ban period for West Coast States and another for East Coast States for EEZ zone. Besides, this seasonal ban also suffers from lack of compliance across the States. Although there is a strong perception among various stakeholders that the scientific evidence is still insufficient to support the seasonal fishing ban as a way to rebuild overexploited stocks, it's desirable to follow a precautionary principle and maintain the uniform closed season. But extensive stakeholder consultation has to be encouraged in each State so as to make them realize this critical need and develop a sense of ownership that will increase the compliance level. The possibility of bringing a uniform ban period for fishing in territorial waters and in EEZ may be given due consideration by policy makers in each State.

Protection of endangered species

Some of the elasmobranchs like Sharks, Rays and Skates are highly vulnerable to overexploitation. Any management measures shall be based on adequate database on the status of these fisheries. Considering the insufficient information, efforts shall be made to strengthen the same through scientific studies.

Establishment of Marine Protected Areas (MPA)

In recent years the Marine Biodiversity protection and conservation are receiving increased attention due to its role in maintaining the ecological value of diverse marine aquatic life. Ecosystem based management approach shall be adopted. Creation of Marine Protected Areas on the lines of Gulf of Mannar Biosphere Reserve shall be encouraged to protect and

conserve marine ecological hot spots. UN Convention on Biological Diversity and Biodiversity Act of India could provide necessary guiding principles. That an MPA in Lakshadweep has been successfully facilitated by BNHS with participation of local people and their consent is a good example of a viable conservation measure in the long term.

Reconciling Conservation Measures with Livelihood Issues

There are many instances where measures aimed at conservation have disrupted the traditional rights of fishers and in some cases deprived them of their livelihood opportunities. While protecting the environment shall be given due importance, the legitimate rights of fishers particularly the small scale fishers shall be given the priority. For example, regulations pertaining to turtle conservation along the Orissa coast have lead to undue restrictions on fishing by small scale fishers in artisanal sector. Any such regulations have to be based on well-informed evidence and seek agreement and support of stakeholders.

Prohibition of destructive fishing practices

At present, practices like use of destructive fishing gears, indiscriminate fishing, use of inappropriate mess size, unregulated collection of fry and juveniles of cultured species of shrimp and finfish from the near shore waters, use of methods like poisoning, dynamiting and electrical fishing are all rampant across all the coastal States. All the nine maritime States have legislation in the form of Marine Fishing Regulatory Acts (MFRAs) and several government notifications to prohibit / regulate these practices, among others. However, their implementation is very poor if not virtually non-existent due to several reasons. Inadequate staff and abysmal infrastructure for monitoring and control are no doubt major reasons. But, lack of involvement of fishing communities in evolving regulatory measures and building consensus through community participation and capacity building have resulted in non-implementation at the ground level. Hence, involvement of fishing communities, other stakeholders and civil society organisations at all levels in planning, management, implementation and monitoring of conservation / regulatory measures on one hand and maintaining sustainable fish production and livelihoods on other hand are the *ONLY viable option* for not only increasing the voluntary compliance level by the primary stakeholders but also assuring a sustainable livelihood in the future.

Control of ghost fishing

Ghost gears damage benthic habitats, pose problems as a source of litter being washed ashore and can potentially entangle with active fishing gear and vessel propulsion systems, raising potential safety issues. There is dearth of information on the gravity of this issue in Indian waters. However, initiatives like marking of gear, use of acoustic detection devices, use of bio-degradable gear and increasing communication between different types of fishing vessels fishing in the same area, etc shall be encouraged.

Monitoring data on fish landings through co-management

The fishery resources are renewable and therefore require to be effectively managed so as to ensure sustainable exploitation and prevent overexploitation. It is desirable that the fishing communities are involved in monitoring the landings and formulation of appropriate management measures so as to educate, empower and make the fishing communities active partners in the management. Already some of the successful cooperative societies on

both coasts are maintaining systematic records of landings. The efforts of State Dept. of Fisheries and other central institutions in preparing production estimates shall capitalize and improvise upon such existing community level initiatives.

Sea safety, Monitoring, Control and Surveillance (MCS) and Maritime Search and Rescue (SAR) systems

Carrying minimum safety communication and navigational equipments for different types of fishing crafts and vessels needs to be made mandatory for issue and renewal of licenses for all types of fishing vessels. Monitoring, Control and Surveillance (MCS) system constitutes a powerful tool that can significantly contribute towards preventing, deterring and eliminating illegal, unregulated and unreported (IUU) fishing practices. IUU fishing poses direct threat to the effective conservation and management of many fish stocks. Regulations must ensure that they address all aspects of IUU fishing.

Also, many times fishing vessels in distress do not get timely help due to delay in coordinating the search and rescue (SAR) operations among the Navy, Coast Guard and Dept. of Fisheries / Fishing Vessels. The policy shall provide for appropriate coordinating mechanism wherein fishing operations are made integral part of maritime search and rescue (SAR) systems. It is essential to reduce the consequences (casualties) of accidents or decrease the likelihood of casualties by accident prevention.

Due to inadequate monitoring, control and surveillance of fishing vessels, inter-state and inter regional conflicts occur among the fishing vessel operators. The enforcement machinery for MCS/VMS needs to be strengthened to reduce such conflicts.

Disposal of seized fish from confiscated vessels

Though there are provisions for confiscating fishing vessels for violating MFRA, there still exists confusion among the state fisheries officials with regard to the disposal of seized fish caught by these vessels. It is recommended that the issue may be sorted and government to come out with clear guidelines.

Mariculture policy

Considering the stagnation in marine capture fisheries production and the feasibility of promoting mariculture in backwater, near shore areas and even in open seas, there shall be a comprehensive mariculture policy. It shall encompass identification and demarcation of suitable areas for mariculture, terms of leasing of those demarcated areas to fishers and entrepreneurs, safety requirements, technological and management options, recognition of local traditional rights of fishing communities, etc. This would also require extensive consultation among various stakeholders as any fresh policy initiative is bound to disrupt the existing arrangement in marine fisheries sector. Recently the Govt. of Tamil Nadu has initiated the process of developing a Mariculture Policy which if evolved through stakeholder consultation and consensus can become a model. Recent decision by State Ministers Conference asking NFDB to initiate pilot projects on mariculture in all coastal states on priority while resolving to formulate mariculture policies in each States for allocation of rights in coastal waters is a progressive step.

Conflicts between small scale fishers and large scale mechanised fishers

There are frequent instances of clashes between fishers of artisanal and mechanized vessels and between those of small and large mechanized vessels resulting occasionally in death and damage to property in many of the coastal States mainly due to competing rights, lack of clarity in existing regulations, and increased fishing pressure. Considering the special requirements of artisanal fishers, the policy shall define and elaborate on allocation of user rights and access control, allocation of fishery resources (e.g. between artisanal, motorized and mechanized categories), ban on certain nets like the ring-seine in specified areas, and adopting new participatory and co-management approaches for the management of resources. The demarcation of fishing areas for different vessels should be made in terms of fishing rights. Customary/traditional rights should be recognized/ensured for the fisher-folk. Besides, there are instances of open sea pirates and robberies warranting a concerted effort to prevent recurrence of such incidences and protect the lives and property of those engaged in fishing. It is recommended that the government may consider suitable security and legislative measures to protect the personnel engaged in fishing.

Deep sea fishing policy

The Marine Fishing Policy 2004 encourages increasing exploitation of the relatively underexploited deep sea fishing resources. States like Andhra Pradesh and Tamil Nadu have taken leads to initiate programs to promote tuna fisheries and reduce the pressure on trawl fisheries. However, the joint venture programs and licensing of foreign vessels for exploitation of deep sea fisheries have not yielded desirable results as several conflicts have gone relatively unaddressed and the present policy has been silent on this. Any policy intervention for promoting deep sea fisheries has be based on long term sustainability and careful but critical review of several policy decisions and GOs during the last two decades.

Regulating fisheries in EEZ

The recent draft Marine Fisheries Regulation and Management Bill 2009 by GoI was the long awaited legislation aimed to regulate / manage the hitherto 'unregulated' fisheries in the India's Exclusive Economic Zone. The draft Bill has created heated debate across India and the consultation process seems to be on. This shall become an opportune time to put in place a more comprehensive policy and legislation for marine fisheries, both within territorial waters and EEZ, aimed at sustainable resource management *as well as* sustainable livelihood development of fishers and fish workers especially in small scale sector. It shall clearly and unequivocally define the fisher and fish worker making a distinction between owner-operator and absentee fleet owners while recognizing the increasingly large migrant fish workers across States. This shall also clearly define the rights and responsibilities of these categories of fishers and workers based on fair and equitable guiding principles of ensure that environment, employment and equity are addressed. Co-management approach shall be the central principle following which the proposed 'management plans' shall be developed with stakeholder participation so that the resource users become responsible 'resource owners' and develop a vested interest sustainable use of marine resources.

Policy Framework for Marine Fisheries Sector: Policy Issues, Policy Elements and Indicative Policy Interventions

Policy Issues	Policy Elements	Indicative Policy Interventions
I. Licensing and Registration	• Registration of small vessels is not yet made mandatory by all countries/states. • Reduction in number of licenses issued. • Alternative / additional employment opportunities during the lean period.	• Make registration of all vessels mandatory irrespective of size or type. • Limit licenses issued to control over fishing. • Introduce buy-back scheme as a means to reduce fishing capacity. • Allocation of user rights-community-based fisheries management (CBFM)
II. Declaration of Closed Season	• Impose seasonal fishing ban location-specific based on scientific studies.	• Incorporate the periods of fishing ban in the States MFRA in consultation with primary stakeholders • Strive for uniformity along East and West Coasts
III. Protection of endangered species	• Inadequate database on highly vulnerable fish species like Sharks, Rays, Skates etc. • TED Regulations for sea turtles.	• Formulate Conservation / Management measures for endangered species in consultation with primary stakeholders, concerned agencies and institutions. • Strict enforcement of TED Regulations for trawlers in States
IV. Establishment of Marine Protected Areas (MPA)	• Marine bio-diversity and eco-system management. • Identification & establishment of MPAs and their monitoring.	• Reorient the R & D activities in the areas of Marine Bio-diversity. • ICAR, MOA and State Governments to come together to initiate action for setting up MPAs.
V) Prohibition of destructive fishing methods	• Types of fishing methods banned.	• Bring out a white paper on destructive fishing practices in the Indian Seas by ICAR Institutes. • State Governments to formulate policy for its implementation in consultation with primary stakeholders

VI) Regulation of mesh size	• Indiscriminate fishing • Exploitation of juveniles	• Bring out white paper on mesh regulations in the India Seas by ICAR Institutes. • State Governments to formulate policy for its implementation. • Participatory approach involving fishers, trawler and boat owners.
VII) Demarcation of areas for fishing operation	• Inadequate Scientific data for prohibited areas particularly in few states like Orissa where fishing areas are demarcated due to regulations pertaining to turtle conservation.	• State Government to have consultation with MOA, MOEF & ICAR to review existing rules and redress the issues.
VIII) Ghost Fishing	• Pose problems of damage to benthic habitat, potential entanglement with active fishing gear and vessel propulsion systems raising potential safety issues.	• Marking of gear, acoustic detection devises, use of bio-degradable gear, compulsory registration of gear, increasing communication between fishing vessels operating in the same area.
IX) Monitoring, control and Surveillance (MCS)	• Aspects of IUU fishing. • Co-operation among states to reduce incidence of IUU. • Effective MCS measures.	• State and central government to formulate a policy to create awareness of the benefits of MCS among fishing communities. • Establish the required system for e.g. VMS. Seeking FAO/BOBP assistance
X) Monitoring data on fish landings through Co-Management.	• Logistics and reliability of the Statistics on fish landings. • Data monitoring through Co-Management.	• State Government and Central Government to formulate a policy to involve the fishing Community in managing fisheries resources including their capacity building.
XI) Integration of Fishing Operations into maritime research and rescue systems.	• Timely Search and Rescue Operations. • Safety legislation and activities.	• Maritime State Governments and Central govt. to develop policy guidelines for integrating fishing operations into maritime Search and Rescue system to decrease the likelihood of casualties by accident prevention.
XII) Regulation, Restriction and prohibition of use of specific fishing gears within specified areas.	• Collection of fry and juveniles of commercially exploited species from the inshore waters. • Bio-diversity issues.	• Ensure effective implementation of the ban by seeking participation of all stakeholders including traders, distributors, etc.

XIII) Disposal of seized fish from confiscated vessels.	• No clear-cut guidelines for confiscating fishing vessels for violating MFRA.	• State Governments to develop clear guidelines with regard to immediate disposal of fish caught by vessels violating MFRA.
XIV) Provision for carrying safety, communication and navigational equipments.	• List of type of Safety and navigational equipments to be carried on artisanal fishing craft.	• Carrying minimum safety and navigational equipments to be made mandatory for issue of license and Registration of small scale fishing craft. • Creation of local level monitoring committees with fishers, boat operators and state govt. representatives.
XV) Promotion of installation of Fish Aggregating Devices.	• Identifying sea areas for installation of FADs. • Mode of involving fishing communities to install, maintain & benefit from it	• Expert Committee may be constituted for recommending sea areas to for installation of FADs and operational guidelines for community led program.
XVI) a) Inter-Sectoral conflicts.	• Inadequate policies pertaining to marine artisanal fisheries in India. • Allocation of fishery resources among artisanal, motorized and mechanized sectors.	• Allocation of user rights. • Ban on certain destructive gears. • Shifting to Management through Community-based initiatives and adopting participatory and Co-management approaches. • Access to alternate livelihoods. • Government to formulate policy to address the needs of the artisanal sector.
b) Inter State/Inter regional conflicts	• Conflicts over fishing rights, usage of fishing ports, movement of fishing vessels, seed transportation and fish marketing, coordination during disasters are perennial thorns in inter-state relations and sustainable fisheries management. crucial • Inadequate MCS of fishing vessels.	• National level comprehensive policy followed by strengthening of institutional coordination mechanism like Ministers Conference, Directors meet, etc shall become formalised • Strengthen enforcement machinery for MCS/VMS.

ii. Policy Framework for Inland Fisheries Sector

At present, there is no comprehensive policy and legislation to sustainably utilize and manage the inland fisheries (riverine fisheries, reservoir / enhanced fisheries, other open water bodies like lakes, flood plains). The policy framework shall take into account the ecological diversity of inland aquatic resource besides accounting for different property regimes and the specific requirements of communities deriving their livelihood from these resources.

One of the major challenges is to prioritise and reconcile the competing user rights for water resources (irrigation, navigation, fishing, domestic and industrial use) across the States. Considering residual status being accorded with respect to availability of water for fisheries development, the non-consumptive nature of water use by fisheries activity must be brought to the light so that *right to minimal water* for fisheries development is ensured. Other major policy challenge is to reconcile the priorities of development on one hand and conservation on other hand. This is more evident in the case of aquatic resources (open waters and wetlands) most of which are in different stages of degradation. While not treating livelihood development and conservation as mutually exclusive, the ecosystem-based fisheries management and improved fisher livelihoods shall become the central elements of any policy.

Defining the scope of policy

Any exercise in developing the policy shall take into account the questions like whether separate policies are required for fisheries development in reservoirs, ponds / tanks and riverine systems or single comprehensive policy for all inland open water resources would suffice; whether it will confine to leasing policy or a broader fisheries development policy with Management Options, Institutional Options, and Technological Options; and whether would be applicable to only those owned/managed by fisheries dept. or for all water bodies under State ownership. It shall also have scope to clarify and define many of the technical terms like fishery and fisheries, fishermen / fisherfolk / fisher, etc.

Riverine Fisheries

The capture fisheries in open-waters of rivers, wetlands, backwaters and lakes has declined over last four-five decades alarmingly with productivities dropping by 50% or more in major rivers like River Ganga, River Brahmaputra, River Yamuna, River Narmada, primarily because of lowered water regime following high abstraction over their catchment feeders. Though open-water fisheries in coastal lagoons have been comparatively stable, near collapse of Kolleru fisheries, stagnation and slow degradation of Chilika bio-productive environment are pointers of this trend. Hence, conservation of the ecosystem should be the major thrust and priority in designing any policy interventions in riverine fisheries.

Management regime for riverine fisheries

The riverine fishery is a resource that lies across several States and hence riverine management system should be included under the concurrent list of the Central government. Meanwhile, an *inter-State river management authority* needs to be constituted for the effective riverine resources management. Though the ownership right of the riverine resources should remain with the State government, fishing rights be allocated to traditional local communities/less privileged groups by organizing them into SHGs, fishers association and other co-operative societies. Moreover, the focus shall be to involve the fishers and other stakeholders as active partners in conservation and management of these aquatic resources. The licensing system shall ensure that the practices are directed towards conservation of the riverine resources, habitat restoration in addition to the livelihood support of the local disadvantaged communities.

Minimum environmental flow in rivers

The dam authorities should also ensure the minimum environmental flow as per the requirement of the riverine ecosystem in order to conserve aquatic biodiversity keeping in mind the interest of the downstream population. It is also suggested to provide fish pass for the free movement of the fish species. The decimation of hilsa fisheries in Ganga river system is an example of damages caused by dams and weirs across river. Adequate provision for migration of fish and provision for preservation of recruitment grounds shall become important considerations in planning of irrigation projects.

Destructive and illegal fishing practices

Though the Indian Fisheries Act of 1897 and other state Acts prohibit many types of destructive fishing practices as well as promulgated seasonal fishing ban, mess size regulation and introduction of exotic fish, the compliance level has been very poor. While appropriate power shall be delegated to the Directorate of Fisheries and its staff for implementation of existing regulations, the major strategy shall be to involve the stakeholders as partners in evolving conservation measures, educating and empowering them on the importance of seasonal fishing ban, etc so as to increase the voluntary compliance across the community.

Other Conservation measures

As some States have already adopted one endangered fish as State fish, other States shall follow the same. Like the Project Tiger, this step would help in conservation of precious aquatic life and fisheries resources in the long term. Establishment of sactuaries on specific riverine stretches / lakes s in some States like Himachal Pradesh can be encouraged. Introduction of some of the exotic fishes has affected the life cycle and cultivable population of indigenous fisheries in open waters. Any decision for the introduction of any exotic should be based on proper scientific appraisal of the ecosystem in question and for that the country has a national level committee. The decision of the committee shall be strictly implemented. To control and minimize pollution in open water resources, Department of Fisheries shall work in close coordination with State Pollution Control Boards. Also, ranching

programs may be initiated through PPP mode for the enhancement of the fisheries resources. It is also important to check for the compatibility of the different fish species with the native fauna before stocking.

Reservoir Fisheries

The Reservoir fisheries in spite of some impressive growth after carp breeding and hatchery technologies provided higher seed availability in 1970s and 1980s, especially in Madhya Pradesh, Punjab, Rajasthan and Tamil Nadu, the productivity has remained rather stagnant. The present fisheries management model in reservoirs would require a major revision in terms of ownership and development rights, leasing system, technological options, management practices, investments, community and stakeholder involvement, etc. The emphasis shall be on co-management of reservoirs for sustainable utilization of reservoirs for fish production while maintaining the ecological balance and ensuring sustainable livelihoods for communities living on the periphery of the reservoirs. The rights of fisheries development in the reservoir shall be transferred to Departments of Fisheries in all States. The DoF has to be involved in any policy measures involving fisheries in the reservoir development plan.

Infrastructure: Adequate steps are to be taken to provide basic infrastructure in the existing irrigation projects to facilitate fishing activities in the reservoir such as approach roads, fish landing centers, seed rearing tanks etc. There should be provision for seed production units, training centre, post harvest landing infrastructure, fishing implements etc. Welfare of the displaced and affected persons need to be inbuilt into the planning process in construction of large reservoirs.

Leasing policy for open water resources

Leasing aim: The guiding principle shall be based on the balance between livelihood development and enhanced sustainable production. Revenue generated through leasing shall be utilized for maintenance and conservation of this highly diversified natural resource.

Lease period: The lease period shall be generally of long term (8-10 years). However, different lease periods based on size - long term for large water bodies and requiring civil/renovation works to be evolved. Annual review shall be built into the leasing policy.

Lease rent: The minimum lease / rent amount shall be 10% of total projected annual gross income of the lessee.

Prioritizing the lessee: The priority for leasing shall be in the following order: Fishers' co-ops jointly with private entrepreneurs, SHGs of fishers adjacent to water bodies, fishers' co-ops, individual fisher, private entrepreneurs, farmers, educated unemployed youth / fisheries graduates and corporate. Unsettled water bodies to be given to interested federations on long term lease

Lease terms: The terms of lease, among others, shall include the following: mesh size regulation for IMC and exotic carps; fishing boats are to be compulsorily registered with Fisheries Dept.; closed season to be followed; and only advanced fingerlings shall be encouraged to be stocked.

Ensuring availability of Seed

The policy shall be oriented towards availability of adequate and quality seed of stockable size at the local level. It shall encourage the lessee to satisfy his or her own seed requirement by developing adjacent area / part of lake for seed rearing. Government shall facilitate development of seed banks in private sector / public - private partnership mode for ensuring *round the year availability* of quality seed at local level. Incentives shall be given for yearling production.

Comprehensive database

The policy shall provide for development and regular updating of reliable and timely data about the resource at different levels. GIS&RS based approach to be adopted for mapping and developing a Comprehensive database which shall be made readily and easily accessible to all and for future planning. Village based volunteers *Matsya/Meen mitra* shall be appointed on contract basis for collection, validation and updating of data by physical verification.

Recognising unique property regimes

The policy shall also recognize the unique property regime in some of the resources particularly the floodplains in some of the States i.e. the multiple individual owners having ownership on part of the total water spread area. Co-operative / collective management wherein crop cultivation is integrated with fisheries (crop acreage as individual commodity / property, water spread area as a common property) shall be the major focus in these resources.

Policy issues for cold water fisheries

The unique nature of aquatic resources, geographical and climatic features in high altitude & hilly regions - Himalayan and sub-Himalayan zones in the north and watersheds draining the southern slopes of Deccan plateau (Western Ghats) that has about 258 fish has different challenges and requires special focus and attention in terms of policy, legislation and development / conservation programs. Fisheries development in these regions / states is not comparable to other States in the plain. Relative lack of policy, R&D support for hill fishery has to be rectified to realize the potential in a sustainable and eco-friendly manner as coldwater fishery can contribute to food and nutrition security in hills and remote regions. Therefore, in the planning process the fishery in hills needs to be given due importance in terms of financial, infrastructure and modem institutional back-up facilities. In hills the fishery development through aquaculture, sport and conservation should be promoted and supported, in order to introduce crop-fish diversification, so that natural resource management becomes economically sustainable activity.

Some of the more specific issues that require policy attention are as follows. a) practically all the water resources suitable for hill fisheries in the state are owned by the forest/irrigation department. For implementation of fisheries development program there is a need to place them under the management of fisheries department; b) construction / renovation of

existing fish farms and hatcheries on a priority to promote aquaculture activities; c) policy shall encourage eco-tourism based sports fisheries along innumerous hill streams / rivers with community and private participation. Linkages with tourism department involving creation of angling facilities, ranching of mahseer and trout in streams shall be integral to this; d) breeding grounds should be declared as sanctuaries and prohibited for fishing during the breeding season; e) scientific evidence suggests that dams and reservoirs have dramatically and negatively affected distribution and abundance of native fishes in mountain streams of India (change in migration route, reduction in native fish population, etc) as well as local fish communities. It's also true that introduction of exotic carps in certain reservoirs has increased production / productivity. Hence, the policy shall encourage a more cautious and balanced approach in future with adequate conservation and management measures in place; f) Special Development Agency for Fisheries Development in Himalayan and NE States - unique nature of aquatic resources, geographical and climatic features in high altitude region and hilly States (Himalayan and North Eastern States) calls for a special Development Agency to facilitate and harness the fisheries potential of the region. This region has huge potential especially in the areas of promotion and generation of livelihoods around angling, eco-tourism, sports fishing, etc besides vastly underutilized cold fisheries like trout fishing.

Policy Framework for Inland Fisheries Sector: Policy Issues, Policy Elements and Indicative Policy Interventions

Issues	Policy Elements	Indicative Policy Interventions
No comprehensive policy and legislation to exploit and sustainably manage the inland fisheries (revirine fisheries, reservoir/ enhance fisheries, other open water bodies like tanks, lakes, flood plains)	• diffused nature of resources, inter-sectoral problems as well as sectoral conflicts, low level of priority to the sector, less organised nature of resources and resource users • Competing user rights (for irrigation, navigation, fishing, domestic and industrial purposes) • Outdated, piecemeal and ad hoc legislative and regulatory measures (Indian Fisheries Act of 1887 has only 7 sections and deal only with regulation of indiscriminate fishing, poisoning, etc in certain water bodies which has hardly been amended)	• Policy framework to account for these specific characteristics and parameters of inland fisheries resources • Feasibility of evolving a single piece of legislation for Inland Fisheries in each State • Eco system based fisheries management, not just production enhancement *as well as* improved fisher livelihoods to be central elements • Integrate CCRF into the fisheries policy • Exploit opportunities offered by CDM and Carbon Trading by treating water bodies like wetlands as carbon sinks
Depletion of riverine fisheries resources Fishing rights, Conservation measures, Enhancement programs, livelihood security	• Industry pollutants, domestic / urban sewage • Competing claims over water resources • Increased fishing pressure • Indiscriminate and unregulated fishing	Objectives • Conservation of indigenous fisheries resources by appropriate regulatory and management regimes • Enhancement: to improve productive/ regenerative capacity of the riverine ecosystem • Livelihood: to improve the livelihood of subsistence /small scale fishers • Weigh the options of Precautionary principle / Polluters Pay Principle? • How do we reconcile the competing interests of the fishing industry and other industries, and the urban development?? • policy to restore river systems with adequate quantity & quality of water to sustain biodiversity • Major program of seed stocking and ranching in rivers

Mess size regulation (State Fisheries Acts) and its lack of enforcement leading to indiscriminate exploitation of juveniles, brooders and discards	• No compliance with the mess size and gear regulation and use of fine meshed nets • Undersized fish and non-targeted species of fish are caught • Limited power to the implementing authorities • Inadequate staff with the implementing agency and their oversight • Question of present need vs. long term sustainability	• Suitable amendment of Fisheries Acts giving enough legal teeth to implementing agencies and the offices, and strong penalties for the violators? • Empowering the fishing communities for enforcing the regulations and hence increasing their compliance • Linking the incentive structures / welfare schemes with the regulation
Desirability and feasibility of closed season for fishing / monsoon ban		• Ban all types of fishing during the closed season in all the riverine stretches / water bodies • Uniform period of closed season across the length of rivers and differential period for different aqua-climatic regions
Inter sectoral conflicts and lack of effective coordination	• Involvement of multiple agencies and Ministries – Departments of Irrigation, Revenue, Agriculture, Environment and Forestry, Fisheries at State and Central levels • No institutional mechanism for effective coordination among all the agencies sometimes working at cross purposes	• Acknowledge it as inevitable; and evolve effective institutional mechanisms through policy and legislative measures like constituting inter ministerial / inter departmental Coordinating authorities at State levels • Empowering the DoF for all matters related to fisheries management in inland water bodies • Independent Ministry of Fisheries at the Centre as in the other Asian countries China, IndonesiaThailand, Vietnam • Evaluate whether NFDB can become the effective coordinating agency at the central level • Comprehensive and overarching Fisheries Policy at the central level

Multiple ownership of open water resources	• Multiple owners and conflicting interests make the inland ecosystems quite complex to manage. • No institutional mechanism to resolve the conflicting interests of different owners / users. • The criteria for assigning and granting of ownership and fishing rights not clearly and rationally delineated.	• All aspects related to management of Fisheries in all open water bodies to be vested with Dept. of Fisheries • Role and responsibility of different Depts. w.r.t. managing open water bodies to be clearly defined
Inter State river management conflicts	• Regulation and development of inter State rivers, and river valleys under Union List • Provisions (Article 262) only for resolving disputes and allocating water rights which are often contested. But no mechanism to share and manage the fisheries resources among the claimant States	• Ensure a rightful place for fisheries and integrate it into the existing inter State river management authorities • Option of establishing River Management Authorities to manage inter-State rivers including controlling pollution, managing fisheries and for sustainable utilisation
Leasing policy for reservoirs and other open water bodies	• No comprehensive leasing policy for leasing different open water resources water (revenue sharing method, long term leasing) • Guiding objective of leasing is revenue generation in most of the States, and livelihood development as secondary criteria • Complexity of the property regimes in the inland resources posing challenge for policy making • No rational criteria followed for fixing the lease period, lease amount / rent, whom to lease (fishers, co-ops, private entrepreneurs, SHGs, women), conditions of lease • Third party leasing and sub-renting	• Property regimes not to be considered on a binary basis. Landlord-tenant regime, shared property / co-management regimes based on different degree of contractual obligations to be considered. • Common policy guidelines for lease period, method to fix the rent, priority of leasing, conditions of lease, etc • Policy support for licensing / contracting out the riverine/ stream stretches / lacustrine areas wherever possible and desirable - Central govt. shall evolve broad set of model guidelines for the Sates to adopt

Very low productivity in reservoir fisheries	• Average productivity is about 11 kg / ha. (in Sri Lanka it is about 100 kg / ha) • Cage culture, large scale stocking and other production enhancing technologies not popularized / adopted due to the discouraging lease policy, poor service delivery, and lack of major programs	• Initiate a major program for increased fisheries production supported by an appropriate policy and legislation • Clear statement on various technological options available and programs for large scale adoption through training and capacity building
Introduction of exotic species and its regulation	• Non-compliance of existing regulations • Predatory exotic species endangering the native indigenous fish species / alterations in habitat and biodiversity • Ineffective enforcement mechanism	• Review and revalidate the existing regulations • Stringent measures to regulate inter State seed movement, and also from across the border

iii. Policy Framework for Freshwater Aquaculture Sector

The primary objective of the Aquaculture Policy for the Centre and States should be to alleviate poverty and enhance the livelihood of the resource poor rural people through increased aquaculture production in view of its role in nutritional and environmental security, and social and gender equity.

The growth of freshwater aquaculture has been phenomenal especially during 1980s and 1990s. It has been driven by adoption of indigenously developed technologies for per unit area productivity to rise over 5 times and expansion of area both by adoption of new technology in traditionally farmed ponds and water-bodies and in new ponds brought under freshwater aquaculture in areas of assured water availability by neo-farmers in their individual ownership lands particularly in coastal Andhra Pradesh, West Bengal, Orissa, as well as other pockets in Bihar, M.P., U.P., Haryana and Punjab. The success of carp culture in freshwater water-bodies had the solid edifice of four pillars of indigenous technologies of composite fish culture (CFC) and Controlled breeding, the organizational support of Fish Farmer development Agency (FFDA) structure for motivation of traditional skills backed by technology knowledge upgradation and liberal institutional financing and subsidy and ready domestic market for the product.

The State programs of hatchery development for carps as well as shrimps have emphasized large circular hatcheries of very high capacity, which by and large have performed much below capacity and expectations. These massive seed production to be successful essentially needs assured supply of mother stocks, large resource base of nurseries and very high demand of seed preferably in the hatchery print area. These were practically lacking except for certain pockets of bright areas under carps culture. Small vertical hatcheries capable of replication to handle seed production as per resource base and demand by supply multiplying units have done excellently in several places in India operated by small farmers within their resource means. And these are the backbone of massive quantities of carp seed production in Bangladesh. Secondly such massive capacity hatchery need a huge space for nurseries and maturing stocks and very high capital, both beyond resource means of farmers, whereas small, cost effective harmonious with rural scenario, vertical for hatcheries have done excellently.

Aquaculture at par with agriculture

Aquaculture should be treated at par with agriculture in terms of credit, taxation, energy charges, water tariff and land allocation owing to the similar nature of the two sectors, resource use pattern and providing food and livelihood to the rural poor.

Water Management Policy

Water has been used for industry, irrigation of agriculture land, transport, domestic use as well as aquaculture and fisheries. Water has been predicted to be most scarce commodity in future. The multi ownership and multi utilities of water resource have been causing conflicts among various stakeholders. There is no clear-cut policy for water management. Therefore an all encompassing holistic water management policy defining roles of each stake holders is the need of the hour. It shall be kept in mind that besides production of cheap protein, fish should be viewed by all as an ecological player, and fish culture should be viewed as a tool

for improving the aquatic ecosystem. The abstraction of water from water bodies for agricultural purposes, especially during summer should be highly rationalized because it affects the active period of growth and breeding of fish.

Restricting eutrophication and aquatic weeds

DOF should ensure the optimal utilization of aquatic primary productivity so that progressive expected increase of eutrophication is controlled. For this, use of primary production dependent aquaculture technology especially of herbivore fishes should be encouraged. In view of heavy infestation of aquatic weeds particularly water hyacinth and Iponea, it is essential that this is eradicated as fast as possible. This will not only help to restore the aquatic ecosystem for aquaculture production but will also have positive effect on public health and hygiene. Therefore, the Government needs to initiate a specific massive program for its eradication following an appropriate approach for making its productive use.

Pond renovation

Any State department or program undertaking the renovation or desiltation works of the ponds and small water bodies should follow the norms and guidelines of the Department of Fisheries of the respective State in consonance of the fish culture requirement in terms of pond size, farm size, farm design, etc to facilitate fish culture. Collaborating with Gram Rojgar Yojana will be highly useful for mobilizing required resources.

Promote sewage fed fisheries

It is also important that waste water should be viewed as wealth in view of its nutrients. Therefore, sewage treatment plant should have fish farm as an integral part of it so that sewage fed fisheries could be promoted.

Credit mechanism

The fish farmers seeking credit upto Rs.50,000 as credit should be exempted from providing collateral for double the credit amount and paying 25% of the credit amount as advance. A mechanism is required to be put in place to assess the value of water and its productivity in the pond in addition to that of the land alone, while valuating the farmers' ponds for collateral security purposes, since fallow ponds with unutilized productivity is a great resource loss.

Ensure micro-finance

Fisheries and aquaculture should be recognized as a priority sector for the purposes of credit. Since aquaculture is a season sensitive activity, the credit for farm operations need to be provided in time, which could be achieved by strengthening micro-finance institutions, disbursement of credit through co-operative societies, introducing a suitable variant of *kisan cards* and by following single window system for credit and subsidy.

Insurance

Crop insurance scheme should be extended to the fish farmers as for the agriculturists in order to guard their losses from disease outbreak, natural calamities, poaching and willful destruction of the crops, etc. Recent decision to provide insurance to aquaculture farms by underwriting part of the premium by NFDB is a welcome initiative.

Effective database on fish production

The fish farmers should be mandated to maintain a stocking record with details on date of stocking, initial size of stocking, feeding schedule, sampling data, etc. in order to maintain an effective database on fish production. Such records could be useful for seeking Institutional finance and insurance claims too.

Establish linkage between DoFs, CoFs and ICAR in farmers training

The Department of Fisheries should strengthen its linkages with Central Fisheries Institutions in order to provide regular training to the fish farmers of the State and also to update the skills of the District and Field level Fisheries Officers on different aspects of aquaculture and aquaculture extension service management.

Introduction and regulation of exotic species

The present regulatory restrictions and guidelines on introduction of exotics, in the form of GOs, was a welcome step after a long felt need. However, they have not been made as part of the larger and comprehensive policy on aquaculture development and or conservation of aquatic resources. Precautionary principle and consideration of best available scientific evidence shall form the basis for regulatory decisions besides considering the potential socio-economic benefits and ecological externalities. The policy shall also encourage long term eco-system studies on impact of introduction of exotics in different aquatic system so far. Extremely weak enforcement and implementation mechanism also has to be weighed while granting regulatory approvals. Recent approval to culture *Pangasius sutchi* illustrates that innovating and enterprising farmers are ahead of regulatory decisions. Stakeholder consultation and consensus shall become an integral part of regulatory decision making as well as its implementation.

Diversification of aquaculture

Govt. should promote diversification of aquaculture by promoting catfish culture, giant freshwater prawn culture, ornamental fish culture, etc., so as to use the available water resources and market opportunities optimally. Besides composite fish culture, it is imperative to propagate different site-specific integrated farming of crop-livestock-fish. The silt and humus of the water logged areas or the pond bottom need to be utilized for such farming system judiciously.

Community water bodies

Community water bodies are being put to use for multiple purposes. The effective usage of the same through aquaculture should be encouraged. Appropriate measures shall be evolved for this purpose.

Exploring the possibilities of bundh breeding

Possibility of bundh breeding should be explored in topographically suitable areas where the catchment is large. This would help reduce inbreeding depression and mass scale seed production. Such activities and areas should be recognized as cottage industry. In order to avoid inbreeding and conserve genetic diversity, the brooders should preferably be collected from rivers.

Encourage women for seed production

Encourage women in seed production, homestead aquaculture, marketing, etc. There should be greater economic and gender equity for more inclusive growth. The economic participation of women in aquaculture activity is minimal at present though there is scope for their greater involvement. Gender - mainstreaming has to be an integral component, including more gender sensitive programs in marketing

Establish government brood stock farms

Government officials should ensure that quality brood stocks are maintained under their supervision in Government farms to facilitate seed production in private farms. Broodstock ponds and nurseries should be established at district level in order to ensure timely availability of good quality fish seeds. Surplus seeds may be raised in heavy stocking density to make available the seed throughout the year.

Create facilities at flood protected upland areas to stock fish seeds

In the flood prone States, the Government should create suitable facilities in flood protected upland areas of the state to stock fish seeds and protect them from seasonal floods, and thereby ensure round the year supply of fish seeds.

Ensure feed supply

Nutritionally balanced feed for seed and brood stock is imperative where as for table size fish conventional feed should be advocated. Encourage locally formulated feed - CIFA has standardized different formulation of fish feed for brood-stock, seeds and table size fish, based on which cheap feeds should be formulated using locally available ingredients.

Seed certification

The implementation of draft proposal of seed certification and quarantine as initiated by the central government should be expedited.

Reduce the risk of aquatic animal pathogens and disease monitoring

Suitable regulatory frameworks should be developed to check the introduction and movement of live aquatic animals in order to reduce the risks of introduction, establishment and spread of aquatic animal pathogens and subsequent impact on the aquatic biodiversity. The Government should adopt the disease reporting systems developed by FAO/NACA/OIE to collect and analyze aquatic animal health information for use in disease forecasting and mitigating action.

Utilisation of irrigation canals for aquaculture purposes

The irrigation canals have hardly been exploited for aquaculture purpose. By ensuring adequate flow of waters in irrigation canals and with use of suitable technologies these canals can generate huge revenues for the nation

Establishment of one stop aqua-shops

The establishment of one stop aqua-shops by State Departments of Fisheries for catering to all the requirements of fish farmers with respect to aquaculture at district level shall be encouraged.

Policy Framework for Freshwater Aquaculture Sector: Policy Issues, Policy Elements and Indicative Policy Interventions

Policy Issues	Policy Elements	Indicative Policy Interventions
Status of aquaculture as being neither here nor there	• SC judgment - aquaculture as an industrial activity. But the benefits available to industry such as easy credit, tax exemption, etc not forthcoming for aquaculture • No concessional electricity tariffs, no exemptions for seed transport, no Kisan Credit Cards, not considered under Prime Ministers Rojgar Yojna (PMRY), unwillingness to extend credit and insurance • Existing guidelines for institutional finance and insurance too difficult to be satisfied	• Survey of suitable water bodies for freshwater aquaculture needs to be undertaken. • Aquaculture to be treated at par with agriculture for the purpose of energy and water charge, credit and tax relief. • Concessional charges in air and rail freight for seed transportation. • State level coordinating cell involving DoF, NABARD, Lead banks, Farmer Associations, Insurers, etc.
Ownership and management of ponds and tanks	• Multiple ownership – village ponds by Panchayats, temple ponds/ tanks by Religious Emdowment Dept. or Temple trusts, some ponds by DoF, some by Irrigation Dept., some by Dept. of Forests • Lack of coordination and conflicting interests among owners	• Granting management rights of ponds/tanks for fisheries development to DoF pertaining to gram panchayat, zilla panchayats and irrigation and state fisheries department water bodies. • Instituting mechanisms for coordination at district and State level.
Leasing policy	• Large no. of variations in leasing period, conditions of lease, lease rent, priorities and preferences as whom to lease, allotment procedures, conditions of renewal, rights of the lessee, etc. • No comprehensive leasing policy in most of the States • Many leasing guidelines are not development oriented, rather regulation oriented – resulting in the wide gap between potential pond/land available and total	• A comprehensive leasing policy for the leasing of ponds and tanks for a minimum period of 7 years, with a broad principle of development orientation (preference to be given to fishers cooperative, self help groups, educated unemployed youth). • Single window system for leasing.

	pond/land allotted	
Low average productivity (FFDA ponds – 2.2 tons / ha & 1.2 tons / ha in non-FFDA ponds???)	• Poor adoption of scientific and improved technologies like low cost aquaculture, integrated fish farming, good management practices • Poor and ineffective service delivery system • Lack of diversification of species in aquaculture due to non-availability of standardized technologies (major dependence on IMC and prawn culture – no hatchery technology for culture of air breathing fish inspite of its demand)	• Sustainable intensification of production, adopting improved scientific technologies • There is a need for diversification of species from the present dependence on IMC. • Simultaneously efforts be made for seed production of air breathing fishes like *Clarias, Channa, Heteropneustes* and medium carps. • Potential exotic species of fish may be considered for culture in ponds and tanks to supplement the presently employed species. • Quarantine mechanism should be evolved at all ports of entry.
Availability of adequate and quality seed	• Demand and supply mismatch in many States • Many of the Dept. run hatcheries and seed farms are either defunct or running in losses due to higher operational cost and inadequate staff • Few examples of model State run hatcheries • Higher seed transportation cost • Lack of seed quality standards and certification mechanisms (A.P. and Assam have formulated Seed Acts)	• To meet the increased demand of seed supply of fish and prawn, private sector should be encouraged in seed production. • Quality and certified seed larger size only to be stocked.
Elusiveness of cost effective and quality feed	• R&D constraints and limitations • Increasing cost of raw materials and their competing usages like rice bran • No major coordinated program for developing low cost feed for different culture systems	• Initiate an all India coordinated program • Validate and improvise the indigenous technologies available • The production of on-farm cost effective quality fish diets should be promoted.

Sustainability vs. production maximisation	• Unsustainable practices in some ecosystems like Kolleru lake area in A.P. due to production maximisation strategy • Very low productivity in traditional but sustainable eco-systems	• Small reservoirs should also be brought under culture-cum-capture practice in order to enhance freshwater fish production. These reservoirs should be managed by the local community forming self help groups. • A mechanism to monitor soil and water quality and fish health through mobile laboratories. • A state of art disease diagnosis laboratory should be established at state level
Ornamental fish culture	Special thrust on ornamental fish culture in small scale sector	• Emphasis should be given to intensification of breeding and culture of ornamental fishes.
Insurance cover	Insurance schemes in freshwater aquaculture sector in mission mode	• Proper insurance coverage should be made available for culture fisheries.
Census of inland fishers		• Comprehensive all India census of inland fishermen and fisherwomen, including those involved in aquaculture shall be conducted

iv. Policy Framework for Brackishwater Aquaculture

Aquaculture is a vibrant and viable economic activity and in recent years has become one of the fastest growing food sectors in the world. There are few economic activities which have globally witnessed high growth rates as the culture of shrimp in coastal areas of a large number of countries, situated both in eastern and western hemisphere. For instance aquaculture including the shrimp farming grew more rapidly than all other animal food producing sectors worldwide, at an average annual growth rate of 8.9 percent since 1970 compared with only 1.2 percent for capture fisheries and 2.8 percent for terrestrial farmed meat production system. However, the impressive development of intensive shrimp farming in India especially in the States of Andhra Pradesh and Tamil Nadu in 1990s, like in most of other countries, was short lived and has been fraught with many challenges. Many of the ecological and socio-economic externalities caused by the intensive and unregulated growth namely improper sitting and over-crowding of farms, changes in land use pattern, unscientific farming practices leading to environmental degradation, outbreak of viral diseases, conversion of paddy fields, salinisation of ground water resources, destruction of mangroves, flooding of villages, etc have lead to the intervention by the judiciary in mid-1990s and the establishment of the regulatory body Coastal Aquaculture Authority of India (CAAI).

Need for Aquaculture Policy

After the boom and burst scenario of shrimp culture in 1990s, the growth has been very slow though as only an estimated 11 percent of potential brackishwater area available across States has been brought under culture. In the aftermath of judicial intervention and CAAI as well as due to earlier unsustainable practices, area under shrimp culture never crossed the peak attained in mid-1990s. By mandate, CAAI is a regulatory quasi-judicial body as against a development oriented agency like the recently set up NFDB. The highly competitive, uncertain and increasingly restrictive international seafood market also contributed to stagnant growth. Other aspects like conservation oriented regulations like Coastal Regulation Zone guidelines, treating of aquaculture as an industrial activity, poor and ineffective land leasing policy, etc have ensured that coastal aquaculture remains a low priority area despite its potential to generate sustainable livelihoods and foreign exchange.

In this context, the existing policies and regulatory guidelines may require to be revisited in the light of lessons learnt during the last three decades as well as the more sober and balanced understanding of the present status, potential, and appropriate technological and management options available for sustainable development. A comprehensive development policy that treats aquaculture at par with agriculture and addresses issues of land leasing, Best Management Practices, species diversification, certification of seed quality and feed quality, introduction / regulation of non-indigenous species, improving productivity in existing farms, encourages group / cluster farming approach, help mobilise credit flow and investment, assures competitive but fair and steady markets is need of the hour.

Reconciling Development and Conservation

The adverse impact of polluting waste-waters being cited as a prime reason for restricting brackishwater shrimp culture is highly discriminating and debatable. Almost all industrial and infrastructure development generates waste-water and wastes that are polluting

environment severely are a fact very widely studied and reported in literature. Ports, industries, mining, infrastructure development continues all along the coast which leaves its foot print of impacts far and wide damaging biodiversity, particularly aquatic. There is urgent need to revisit the whole gamut of restrictions imposed by various regulations.

Agriculture status for Aquaculture

The present system of categorizing aquaculture as industry and depriving of the benefits extended to agriculture of the similar activities (e.g. Subsidized electricity, subsidized seed transport rates, institutional credit and insurance, etc.) puts lot of pressure on the aqua-farmers and causes disparity among farmers. While the country could identify thousands of ha of land for agriculture and urban expansion and development of SEZs, similar thrust for brackishwater aquaculture backed by scientific data and sustainability principles can make available large areas, particularly uncultivable wastelands for development of brackishwater aquaculture. Detailed State / district wise database based on more rigorous assessment of lands appropriate for aquaculture need to be developed which would help plan and use them on a sustainable basis.

Land leasing policy for aquaculture

The land leasing criteria in many of the coastal states is having large no. of variations in terms and conditions of leasing (i.e leasing period, conditions of lease, lease rent, priorities and preferences as whom to lease, allotment procedures, conditions of renewal, rights of the lessee), leasing criteria are also not based on systematic and scientific principles, and also inordinate delays in land allotment due to clearance. Therefore, the need of the hour is to have a development oriented leasing terms and conditions based on scientific principles as in the case of Gujarat. As in Japan, leasing of coastal waters for mariculture/sea farming can also be worked out.

Diversification of aquaculture practices

Besides, the issues of low average productivity, and input availability, adequacy and quality are main obstacles in brackishwater aquaculture development. These aspects have also restricted the development of far less intensive traditional shrimp culture that gives due importance to habitat environment in areas of West Bengal, Kerala, Andhra Pradesh and Orissa, even Karnataka to a lesser degree mostly backed by indigenous expertise also suffered. Hatchery and culture technologies for the indigenous candidate species are not available. Timely availability of inputs in adequate quantity and quality should be ensured.

Promoting ecologically sustainable aquaculture

The organic load of the aquaculture effluent and its environmental effect and sustainability of coastal aquaculture are the other important issues to be addressed. The common effluent treatment plant is not viable and good management practices are not followed. Organic aquaculture and eco-labeling would to a certain extent help in sustainable coastal aquaculture. Introduction of exotics shall be based on scientific analysis of merits and demerits. Before introducing exotics, all the concerns (ecological, environmental, social, etc.) should be addressed. The country shall be equipped to deal with illegal or accidental introductions. Livelihoods of the local communities are under threat in the present condition through indirect effect of biodiversity loss, environmental sustainability, etc. The policy should address these issues.

Policy Framework for Brackishwater Aquaculture Sector:
Policy Issues, Policy Elements and Indicative Policy Interventions

Issues	Policy Elements	Indicative Policy Interventions
Status of aquaculture	• Concessions, insurance or subsidies to aquaculture • Subsidized electricity and transportation?? • Treating aquaculture at par with agriculture	• Govt. of Bihar has made aquaculture on par with agriculture recently • if considered on par with industry, benefits available to industry such as easy credit, tax exemption, etc be extended to aquaculture • Reformulating the guidelines for institutional finance and insurance • State level coordinating cell involving DoF, NABARD & Lead banks, Farmer Associations, Insurers, etc
Coastal Land assessment and aquaculture database	• No comprehensive and detailed information on extent of land suitable for different types of aquaculture practices • Poor database on culture area, production, disease incidence, type and intensity of culture, etc.	• Policy directions for country wide major program for land mapping & assessment and establishing a Nodal Centre for the database
Land leasing	• Large no. of variations in terms and conditions of leasing (i.e leasing period, conditions of lease, lease rent, priorities and preferences as whom to lease, allotment procedures, conditions of renewal, rights of the lessee) • Many leasing guidelines are not development oriented, rather regulation oriented • Inordinate delays in land allotment due to clearance from other dept	• Broad principles (as to all the parameters listed) of the leasing policy • Gujarat Govt. leases for 5 to 10 years • A long term policy is required for leasing of land to individuals, cooperatives, SHGs and corporates; traditional fishers to be given preference on leasing • Single window system for leasing and licensing
Leasing of coastal waters for mariculture / sea farming	• No policy for lease of specific area of coastal waters / open sea for culture	• Japan – sea (territorial waters) is owned in the same way by fishers as land is

	of shell fish, finfish and sea weeds • Traditional fishers have no legal rights over the coastal waters, the rights are only notional	owned by farmers with permanent legal rights • Legal adaptation of certain *de facto* traditional ownership in some coastal States in Kerala and T.N
Low average productivity	• Predominance of traditional culture practices with no stocking and feeding practices and not practicing good management practices • Poor and ineffective service delivery system • Lack of standardized and commercially viable technologies for diversification of aquaculture	• Develop hatchery and culture technologies for the indigenous candidate species • Import hatchery and culture technologies for other commercially important species • New model of service delivery system
Input availability, adequacy and quality	<u>Seed</u> • Demand and supply mismatch in many States • Defunct or loss making Dept. run hatcheries and seed farms • Higher seed transportation cost • Lack of seed quality standards and certification mechanisms, and enforcement mechanisms <u>Feed and chemicals</u> • Lack of certification and monitoring mechanisms for aqua feed and aqua chemicals	• Privatise hatcheries and seed farms or encourage Public-Private-Community partnership • Establish and enforce quality standards and certification mechanisms • A.P. and Assam have formulated Seed Acts for quality assurance
Environmental concerns and sustainability of coastal aquaculture	• Non-compliance Good Management Practices and integrated health management strategies • Less disease incidence in West Coast States due to less intensive culture practices – will become a major threat once the area increases and intensive culture practices are	• Implementation of guidelines by Coastal Aquaculture Authority • The provisions of CCRF on aquaculture development to be kept in mind while formulating policy guidelines • Ensuring aquaculture developments within the local and regional carrying capacities

	adopted • Operational problems and economic viability of Common Effluent Treatment plants (faced by Maharashtra shrimp farmers) as mandated by CAA • Relevance of SC judgment for West Coast states • M S Swaminathan Committee recommendations on CZM replacing CRZ with CMZ	• Review and revise the CAA Act - to account for variations in the land use and ecosystems across States and modify some regulations • Measures for promoting aquaculture in clusters as in Ecuador • Permissibility of aquaculture in the proposed different Coastal Management Zones
Introduction of exotics	• Lack of clear cut policy decision	• Decisions based on scientific analysis of merits & demerits
Organic aquaculture, eco-labeling, etc	• Lack of major program or policy initiative for promoting organic aquaculture	• Organic aquaculture in clusters and notified areas • Allow FDI in establishing vertically integrated farms as in Vietnam
Livelihoods of the local communities	• Livelihoods of local communities, and their access to fishing grounds, shall not be negatively affected by aquaculture developments	• Promotion of good management practices that ensure protection of biodiversity and environment • Integration of aquaculture development planning with rural development to achieve multi-sectoral development

v. Policy Framework for Post Harvest and Processing Sector

Health and hygiene

The general hygienic conditions at landing center, onboard the fishing vessels and local processing units are very poor. There is also scant attention to health of the people handling fish at different points. Therefore, these could serve as sources of contamination with fish spoilage microflora and microorganisms of public health significance. The problem however is complex and has roots in basic education of the workers, knowledge in hygiene, training of workers in handling, availability &quality of water supply, availability and quality of construction of infrastructure, surrounding environment, waste disposal routes etc. The problem is further complicated due to multiple controls on the infrastructure. The responsibility for promotion of post-harvest activities does not lay with the agencies that control infrastructure. These issues therefore have to be addressed at different levels and by different organizations and must have policy level interventions as well. Some of these issues need to be addressed individually and some needs to be addressed collectively.

Inadequate Infrastructure

Inadequate and sub-standard infrastructures are a major bottleneck in the post-harvest management of fish. A kilo of fish saved from being lost due to spoilage or otherwise, is equal to a kilo of fish produced. However, post-harvest losses should be taken more seriously due to environmental pollution caused by deterioration and loss of as much of resource. Major infrastructure requirement include jetties, water supply, drainage, motorable roads, fish handling devices, ice supply, cold stores etc.

Waste and reduction of post-harvest loss

It is estimated that the post-harvest loss in India is over 20% i.e. about 1.2 million tons every year. Post-harvest loss may arise from inadequate infrastructure and due to improper handling and also due to inadequate knowledge of making waste utilization an economic venture. Development of a network of waste collection, and managing the waste the way municipal waste is handled would definitely be remunerative. Post-harvest loss can also be reduced significantly by value addition which has been dealt separately.

Value addition

Value addition refers to all the changes that can be brought in to fish in order to realize better utililisation, price or quality. Commercially important fishes can be added value by hygienic handling, proper storage and transportation. Because of commercial importance, the buyer driven market has forced better handling of commercially important fishes. However, the low value fish are neglected and often suffer post harvest loss. The preparation of value added products from the edible portion of these fishes can make them increase the value realization many fold. Acceptance in domestic market, availability of technology and availability of trained human resource play important roles in deciding the value addition. Role of promotional institutions, research institutions, government driven incentive programs may lead to more effort in this direction and subsequently help reducing post harvest loss.

Health and safety standards (HACCP/ GMP) and its compliance

The fishes for domestic market are not processed with adequate care due to lack of awareness about hygiene among general public. Further, standards for food products sold in domestic market were mostly concerned with adulteration according to PFA guidelines. Whatever, guidelines are available were not adhered to because of failure in implementation. The problem has been confounded by multiple control on food products especially for licensing, promotion, hygiene regulation etc. Government's recent initiative of establishing Food Safety and Standards Authority to bring coherence in promotion, guidance and control would go a long way in improving the quality of fish available in the markets.

Under-utilized processing capacity and shortage of raw material

Many small processing units are failing to adhere to higher levels of standards as well as waste disposal. The cooperation among small units to pull resources for activities that are otherwise not possible singularly may pay dividend and avoid wrath of the enforcement agencies. The promotional agencies may facilitate the process for greater interest of the industry in general. Under-utilization of processing capabilities can make the processing unsustainable. The quarantine and the import for 3rd party processing needs careful examination by the Agriculture and Food processing ministry. This may help the factories to obtain and process materials from another country.

Labour standards in processing sector

The post harvest sector employs a large number of labour and is largely unorganized. Labour welfare is non-existent and there is exploitation. In the absence of statutory provisions, welfare benefits are not available. It is high time that the policy focuses on organization of the labour in this sector and welfare schemes are formulated in accordance with ILO guidelines.

Gender sensitization

A large chunk of the workers in the processing sector is contributed by the women. Often the processing industries are located in distant location. The safety of women of labour class are often a secondary concern. Further, accommodations at the site of work are not women friendly. Commonly the labour contractors and managers are insensitive to these issues. Greater sensitization all involved and wherever necessary enforcement of existing rules may improve the situation

Policy Framework for Post Harvest and Processing Sector: Policy Issues, Policy Elements and Indicative Policy Interventions

Issues	Policy Elements	Indicative Policy Interventions
Health and hygiene	• Hygiene conditions onboard the fishing vessels, landing centers and local processing units are very poor. • minimum standards wherever existing are hardly followed and adhered to	• Aggressive training of fishers on personal hygiene with the support from Government and non-govt organization. • Incentives, subsidies must be linked to compliance of the guidelines

Infrastructure	• Minimum infrastructure facilities lacking at all landing centers to facilitate maintenance of hygiene and for getting better returns from the produces • Infrastructure for Tuna fishing, handling and storage at important fishing harbours should be strengthened. Subsidies and other promotions for tuna fisheries may be continued for some more time	• Encourage public-private-community participation or develop infrastructure • Tolled infrastructure • Civic bodies and ministry of health of states need to be primed for developing guidelines.
Waste and reduction of post-harvest loss	• More than 20 % post harvest loss • Poor fish handling practices as well as lack of on board and on shore cold storage facilities being the main causes	• All out efforts must be made to reduce the cost of ice and to increase the quality of ice. • Ferrying of catches and supply of ice by transport vessels need to be examined. • Incentives for not throwing the low cost fish in to the sea or at the landing centre.
Value addition	• Only labour intensive primary processing is done in – structure of processing industry being determined by tariff structure in importing countries (higher tariff for value added products to protect their domestic industry) • No focus on developing the domestic market for VAPs • Limited training programs and technological collaboration	• Research institutes should be encouraged to come up with diversified products. The attention must be given to freshwater fish utilization. • Training of entrepreneurs on available technologies in Value added products
Health and safety standards (HACCP/ GMP) and its compliance	• Processing units are compelled to comply with the standards – resulted in higher cost of processing with no increase in the export price • Better health standards desirable even from the domestic consumers perspective	• Under the Food safety and standards authority of, the standards requirement may be elevated for domestic market. This may in turn compel the processor to take equal care for domestic market as well.

Large number of small scale processing industry and Increasing number of sick units	• Cost competitive only for labour intensive primary processing and for the export of raw materials • Value addition involves huge capital investment and technological improvement.	• Encourage merger and integration of small processing units or allow them to operate under cooperative mode. Incentives may be linked. • Allow Foreign Direct Investment in processing sector having 100% buy back arrangement
Under-utilised processing capacity and shortage of raw material	• Raw material is not available throughout the year for several small scale fish processing units. • Import is not encouraged (import duty is about 30-40%) – protest from fishers • No specific schemes to promote value addition of freshwater fishes	• To liberalize import of raw materials by reducing the tariff during lean seasons for re-export. • Measures to utilize freshwater fishes for preparation of value added products especially for domestic market
Quality of products for domestic market	• The inferior and rejected products of the export oriented factories are pushed to domestic market because of lack of clear guidelines for domestic market. The BIS standards available for some products are not adhered to.	• More aggressive efforts by the standards bodies and by the Food safety and standards authority to put in place clear guidelines. • Efforts should be made for greater monitoring and enforcement of available guidelines.
Labour standards in processing sector	• Safeguards for protecting the interest of labour in processing sector is very much needed • Minimum labour standards as prescribed by different legislations and conventions not followed • Threat of linking the trade to the adoption of minimum labour standards under WTO framework • Cost competitiveness of labour and labour productivity linked to labour standards	• Enforce the existing labour standards and welfare schemes. • Govt. assistance on welfare schemes run by the industries.
Safety and welfare of women workers	• Wage disparity between men and women workers • Safety and Security of women workers are not given adequate attention. Exploitation by work contractors • Women friendly accommodation are not available	• Special attention needs to be given at the time of EIA certification and MPEDA assistance. • Controlling authorities must ensure compliance of gender related provisions in industry act and labor laws. • Sensitization of the labour contractors and factory managers regarding these issues

vi. Policy Framework for Fisheries Marketing and Trade

Marketing and Trade

As food sector diversification and commercialization gains ground, and producers shift to horticulture, floriculture, animal husbandry, fisheries and diary etc., the need for improved post-harvest handling and marketing becomes crucial. The Govt. should take steps for setting up regulated markets with the primary objective to improve market efficiency and in the process ensure a more equitable distribution of gain from fisheries trade between consumers, traders and producers. The Govt. should evolve strategies to strengthen the marketing infrastructure through improvement of density of regulated market yards equipped with grading, cleaning and packaging facilities, market information system and auction systems. The marketing system should be thoroughly geared up in the context of increased consumer awareness and overall globalization of economy. Private sector investment for development of marketing infrastructure should be encouraged.

Establishment of cold chain

The establishment of cold chains, provision of pre-cooling facilities to farmers as a service, cold chains in the terminal markets and improving the retail marketing arrangements will be given priority. It is necessary to develop a conscious strategy for building up a cold infrastructure consisting of pre-cooling, cold storage, refrigeration, refrigerated transport and modified atmosphere storage, commensurate to the requirements of the agro-processing sector. This calls for active participation of the corporate sector and private capital in terms of investment. The Govt. shall strive to treat cold chains in the private/public sector as a continuous process industry and shall award priority sector status. This includes giving the food preservation sector a priority for assured power as to hospitals at fix prices or concessional rate like the agricultural sector as they are handling perishables. The State Government shall effectively coordinate with National Fisheries Development Board (NFDB) to attract maximum investment in this sector in the States. That the recent State Ministers Conference called for setting up of one model clean and hygienic fish market in each State with NFDB aid shall go a long way.

Strengthening domestic market(ing)

Major reliance on exports and the international market has made Indian producers (fishers and farmers) and processors highly vulnerable in terms of price, fluctuating demand and various types of tariff and non-tariff barriers put by importing countries. On the other hand, the domestic markets for food and consumer items are increasing due to increase in disposable income and growth of urban economy auguring well for increased consumption of fish. The potential markets in the cities need to be identified and these markets are to be linked with the producers through an effective and efficient market chain. Domestic market for fish and fish products have very poor network. The supply chain of fish market in the domestic market is suffering from a number of lacunae. Domestic fish marketing and market information network needs to be strengthened to reduce exploitation of farmers and fishermen. Market analysis and training on value addition for processors and vendors is necessary to increase the realization of value from their produce. The domestic and export marketing of freshwater fishes needs lots of improvement in order to reduce post harvest losses, improve food safety and earn better value of farmers and fishers. Therefore there is

a need for creation of Freshwater Fish Marketing Development Agency (FFMDA) on the lines of MPEDA.

Maintaining minimum standards

International standards shall be implemented for hygiene onboard fishing vessels, landing centers, and at the local processing units. Minimum infrastructure facilities for icing and cold chain should be developed at all landing centers to facilitate maintenance of hygiene and for getting good returns from the produces. Despite availability of standards very little is done to improve on ground the hygienic and sanitation conditions in most of the existing fishing harbours and landing centers. Also, there is no effective mechanism and a marketing network to utilize the bio-wastes from landing centers, peeling sheds, processing units and fish markets. Hence bio-waste management should be given priority. The policy shall provide for requisite investment for infrastructure development, result oriented implementation mechanism and capacity building and training of all stakeholders. Now that Food Safety Standards Act 2006 is in place and Regulatory Authority is being set up, there is renewed hope that it will lead to maintenance of quality and minimum safety standards across the supply chain and the markets.

Exports and trade

Fishers/fish farmers are suffering from glut in the market during harvest season and are forced to sale at lower price in the local market due to improper storage and marketing facility. Major dependence on EU, US and Japan markets need to give way to greater diversification in other markets, besides diversifying the product range itself by moving up the value chain. Though the importance of shrimp exports is declining in value terms, still it accounts for nearly one third of the export value. Increasing trade restrictive measures from export countries, linking of trade and environment in the export trade, linking of trade and labour standards in the export trade, lack of brand equity for Indian products, lack of effective forward and backward market linkages are some of the issues that need to be addressed. India has to cautiously negotiate on these issues and other related trade disputes keeping view the interest of small scale fishers and their livelihoods. In international fish trade, often importing developed countries resort to regulations in the guise of using environmental standards to protect their domestic markets. This has become a trade restrictive and discriminatory tool affecting export from developing countries. Experiences of TED, eco-labeling standards, tuna-dolphin debate illustrate this. WTO has also favored linking the environment issues to the trade. In this scenario, fisheries policy while in sync with international agreements shall strive to delink these two different issues and provide institutional mechanism to develop strategies for international trade negotiations.

Fisheries subsidies

Subsidies in fisheries sector has also come under the WTO banner of late. Though subsidies *per se* are not bad, as long as they are not targeted and add to the net value they should be phased out over time. Any international negotiation on fisheries subsidies or even a preparation for the same without providing any platform for encouraging the ecological values of fisheries can at best be incomplete, half-hearted and inimical to the interests of fish and fishers. Given serious lack of transparency in fisheries subsidies data across the

world and more so in the developed nations, there is a strong need for clarity in definition and utmost discipline in the operational structure of fisheries subsidies. Since most of the developing countries don't have much to lose by being transparent on this matter, such transparency and voluntary revelation may pose a threat to the developed countries and force them to be more transparent in the sharing of subsidies data. No meaningful discussion on and effective management of fisheries subsidies is possible, unless member countries are willing to undertake rigorous domestic sector reforms in a holistic framework. In fact, the current debate on fisheries subsidies can in fact be looked upon as an opportunity to the less developed nations to set the house in order.

Public and private investment

Public Private Partnership (PPP) model to be followed in marketing for promotion of domestic market for value added products and diversification of products. Private investments in fish marketing (establishment of cold chains) is to be encouraged.

National Fisheries Development Board for marketing has to function on the same line of National Dairy Development Board (NDDB) which has successfully spearheaded the producer centric but market savvy and competitive development of the small scale diary sector involving the entire supply chain.

Policy Framework for Fisheries Marketing and Trade:
Policy issues, Policy Elements and Indicative Policy Interventions

Policy Issues	Policy Elements	Indicative Policy Interventions
Weak domestic marketing network	• Unorganized domestic fish markets with inadequate / minimum infrastructure facilities • Major dependence on export markets not desirable • Need for a major program • Very low Private investments in fish marketing (establishment of cold chains)	• Organized modern markets exclusively for the fish with waste management • Small market Federation should be established for Procurement and marketing of Fish • Promote the marketing of low value fish through SHGs, etc for low income groups • Cold containers for fish in the passenger trains can me provided (like for milk) • Promote cold storage and transport facilities • Establish wholesale and retail fish markets on the lines of markets for agri-produce • Cold containers for fish in the passenger trains can be provided (like for milk)

		• Development of cool chains along the marketing/supply chain should be promoted in the domestic market. • Supermarket and ultramodern retail shop for the fish market should be encouraged in the domestic to provide hygienic food to the consumer in the domestic market too.
Market information and marketing intelligence	• Only MPEDA collects regular price information from different export markets, no systematic information available for the domestic markets • NICNET Based Agricultural Marketing Information System Network (AGMARKNET) sponsored by Directorate of Agricultural Marketing, Faridabad is displaying daily prices of fish for the states of Meghalaya, Delhi and Tripura. Prices of fish in other states are not being displayed in Agmarknet website. The same should be displayed.	• Demand and Supply analysis of Fish products should be undertaken to identify surplus and deficient states in the country • Promoting branding in the international market to achieve brand equity • Promotion of Fish through awareness camp and publicity campaigns • The underutilised capacity of the processing plants by promoting reprocessing of imported raw material - this means changes in trade policy to compete with world market • NICNET Based Fish Marketing Information System Network on lines of AGMARKNET in all the States
Hygiene and safety standards in the domestic fish markets	•	• Enforce hygiene and safety standards at domestic markets by fishers themselves • Training on quality awareness should be conducted for whole sellers as well as for retailers • Efforts should be made to take example of world markets in quality aspects like smell
No organised procurement system	• Ineffective fishers co-ops, no assured price and quality	• Strengthen and reform cooperative marketing system
Export market composition	• Major dependence on EU, US and Japan – need greater diversification in other	• Programs for product diversification like sea bass, seaweed, scampi etc. along

	markets	with emphasis on value addition • Developing fish meal from the trash fish and by-catch can be a substitute to imported fish meal
Export Product composition	• Though the importance of shrimp exports is declining in value terms, still it accounts for nearly one third of the export value • Less value addition, and diversification of products	• Programs for product diversification like seaweeds • Developing fish meal from the trash fish and by-catch can be a substitute to imported fish meal
Increasing trade restrictive measures from export countries	• Example of US anti-dumping duty on shrimp exports. • Unfair and discriminatory safety standards in some EU countries (Spain) • Other non-trade barriers • Changing of buyers market into sellers' market	• Diversify export product composition and market composition particularly moving up the value chain • Strengthen domestic markets • Aggressive negotiation at WTO and bilateral levels
Linking of trade and environment in the export trade	• Measures like TED, eco-labeling are to be increasingly adopted • WTO also favours the linking of the two	• Skillful negotiation and policy interventions to improve promote sustainable and CCRF compliant fisheries go hand in hand
Linking of trade and labour standards in the export trade	• Under debate/negotiation in the WTO • India's stand is not clear while other countries have stated their positions	• Skillful negotiation and policy interventions to improve labour standards go hand in hand
No brand equity for Indian products	• Majority of the Indian exports are reprocessed, repackaged, re-exported by branded processing companies and retailers – less value realisation	• Building Brand India Equity
Export promotion	• Extent of export subsidies likely to be under WTO scanner	• Strengthen the database on subsidies in domestic and export sector • Negotiate aggressively for accounting all types of subsidies in fisheries industry of developed countries

vii.Policy Framework for Human Resource Development

Human Resource Development is a critical input for sustainable development of fisheries and aquaculture. The State Department of Fisheries play a pivotal role in transfer of technology, management and development of fisheries sector in the respective States. During Zonal Workshops it came to the fore that most of DoFs have inadequate staff and about 50% of posts are lying vacant which is not being filled up due to freeze on new recruitment. Keeping in mind the role of DoF in development of fisheries sector, the freeze may be lifted to fill the vacant posts. Reliable estimates on human resource requirements are lacking at State and National level. In the absence of such information, human resource planning for the sector cannot be done properly, including opening of new fisheries colleges or initiation of new academic and training programs.

Conflicting roles and expectations

It was also evident during the discussions of Zonal Workshops that there is a mismatch between the expectations and responsibilities assigned to the staff of DoFs in most of the States. This needs to be corrected immediately. Capacity building of DoF personnel needs to be taken up on war footing keeping in mind the latest national and international developments that have taken place in the sector.

Reforms in recruitment and career advancement policy

There is a need for revamping recruitment policy and career advancement program of State DoFs. Preference need to be given to professional degree holders in recruitments to usher in professionalism and new ideas. Career advancement has to be linked to merit not necessarily based on length of service to encourage talent and efficient work force.

Strengthening training infrastructure

Training infrastructure for staff of DoF is very poor in States. Strengthening of state level training and HRD infrastructure is need of the hour. In order to ensure high standards in fisheries education, ICAR has constituted Deans' Committees and Broad Subject Matter Area Committees from time to time for course content revision and uniformity. The recommendations of IV Deans' Committee need to be implemented for UG Programs, and Broad Subject Matter Area Committee recommendations for PG programs. Colleges of Fisheries need to be strengthened in terms of faculty, infrastructure and library facilities.

Professional leadership in Fisheries Departments

At present the post of Director in many States is held by IAS officers rather than the fisheries professionals who are part and parcel of the Department. This limits the professional management of this department. Besides, the promotional avenues of officers in DoF become limited. This also sends a message across the professionals with in DoF that there is

no scope to assume leadership position despite their professional capabilities, resulting in demoralisation. It was therefore suggested in Zonal Workshops that technical person should head the State DoF.

Encouraging women's participation at all levels in fisheries sector including Department of Fisheries would go a long way in making fisheries an equal opportunity sector, and may bring fresh perspectives.

Policy Framework for Human Resource Development:
Policy Issues, Policy Elements and Indicative Policy Interventions

Policy Issues	Present Status	Indicative Policy Interventions
Inadequate officers and staff with DoF	• about 50% posts are vacant and there is a freeze on new recruitment in many states	• Freeze to be lifted to facilitate filling of vacant posts
No proper human resource assessment in the fisheries sector	• Unable to systematically plan the HR requirement in the present and future	• National level assessment of human resources required at different levels • State specific requirement / needs assessment to be conducted
Lack of clarity of roles and responsibilities	• Involvement in non-technical / non-developmental work – lack of focus • Subsidy driven and revenue generation oriented work	• Responsibilities assigned to DOF staff need to be redefined keeping in mind developmental needs and expectations of the sector
Position of fisheries in relation to other departments	• Given least importance • Non-technical persons at the helm of affairs – few states have technical Directors • No fixed tenure of the Commissioners/Secretaries – frequent shifting and transfer – average life span is about 6 months • No separate Dept. of Fisheries / Ministry in most of the States and the Centre	• Technical persons to head the state DOF • Separate Dept / Ministry at the central and in states where such arrangements does not exist
Capacity building of DoF and other developmental personnel (NGOs)	• No regular training and capacity building programs • Few existing programs are focused only on technical advances, no development and management oriented training	• Compulsory refresher courses at least once in five years for DOF staff and NGO's. • Deputing DOF staff for courses such as PDP and

	programs	EDP of CIFE, Mumbai Development and management oriented short term programs for officers of deputy director and above level in DOF
Lack of autonomy (financial, executive) to the Director in some States	• Limited budgetary allocations based on top down planning • Delay in availability of funding • Red tapism	• DDO power to Directors of DOF • Status of Director of DOF to be on par with Directors of Agriculture and Animal Husbandry
Lack of rational recruitment policy and career advancement program	• Inadequate / no Subject Matter Specialists, only generalists man the DoF • Career advancement by seniority, no merit • No incentives for good performance and lack of promotional avenues	• Preference to be given to professional degree holders in recruitment to state DOF positions. • Certain percentage of promotions to be made out of turn based on merit
Poor State level training infrastructure	• No full fledged and fully staffed Training institute in the States (A.P. is exception) • No master trainers	• Strengthening staff level training and HRD infrastructure. • Colleges of Fisheries to be strengthened in terms of faculties, infrastructure and library facilities.
Standard of fisheries education	• Inadequate field training / onsite training • Implementing the IV Dean's committee recommendations on UG curriculum, and the recommendation of the recent Consultative Workshop on Education Policy	• Compulsory comprehensive inbuilt internship program on various aspects of fisheries and agriculture. Improvement IV Deans committee and also BSMA (fisheries) recommendations at UG and PG level respectively
Strengthening participation of women	• Disproportionately less percentage of women officers and staff in DoF and other institutions	• Make fisheries dept. and other institutions an equal opportunity institution with more participation of women and other disadvantaged sections

viii. Policy Framework for Service Delivery System

Service delivery system i.e. extension system, is the crucial link and the interface between the technology generation system and the client / stakeholder system. In fisheries, extension is often portrayed as the weakest link. Unlike the crop sector or livestock sector, fisheries extension consisting both marine fisheries extension and aquaculture extension, is yet to mature as an institutionalised mechanism with adequate policy support, organizational structure, and professional development. Though the main mandate of fisheries development and extension rests with State Departments of Fisheries, they are involved more in regulatory role than the extension / developmental role due to the nature of property regime in the fisheries sector as well as lack of policy support and clearly defined roles.

Fisheries extension

Fisheries sector is characterised by two distinct sub sectors namely the marine capture fisheries, and aquaculture. Marine fisheries sector, being a common / open access regime, the de facto ownership being vested with the state, is characterised by absentee management. The extension system or even research system, has played very little role in technology transfer that has taken place in the form of motorization / mechanization. But the recent realization that the current level of exploitation, if unchecked, would lead to tragedy of commons that has already taken its toll in most of the fisheries across the world call for concerted extension approaches to implement conservation and sustainability measures for optimal resource utilization. Hence, extension strategies in capture fisheries shall revolve around the development objective of sustainable utilization of resources, livelihood security and ensuring biodiversity.

Aquaculture extension

In the case of aquaculture sector, the limited extension services are mainly organized around the Fish Farmers Development Agency (FFDA) though other agencies such as ICAR Institutes / SAUs, KVKs, NGOs, private input manufacturers and consultants are involved to a limited extent. In Andhra Pradesh, the seat of aquaculture revolution in 1980s and 1990s, progressive farmers and their enterprising associations have played pivotal role in diffusion of technology across the client system.

Challenges for extension system

The major challenges for aquaculture extension are to bring additional unutilsed resources under aquaculture, increase the average productivity and sustain the gains and diversify coastal aquaculture. These challenges call for different extension approaches and strategies by multiple agencies both public funded, civil society organizations and private agencies. There are many innovative and participatory extension approaches including experiments in community based management systems already being practiced at few places, as well as several success stories of technological adoption and farmer led innovations. Recently, Bihar has launched an innovative Para Extension Services wherein aspects of entrepreneurship development, employment generation and aquaculture development are integral to each other. Some other states like Jharkhand and Assam have also started *Matsya Mitra* (Friends of Fishers/Fishfarmers) program to strengthen the extension system at grassroots level. Such concepts should be given the support from the Department of Fisheries, in terms of

helping them to start demonstration units of their own or even under PPP mode with extension approaches, strategies and methods to complement their marketing strategies. However, these sporadic and disconnected efforts are yet to be woven into a major extension paradigm consisting of well defined concepts, approaches, strategies, tools & techniques for implementation by public & private extension agencies so as to usher in an all round fisheries development across the country

Limitations of extension system

The review of fisheries extension scenario has brought out the major limitations in the present extension system that hinders providing adequate technical support and associated services for furthering fisheries development. This can be summarized as follows: i) Technology and subsidy driven system including the faulty assumption that lab generated technology is readily applicable & appropriate under varied local conditions; ii) Subsidy and dependency syndrome meaning fishers / farmers being treated as passive receivers of subsidy with little knowledge empowerment; iii) ignorance / oversight of social parameters & conditionalities including lack of innovation & skill to motivate / organise farmers / fishers groups and isolation from community / village level organisations, NGOs; iv); v) Executing agency / Directorate of Fisheries has very little financial autonomy as a result in many States more than one third of plan budget remain unutilized; vi) lack of adequate and skilled staff mainly due to faulty recruitment policy and absence of regular capacity building and HRD programs for staff; vii) lack of coordination among DoF and other development agencies like financial institutions, NGOs, line departments, PRIs, etc.

Redefining roles and responsibilities

Inappropriate and ineffective organisational design of Dept. of Fisheries with respect to its expected roles and functions has meant Dept. staff being given conflicting responsibilities of enforcing fisheries regulations as well as providing technical support / extension service at the same time. 'Role-Expectation' from the Department of Fisheries is participatory developmental in nature, that involves social skills in addition to technical skills. However, since inception till now the 'Role-Performance' of the department has been regulatory, that originated from revenue collection from leasing out of water bodies to enforcement of fisheries acts. The department is also implementing development and welfare subsidy-driven-schemes without having much developmental orientations. This has created a role-conflict from such 'Expected-and-Performing-Role-Dilemma' of the development officers. Therefore, the role of fisheries development officers needs to be redefined and accordingly they should be oriented through different training programs.

Besides, the conventional extension system is no longer able to address effectively the changed grassroot level reality in terms of inadequate extension personnel, limited budgetary provisions, dispersed aqua farmers and fishers, increasing global integration of markets, importance of timely availability of information, inputs and support services.
Participatory aquaculture extension and fisheries co-management shall become the major paradigms of extension for the two sectors respectively.

Transparency and accountability

The policy should ensure transparency and accountability in the functioning of departmental staff and field level functionaries. Creating awareness and implementing

provisions of RTI Act shall get priority focus. Performance based incentives and facilities shall be introduced. Self assessment and participatory evaluation shall be part of this process.

Convergence and coordination

It is a fact that multiple development departments, agencies and organizations (GOs, NGOs, CBOs) work and implement multiple programs, projects and schemes for multiple client groups at the grassroots / rural area. Fisheries related programs are one of them. Though the target client groups are the same in many cases, there is hardly any coordination, let alone convergence, among the agencies as well as programs. This has not only meant a higher transaction cost (unit cost of delivering the services) and duplication of effort but sometimes competing, instead of complementing, programs that defeat the very purpose of developmental interventions. That this is an age of linkages, networking, cooperation and convergence among multiple agencies and stakeholders is yet to sink in with the Fisheries Departments across the States. For e.g. except in few States, DOFs hardly have any effective linkages with PRIs, or rural development department, forest department, etc. DOFs shall develop, through FFDAs, district and grassroots level linkages for effective convergence and complementarity, while at the State and national level institutional mechanisms shall be evolved and strengthened. For e.g. effective utilization of RKVY funds by DoF would necessitate such institutional arrangements.

Database on fisheries resources and fishers / fish farmers

Highly dispersed and diverse nature of resources and resource users, especially in inland areas coupled with lack of adequate staff in State DOF has lead to non-availability of rigorous and authentic baseline data. However, CMFRI's survey provides a reliable and relatively comprehensive benchmark scenario for the marine fisheries sector. That a census like comprehensive survey is a possibility has been illustrated by Tripura where door to door survey of inland fishery resources and production is being collected every year since 2004-05 by DOF staff in collaboration with Gram Panchayat officials. The policy shall encourage and incentivize collection of authentic data base by DOF staff. Innovative mechanisms can be devised wherein stakeholders / resource users volunteer to supply reliable data through CBOs / PRIs /NGOs. Since the planning exercise has to be based on reliable data to be effective, policy shall put a premium on it.

Strengthening technical field staff

The vacancy positions, for technical cadre, in many State DOFs are as high as 35-45%, while the sanctioned strength itself has been reduced/down sized in most of the States. Though it's unlikely that new posts would be created, the recruitment policy has to be revisited to fill all the vacant positions immediately. But, field level technical staff (fisheries extension officers and fisheries demonstrators) has to be recruited, on contractual basis if not on permanent basis, to bring the vast unutilized water resources under scientific fish culture. *Matsya mitras* programs in Assam and Jharkhand and Para Extension Workers program in in Bihar are good initiatives that recognize and incentivize both progressive farmers and rural educated youth to popularize fish culture.

Policy Framework for Service Delivery System: Policy Issues, Policy Elements and Indicative Policy Interventions

Issues	Policy Elements	Indicative Policy Interventions
1. Service orientation The officials of DoFs seldom visit the fields and mostly attached to office works.	Desk to field orientation	• It requires change of mind-set from predominantly desk based to field based / client oriented department. • Besides they also deserve adequate support in terms of fund and means for undertaking frequent travels. • Extension workers serving in remote / difficult areas deserve special consideration.
	Poor mobility of Fisheries Officers	• Mobility of Fisheries Officers should be increased by • Providing vehicle facilities. • Policy for incorporating travel support including means of travel (motorcycle) shall be an integral part of any development package for the development of fisheries / aquaculture. • Developing field oriented programmes
	Less numbers of women Officers	• More women should be employed in the department especially to mobilize women
	Shortage of staff	• Recruitment of staffs is very much necessary. • To cope up with staff shortage, participative extension programmes such as 'Trickle-Down System of Aquaculture Extension" should be introduced.
	Less number of fisheries professionals in frontline extension service	• The frontline extension service of ICAR, SAU & KVK should have fisheries professionals in deserving areas.
	Need to have a separate Fisheries and Aquaculture Extension Service from DOF	• Fisheries and Aquaculture Extension Service needs to be created and should be separate from DOF which can be empowered with better extension skills.
	No Community Based Service Delivery System	• Matsy mitras may be encouraged to organize fishers/fish farmers for proper distribution of inputs and procurement of the produce.
2. Community Empowerment Service should be targeted for the overall empowerment of target communities	Empowerment of target communities	• SHGs should be encouraged for fishing, fish farming and fish marketing. • Efforts will be done to organize the fishing/fish farming communities including revival of fishers' cooperative societies and empowering and augmenting fisheries resources management.

integrating essential human development elements such as social mobilization, fisher population, education, health and environment.		• Partnerships of fishers in the decisions taken for the large water bodies should be encouraged.
	Empowerment of resource poor	• Empowerment of resource poor fishing communities like women and small scale aquaculture be given priority through social, economic, technical information inputs as this has multiplier effect.
	technical developments with emphasis on social development	• All stakeholders (resource user groups) involved in fisheries development should be made aware of technical developments with emphasis on social development and community involvement.
3. Training There are very limited numbers of training programs for the farmers and trainers are organized. Exchange of information by several methods has shown to have good results. In the age when communication is growing at rapid strides.	Training on fish culture	• Standardization process of fish culture practices for different zones should be initiated
	Training for seed production.	• Training for entrepreneurs should be organized in collaboration with SAU/KVK/ICAR
	Training for Bio-waste management	• Fishers' societies or entrepreneurs should be trained in scientific bio-waste management. Better utilization of wastes from peeling sheds, processing units and fish markets is need of the hour and therefore bio-waste management should be made compulsory
	Training on quality awareness for marketing intermediaries	• Training on quality awareness should be conducted for wholesalers, retailers and all the marketing functionaries in the value chain to encourage hygiene and safety standards at domestic markets by fishers themselves,
	Training programs for the processors and vendors	• Market analysis and training on value addition for processors and vendors is necessary to increase the realization of value from their produce. Fishers / their associations should also be trained in the production of such products , may be in partnership with private agencies.

4. Informing	National Fisheries News Bulletin	• 1. There shall be National Fisheries News Bulletin for dissemination of latest information to the stakeholders
	Fortnightly fisheries news bulletins	• In this view, the ministry should publish fortnightly fisheries news bulletin for the benefit of fishers at large. Fortnightly fisheries news bulletins can be of great help to the stakhoders as they can have an updated knowledge of the sector as well as the recent developments and trends.
	Disseminate the fisheries and aquaculture information over radio and TV	• The ministry should also disseminate the fisheries and aquaculture information through village information network of NIC, radio, TV and other media. • At the state headquarters level fisheries programmes for media may be prepared.
	ICT in management and service delivery.	• ICT should be increasingly used in all aspects of management and service delivery.
5. Credit No financial assistance to the poor farmers	Credit policy for poor	• Financial institutions and insurance agencies should extend credit facilities as existing in agriculture sector so that small fish farmers and fishers are also benefited. • SHGs of poor farmers may be formed
	Collateral security	• Loan amount to be granted without collateral security as the socioeconomic status of the small farmers need to be raised
	Insurance cover	• Adequate insurance cover for fishers and their families, their craft & gears may be provided as fishing communities are a vulnerable group.
6. Welfare	Link compliance of the code of conduct with the development and welfare programs	• Compliance of the code of conduct (like closed season) may be improved by linking it with the development and welfare programs.
	Mobilize support from various welfare and development agencies	• Department of Fisheries (DoF) to emerge as a service providing agency for developing the capacity of fishers and fish farmers technically, socially and economically. • They also need to coordinate and mobilise support from various welfare and development agencies (Central / States / NGOs) for the clientele of fisheries sector.

ix. Policy Framework for Fishers' Livelihood and Welfare

Livelihood generation and poverty reduction has to be the focus for the fishers. Recognizing and developing potential of the poor, increasing their productive capacity and reducing barriers limiting their participation in society. Focus has to be on improving the social, health, nutritional, economic and environmental conditions of the poor and their access to decision-making. Targeted programs for poor to reduce the disparity and gap between rich and poor. Increased access to and control over productive assets (especially water, land, capital and credit) and other basic services for poor and women. Greater access to and control over credit, training and services for women entrepreneurs. Social security schemes should be introduced.

Increased recognition of local men and women's knowledge of the natural environment, ITKs and increased decision-making role for them in natural resource management and sustainable development.

Fisheries and related livelihood opportunities be created. Alternative livelihood opportunities for men and women be created during closed season, conservation programmes and also as an alternate option for them. Ensuring participation of women in all activities of fisheries and aquaculture. Gender equity, economic equity and inclusive growth be ensured. Gender based auditing of all programmes be done.

Fisheries be integrated with NREGS. Relief during closed season based on economic status of individuals not households. Pension for men and women and poor in particular be provided.

Fishing communities are vulnerable to disasters and other health risks. So Community Based Disaster Management has to be given emphasis. Fisheries insurance has to be introduced as it is a high risk job. Insurance should be there for natural calamities, against threat of life/accident, economic loss, to crafts and gears. Security measures for the workers be provided. Improve well-being and ease workloads by facilitating access to basic rural services and infrastructures.

Empowerment of fishing communities is necessary, recognizing poor and women as a target group deserving special attention should be emphasized. Expanding poor and women's access to and control over fundamental assets – capital, land, knowledge and technologies . Participatory decision-making role in community affairs and representation in local institutions.

Development initiatives should incorporate the priorities and needs of both women and men and give them equal opportunities to access benefits and services. Address the structural inequalities that prevent poor and women from realizing their potential as human beings and producers. Providing education, health care, nutrition, access to basic services as per the UN indicators of HDI, GDI, GEM. Drinking habits of fishers and the economic loss to the family be addressed.

Facilitation of poor women's and men's access to credit and other microfinance products be addressed. SHG and enterprise development be encouraged. Fisheries sector be recognized as priority sector for the purposes of credit. Suitable variant of kisan cards be introduced. Saving habits be inculcated.

Strengthening of cooperative societies and participation of credible NGOs is needed with strengthening women's representation in community-based organizations (CBOs). DOF should work with the rural development programs and PRIs. Strengthening democratic system and bringing equitable distribution of benefits.

Reforms in Co-operatives

To ensure greater degree of accountability of the fishers' co-operatives, strengthening democratic system and bringing about equitable distribution of benefits, following measures shall be initiated: all societies shall have joint account preferably in nationalized banks; all members shall have photo ID cards and the list to be available for public scrutiny; incentives and awards to best performing societies based on overall production as well as socio-economic parameters; power of registration of societies and settlement of their disputes to be given to Dept. of Fisheries as in other States like MP, UP, and WB; all transactions be made only through cheque/DD and no cash transaction; extension of lease period be given based on performance; and regular independent survey of socio-economic status of members about the impact of co-operative societies.

To bring professionalism in the fishers' co-operatives and make them main vehicles of promoting livelihood development through scientific aquaculture, technical and promotional cells in apex fisheries federations shall be promoted. Secretaries of co-op societies shall be minimum matriculate pass (UP govt. has recently made this) and preference to fisheries graduates / persons having knowledge in fisheries. To encourage education among fisher communities, preference as office bearers shall be given to fishers whose children are school going or educated. Compulsory primary education for all fishers' children by 2012 shall be a major policy objective.

Data on status of fishers and fish farmers

There is no reliable data on the social and economic status of fishers, fish workers and fish farmers across the country both in marine and inland fisheries sub-sectors. The CSS on fishermen welfare including subsidization of diesel are not effectively targeted but available to all the 'fishermen' who are mostly defined by caste for all practical purposes in most of the States rather than by occupation. Thus, the limited budgetary provision and coverage under the welfare schemes by default has excluded really needy in its ambit for example the migrant fish workers. There are no comprehensive studies so far on these aspects. The welfare policy shall be based on sound and reliable scientific study / survey and shall be targeted based on income / poverty levels. That recent State Ministers Conference called for such comprehensive study by ICAR is a welcome initiative. All the CSS and SSS programs shall be thoroughly reviewed in terms of its impact on target groups and accordingly revised during the next Plan period both in form, coverage and adequacy of support. For example many States felt that adequacy of financial support under saving cum relief Schemes shall be increased to Rs. 3000 / two lean months / fisher family, etc.

Policy Framework for Fishers' Livelihood and Welfare: Policy Issues, Policy Elements and Indicative Policy Interventions

Sl. No	Policy Elements	Indicative Policy Interventions
1.	Poverty reduction	• Root causes and structural factors of poverty be addressed. Recognizing and developing potential of the poor: increasing their productive capacity; and reducing barriers limiting their participation in society. • Focus on improving the social, health and nutritional, economic and environmental conditions of the poor and their access to decision-making. • Targeted programs for poor to reduce the disparity and gap between rich and poor. • Increased access to and control over productive assets (especially water, land, capital and credit), processing and marketing for poor and women. Increased access to and control over basic services. • Increased economic options for poor and women. Greater access to and control over credit, training and services for women entrepreneurs. • Social security schemes
2.	Environment	• Increased recognition of local men and women's knowledge of the natural environment, ITKs and increased decision-making role for them in natural resource management - whose particular knowledge of ecological linkages and fragile ecosystems is essential. Increased participation of organizations in sustainable development.
3.	Livelihood opportunities	• Fisheries and related livelihood opportunities be created. • Alternative livelihood opportunities for men and women be created during closed season, conservation programmes and also as an alternate option for them. • Fisheries be integrated with NREGS / RKVY. • Avoid stereotyping of sex based roles • Relief during closed season based on economic status of individuals not households. • Pension for men and women and poor in particular. • Encourage women in all activities of fisheries and aquaculture Gender equity, economic equity and inclusive growth. • Gender based auditing of all programs be done.
4.	Disaster management	• Fishing communities are vulnerable to disasters and other health risks. Awareness programs and capacity development programs on disaster management are needed. Community based Disaster Management has to be given emphasis. • In addition fisheries insurance is as it has high risk. Insurance should be there for natural calamities, against threat of

		life/accident as well as economic loss. • Insurance to crafts and gears. • Security measures for the workers.
5.	Workload	• Improve well-being and ease workloads by facilitating access to basic rural services and infrastructures.
6.	Empowerment	• Recognizing poor and women as a target group deserving special attention. Expanding poor and women's access to and control over fundamental assets – capital, land, knowledge and technologies. Participatory decision-making role in community affairs and representation in local institutions. • Development initiatives should incorporate the priorities and needs of both women and men and give them equal opportunities to access benefits and services. • Address the structural inequalities that prevent poor and women from realizing their potential as human beings, producers and agents of change • Different roles and needs of women and men to be taken into account in project design and implementation, development interventions. • Shift in paradigm by empowering stakeholders, organsiing stakeholders and organsiational development.
7.	Human development	• Providing education, health care, nutrition, access to basic services as per the UN indicators of HDI, GDI, GEM.
8.	Basic Human Needs: primary health care, family planning, nutrition, water and sanitation, and shelter.	• Increased access to and control over primary health care services for poor, women and girls. Understanding of diseases such as malaria, HIV, AIDS and occupational health. Increased access to a broad range of reproductive health care services for women and men. • Increased access to and control over water, sanitation and other basic services. • Increased access to and control over decision-making by women in the design, management and maintenance of water and sanitation services. • Housing facilities
9.	Education	• Increased access to education programs for children and particularly girl child. Schools for fisher children with adequate infrastructure facilities.
10.	Health and nutrition	• Health and nutrition of men , women and children of fishing communities be given importance • Safeguarding the health and nutrition of workers of the processing industry • Malnutrition • Fish as health food • Medicare facilities for women as well as men be given

		• Drinking habits of fishers and the economic loss to the family be addressed
11.	Credit, Microfinance and SHGs	• Facilitation of poor women's and men's access to credit and other microfinance products; Crop insurance, SHG development • Fisheries sector be recognized as priority sector for the purposes of credit. Suitable variant of kisan cards be introduced. • Saving habits be inculcated
12.	Organization development	• Strengthening of cooperative societies • Participation of credible NGOs and SHGs • SHG formation, enterprise development, strengthening women's representation in community-based organizations (CBOs) • DOF should work with the rural development programmes and PRIs • Strengthening democratic system and bringing equitable distribution of benefits
13.	Strengthening of DoFs	• Strengthening of DoFs. Focus of the DoFs need to be reoriented from a predominantly desk service to field service. Financial outlay of DoFs needs to be substantially increased to improve their working condition and help them take developmental activities.

Kindly send your valuable comments and suggestions to director@cife.edu.in with a copy to ananthan@cife.edu.in