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CIFE
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Fisheries Department
Haryana

4th Zonal Workshop on

Fisheries and Aquaculture Policy: Alternative Livelihoods and Sustainability Perspectives for Northern States

Haryana, Punjab, Delhi, Himachal Pradesh Jammu and Kashmir,
Rajasthan, Uttarakhand and U.T. Chandigarh

Chandigarh
6-7 July, 2007

Proceedings

4

Central Institute of Fisheries Education
(Deemed University-ICAR)
Fisheries University Road, Versova, Mumbai - 400 061
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PREPARATION OF THE DOCUMENT

This document is 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 is the proceeding of the 4th Zonal Workshop on 'Fisheries and Aquaculture Policy: Alternative Livelihoods and Sustainability Perspectives for Northern States' consisting of J&K, Himachal Pradesh, Uttarakhand, Haryana, Punjab, Rajasthan, Delhi and UT of Chandigarh was held during 6-7 July 2007 at Haryana Niwas and CRRID, Chandigarh. 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. In the process the quality of each of these proceedings document got considerably improved. It is our hope that the document would be of use to all the stakeholders particularly the policy makers and development planners. Suggestions on the content of the document or on issues related to fisheries policy are welcome. The same may be addressed to Director, CIFE or emailed to director@cife.edu.in

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Acronyms and Abbreviations

ASRB	Agricultural Scientist Recruitment Board
CCRF	Code of Conduct for Responsible Fisheries
CIFE	Central Institute of Fisheries Education
CIFT	Central Institute of Fisheries Technology
CMZ	Coastal Management Zone
CRZ	Coastal Regulation Zone
D.F.Sc	Diploma in Fisheries
DDG	Deputy Director General
DoF	Department of Fisheries
EIA	Environment Impact Assessment
ETP	Effluent Treatment Plant
FAO	Food and Agricultural Organization
FFDA	Freshwater Farmers Development agency
FISHCOFED	Fisheries Co-operatives Marketing Federation
FTC	Fisheries Training centres
GDP	Gross Domestic Product
GIS	Geographic Information System
HDI	Human Development Index
HR	Human Resources
HRD	Human Resource Development
ICAR	Indian Council of Agricultural Research
ILO	International Labour Organization
IMC	Indian Major Carps
ITK	Indigenous Technical Knowledge
KVK	Krishi Vigyan Kendra
MoEF	Ministry of Environment and Forest
MPEDA	Marine Products Exports Development Agency
NABARD	National Bank for Agricultural and Rural Development
NCDC	National Co-operative Development Corporation
NE	North Eastern
NECC	National Egg Coordination Council
NGO	Non Governmental Organization
PG	Post Graduate
PPP	Public Private Partnership
PPCP	Public Private Community Partnership
PRI	Panchayati Raj Institution
R&D	Research and Development
RS	Remote Sensing
SHG	Self Help Group
SPF	Specific Pathogen Free
SPR	Specific Pathogen Resistant
TDS	Trickle Down System
UG	Under Graduate
UGC	University Grants Commission
WTO	World Trade Organization

Executive Summary

Fisheries and aquaculture, the fastest growing food production systems, contribute significantly to the economy and the society in general and the food and livelihood security of the poor in particular, though understated so far. While there are still vast underutilised and untapped resources having potential for development, some of the resources are overexploited and mismanaged, and sustainable development of which is being limited greatly by the absence of comprehensive and an enabling policy framework at the Central and State levels.

In this context, CIFE, Mumbai has taken a lead role in facilitating the process of developing an overarching Fisheries and Aquaculture Policy Framework by organising five consultative workshops at different levels involving all the stakeholders since December 2006. Three workshops were conducted in different parts of the country and this is the report of 4th Zonal Workshop on 'Fisheries and Aquaculture Policy: Alternative Livelihoods and Sustainability Perspectives for Northern States' consisting of J&K, Himachal Pradesh, Uttarakhand, Haryana, Punjab, Rajasthan, Delhi and UT of Chandigarh was held during 6-7 July 2007 at Haryana Niwas and CRRID, Chandigarh. It was organized jointly by CIFE, Mumbai and Department of Fisheries, Haryana.

The workshop consisted of inaugural session, policy status overview session, parallel working group discussions, plenary session and concluding session. Participants consisted of the Governor, Secretaries, Directors and other Staff of Fisheries Departments, Scientists, NGO representatives, Farmers, Bankers and Entrepreneurs actively participated in the workshop with open mind which was conducted in a truly consultative and business like mode. The following policy issues were brought out by the workshop:

1. The absence of a comprehensive policy / legislation to sustainably harness and manage the inland fisheries and aquaculture resources sustainably (riverine fisheries, reservoir / enhance fisheries, other open water bodies like lakes, flood plains) is the most serious and critical impediment to the sector's growth. Also, the specific characteristics of upland and cold water fisheries resources particularly for promoting trout farming, sports fisheries and eco-tourism has not been given requisite thrust. Besides addressing these issues, international instruments like CCRF/ CBD/ SSA / CITES / WTO agreements, etc shall be integrated into the policy.

2. Indian Fisheries Act, 1897 and subsequent amendments need to be

reviewed thoroughly in the light of regulatory and development experience in the last 50 years as well as the present opportunities and challenges posed by liberalisation and globalisation processes. The regulatory provisions could not be enforced effectively by State governments for various reasons, one of them being lack of stakeholder acceptance and compliance. Hence, the policy shall provide for stakeholder consultation in formulation of policies and legislations and participation of communities, NGOs, and other stakeholders.

3. Presently the public water bodies particularly the reservoirs are owned by Irrigation Departments and/or Forest Departments and only in few cases the fisheries development rights are given to Fisheries Department. Also, the irrigation / dam projects or river valley development projects are implemented with no consultation of Fisheries Dept. adversely affecting the interests of fisheries and aquatic biodiversity. The policy shall contain provisions for mandatory consultation from the project design stage though execution and management stages from fisheries Dept. and obtaining NOC from the fisheries department shall be made a prerequisite for execution of all river valley projects.

4. Due to competing user rights for water (irrigation, navigation, domestic and industrial use, fisheries), the availability of water for fisheries has diminished. Policy shall address reconciling the priorities of development and conservation. In this context, open waters and wetlands shall be appropriately defined keeping in mind the contemporary debate. Also, there are various inter-sectoral conflicts and at present no institutional mechanism exists for their effective coordination and timely resolution. Policy measures like constituting inter ministerial / inter departmental coordinating mechanisms and empowering the DoF for all matters related to fisheries management in inland water bodies would be essential.

5. Presently there is no uniform closed season for fishing during spawning season of depleted fish species in a particular riverine system due to which catches of some of the commercially important species has depleted considerably. Hence, the policy shall pave way for the introduction of uniform closed season along the same riverine system.

6. Production maximization appears to be the aquaculture development objective in the current scenario, often undermining the long term sustainability goal. The proposed policy for aquaculture shall be based on long term sustainability. Also, the present anomaly in not treating aquaculture at par with agriculture is both inequitable and unjustifiable. The first priority shall be to correct this and bring aquaculture at par. This will not only benefit small farmers and fishers, but also would lead to increased investment and capital flow into fisheries sector in terms of bank lending, insurance and marketing infrastructure.

7. There are no clear criteria determining the leasing of both water bodies and land for fisheries and aquaculture development in different States in terms of leasing period, lease rent, lease priority, conditions of lease etc. This has resulted in limited development of potential resources suitable for fisheries. Besides, lack of clear criteria and large discretionary powers with the allotment officers have lead to numerous litigations related to leasing. To address these comprehensively the leasing policy shall be evolved based on clearly defined criteria and principles.

8. Aquaculture development in Northern States is restricted though the productivity is among the highest in India. However, there is scope to bring more area under culture. To promote this, policy shall provide for incentive structures for availability of adequate and quality seed. Also, to capitalise on the demand for organically grown fish, organic aquaculture and it's marketing in niche markets need to be promoted. Northern States have vast tracts of inland saline areas unsuitable for crop cultivation but with little investment can effectively be put to use for aquaculture. The policy shall encourage, after due expert consultation, the utilisation of these areas for aquaculture.

9. The consumption of fish in Northern States, particularly in rural areas and small towns, is very less but the growing cities have huge markets supply which is mainly from coastal and southern States at present. With consistent promotional measures and development of market infrastructure the overall demand can be increased manifold that would give a major fillip to growth of aquaculture in the region. Establishing Freshwater Fish Marketing Promotion Agency, one stop Aqua-Business Shops, revitalising co-operatives would be few of them.

10. DoF shall be reorganized as professional service deliver agency. The present practice of appointing non-technical bureaucrats as heads of Fisheries Departments does not augur well for this. Instead the Departments should be headed by a fisheries professional on a tenural basis to ensure continued leadership and accountability for sustainable development of the sector on long term basis. Also, all the technical positions in the state department should be filled by qualified technical personnel. Commissioning of Indian Fisheries Service on the lines of Indian Forest Service could be considered.

11. The present inter-institutional linkages are the weakest link in efficiently delivering the professional services to the fishers and farmers in time. Institutional mechanisms shall be put in place for continuous linkages between DoF and ICAR/SAUs on one hand and DoF and other line Departments on the other.

12. Many staff positions in most of the DoF are remaining unfilled for many years affecting the functioning. Though efforts shall be made to strengthen the manpower, considering the limited field staff and resources, there is a strong need to develop and use innovative extension approaches like the farmer led Trickle Down System (TDS) of aquaculture where farmers and fishing communities would be partners in extension system. The policy shall encourage such approaches. In this context the potential of ICTs could be harnessed effectively. There was a consensus to appoint ATMA Project Directors from DoF in those districts having distinct competitive edge in terms of fisheries and aquaculture. At present, they are appointed from Agriculture Dept. irrespective of the resource and development potential.

Overall, the workshop felt that the potential of fisheries and aquaculture to contribute to employment, food security, economic and social well being in Northern States has not been fully realized at present. Only a comprehensive and responsible policies and goals that encourage sustainable development coupled with pragmatic development plans and strategies could help realize this.

1. Introduction

Context and Challenge

Fisheries and aquaculture have been the fastest growing food production systems during the last three decades. Their significance and contribution towards agricultural and national economies, livelihood and nutritional security, employment generation and foreign exchange earnings have been enormous, though understated so far. The sector has increasingly been recognised as a powerful tool for poverty reduction through creating sustainable rural livelihoods besides providing much needed animal protein especially to the protein starved developing countries. Fisheries sector provides livelihood for 11 million people in India with 6.5 million fishers directly deriving their sustenance from it. The sector contributes 1.3 per cent of the total GDP or 4.6 per cent of GDP from agriculture. Fisheries exports in 2005-'06 have earned a foreign exchange to the tune of Rs.7245 crores accounting for over seven per cent of net forex earnings.

Aquaculture has emerged as an important farming activity transforming aquaculture from a traditional livelihood-support rural activity to profit oriented production system. The future development of aquaculture will depend on improvements in new and adaptive research and management, especially in relation to emerging environmental issues and their mitigation. Thus the important challenge for aquaculture in India in the future is to ensure livelihoods, sustainability and profitability. Therefore, in order to support the development of fisheries and aquaculture, India needs a realistic fisheries policy.

Fisheries in inland open waters systems have been an important source of livelihood security for the resource poor rural communities of the country. India has vast inland fisheries resources comprising 17, 13,343 km of rivers and canals, 2.36 million ha of ponds and tanks, 1.1 million ha of floodplain lakes and derelict waters, and 3 million ha of reservoirs offer immense scope for furthering fish production. Inland fisheries and aquaculture contribute 53per cent of total production. The inland fisheries sector registered an impressive growth rate of over 6 per cent in 1990s. Of the total inland fish production, about three fourth has been obtained through aquaculture.

The Northern States of India has a large unfulfilled potential in the form of ponds and tanks for rural aquaculture and it can contribute considerably to improve the livelihoods of poor people. Coldwater resources dominate many of the North Indian states. The upland fishery

resources include rivers (8,253 km), natural lakes (21,900 ha), and reservoirs (29,700 ha) which form an important source of fish production particularly in the states of Jammu and Kashmir, Himachal Pradesh, and Uttarakhand. However, fisheries of these waters are poorly developed. These resources are largely untapped and underutilized. Further, there is decline in catches in these water bodies owing to many factors such as changing ecological condition of the habitats, destruction of spawning & nursery ground and barriers created on the breeding migration path. Besides, there is a vast expanse of land lying fallow due to saline soil and underground saline water particularly in the states of Rajasthan, Haryana, Punjab, Uttar Pradesh etc. These saline water ecosystems have to be utilized properly and judiciously under suitable policy frame work.

The multipurpose nature of use pattern in inland waters has relegated fisheries to low priority in most of the Northern states and their importance relative to other production systems has not been given due recognition. Consequently, most of the inland open water resources have witnessed habitat degradation and resulted into low fish yields. This has also contributed to reduced employment opportunities in the rural areas. The present day riverine fishery is also below subsistence level with an average yield of 0.3 ton per km, which is only about 15 per cent of their actual potential.

Currently, though India is the third largest fish producer (6.4 million tons in 2004-'05) and second largest producer of freshwater fish (3.4 million tons) in the world, the gap between the top producer China and India is astounding and more than eight times that of India's production. Thus, resources, if developed to its optimal potential, could greatly improve the livelihood standards of the primary producers, fishers and farmers, who still constitute the poorest of the poor and the most marginalized and vulnerable sections of the society.

Why policy?

The extent and quality of development is largely conditioned by the given policy, regulatory mechanism and enabling institutional environment. Lack of broader policy framework at the Centre and comprehensive policy at State level, non availability of adequate and professionally skilled human resource, ineffective and redundant services delivery systems, and poor infrastructure have almost limited the scope of fisheries development in India. Ironically, the importance of policy and HRD aspects has not been given sufficient attention so far.

An overarching Fisheries and Aquaculture Development Policy Framework at the Centre and comprehensive fisheries policy in the States which is in harmony with Center's policy framework is therefore the need of the hour. Policy is generally intended to give over all direction and seeks to achieve a desired goal. Development of policy is also a decision making process that helps address identified goals, problems and concerns. .

CIFE Initiative

Central Institute of Fisheries Education, Mumbai has taken a lead role in the facilitating process of developing an overarching Fisheries and Aquaculture Policy Framework at the Centre and a Comprehensive Fisheries Policy in the States. The facilitation process involves organizing meeting at the state, regional level with the sectoral representatives, policy planners, resource users, resource managers, NGOs and other stakeholders. The policy will differ from state to state and region to region based on the nature of resource and its availability, food security, states own priority and institutional framework.

In this context, CIFE has taken an initiative to organize five zonal workshops across the country and a concluding national workshop at Mumbai with active support and participation of State Departments of Fisheries, ICAR sister institutions, Union Ministry of Agriculture and State departments of Water Resources, Environment and Forests, fishers and farmers and committed NGOs. The first zonal workshop on 'Policy issues and HRD needs in Fisheries and Aquaculture for North Eastern States' was held in Guwahati during 7-8 December, 2006 where in the eight land locked hilly states in the North Eastern zone participated. The second Zonal workshop on 'Fisheries and Aquaculture Policy: Ecosystem and Livelihood Perspectives in East Coast States' was held at Hyderabad during 22-24 March, 2007 for the East coast states of Andhra Pradesh, Tamil Nadu, Pondicherry, Orissa ,West Bengal and Andaman & Nicobar islands. The third Zonal workshop on 'Fisheries and Aquaculture Policy: Ecosystem and Livelihood Perspectives in West Coast States' was held at Goa during 21-23 June 2007 for the West Coast states consisting of Gujarat, Maharashtra, Goa, Karnataka and Kerala and the Union Territories of Daman & Diu, Dadra & Nagar Haveli and Lakshadweep.

The three workshops conducted provided a platform where the policy issues and HRD needs of the respective zones were addressed and discussed at length in a truly consultative and participatory mode evoking intense interest and introspection among all the stakeholders. The output

and recommendations of the two workshops provided essential ingredients that would assist the state in developing their own state fisheries policy. The workshops have also brought out several cross-sectoral issues confronting the fisheries sector and their interdependent nature. These issues have been suitably incorporated in the forthcoming workshop agenda. This was the fourth Zonal Workshop for the Northern states consisting of Haryana, Punjab, Himachal Pradesh, Rajasthan, Delhi, Uttarakhand and Jammu & Kashmir and was held in Chandigarh during 6-7 July 2007.

Specific Objectives

- To sensitize and facilitate the process of developing an overarching Fisheries and Aquaculture Policy Framework at the Centre and a comprehensive fisheries policy in the States
- To critically review the quality of the services delivery system in the fisheries sector and suggest innovative measures and strategies to make it more effective and efficient.
- To flag off desired HRD requirements and strategies for institutional strengthening of the fisheries sector

Workshop Design

The workshop was truly interactive and participatory in nature. For an effective outcome towards promoting a fresh and holistic policy reforms, it was expected that participants have an open mind to exchange new perspectives and experiential wisdom of each other. Hence, they came prepared with requisite materials. The workshop consisted overview session, parallel work group discussions, joint sessions and plenary session.

Participants

- State Directorate / Dept. of Fisheries
- Central/State Depts. of Environment & Forest, Rural Development, Water Resources, Agriculture, Animal Husbandry & Fisheries
- Fishers Co-ops, Fishers / Farmers Federations
- NGOs /Civil Societies, Fisheries Institutes, Scientists, policy makers

Expected Outputs

- Sectoral and cross sectoral issues that deserve policy consideration
- Factors confronting quality service delivery system in the fisheries sector
- Institutional weaknesses and prioritised HRD requirements
- Recommendations for improving service delivery system, institutional strengthening and HRD support

2. Inaugural Session

The 4th Zonal Workshop on Fisheries and Aquaculture Policy: Alternative Livelihoods and Sustainability Perspectives for Northern States consisting of J&K, Himachal Pradesh, Uttarakhand, Haryana, Punjab, Rajasthan, Delhi and UT of Chandigarh was held during 6-7 July 2007 at Haryana Niwas and CRRID, Chandigarh. The workshop was inaugurated by **Dr. A. R. Kidwai**, His Excellency, Governor of Haryana at the Haryana Niwas on Friday 5th July.

Secretaries and Directors of Departments of Fisheries from the participating States, fisheries officers, representatives of farmers, fishers, co-operative societies, banks, scientists, and policy makers deliberated in an informal but intensive consultative sessions. In the evening the participants were treated with the show case of cultural heritage of Haryana and Punjab at the picturesque Pinjore garden.

The program started with a welcome address by **Dr. Dilip Kumar**, Director, CIFE. He welcomed His Excellency, the Governor of Haryana, Shri Prem Prashant, IAS, Chief Secretary Govt. of Haryana, Shri Samir Mathur, IAS, Principal Secretary (Fisheries) and Finance Commissioner, Govt. of Haryana, Dr. P.V. Dehadrai, Former DDG (Fisheries), ICAR, Dr. S.A.H. Abidi, former Member, Agricultural Scientists Recruitment Board, Dr. S.C. Agarwal, Director of Fisheries, Govt. of Haryana, Dr. M.Y. Kamal, former Vice-Chancellor, Sher-e-Kashmir University, J&K, Dr. S.C. Pathak, Former CGM, NABARD, Dr. Kuldip Kumar, Advisor, Govt. of Himachal Pradesh, Officials of the Departments of Fisheries from Haryana, Punjab, Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Rajashtan, Delhi and Chandigarh, Deans & Faculty of Fisheries Colleges from these States and Dean of Fisheries College, Agartala, Dr. P.C. Mohanta, Director, NRC on Coldwater Fisheries, Dr. S.C. Mukherjee, Jt. Director, CIFE and staff of ICAR Institutes and CIFE, and all other participants.

He said that we were extremely fortunate to have His Excellency the Governor of Haryana this morning to inaugurate this program and felt unnecessary to reiterate how great a person he is and how much close to his heart the fisheries sector is, as he has been practicing aquaculture for a long time. His Excellency has been a guiding force for us in developing new technologies and adopting them to suite the requirements of the aquaculture communities. He said we could not have got a better person than him to inaugurate such an important workshop, the fourth in the series to help the governments formulate the fisheries and aquaculture policies.

He acknowledged the keen interest shown by Shri Samir Mathur, Principal Secretary & Financial Commissioner, Dept. of Fisheries Govt. of Haryana and his team in organizing this workshop and for hosting it at this venue. He said that Dr. P.V. Dehadrai has been a guiding force for all of us and he had guided the fisheries sector of this great country for two decades. He is a store house of ideas which would freely flow during the deliberations. He also welcomed Dr. S.A.H. Abidi who has guided CIFE and later on as a Member of the ASRB, has contributed immensely to the development of the fisheries sector in more ways than one. He has been and still is an integral part of the fisheries sector and it is certain that we would benefit immensely due his presence here. He thus welcomed all the dignitaries.

Dr. S. C. Mukherjee, Joint Director, CIFE briefed about the background and the rationale of the workshop and the initiative of CIFE in facilitating the process of developing policy framework and organisation of zonal workshops at Guwahati, Hyderabad, Goa, and Chandigarh.

He reiterated that fisheries are common property resources that provide livelihood for millions of poor people. It also has inter-sectoral and inter-state issues and therefore a national policy is the need of the hour. He further said that since fisheries and aquaculture is state subject, CIFE will also facilitate in developing the state fisheries and aquaculture policy.

Dr. S. A. H. Abidi in his opening remarks said that policy is the need of the hour. He wanted all the stakeholders' perspectives to be accommodated. He expressed his anguish that though the GDP has increased the farmers are still poor, and called for mission oriented approach to address these issues.

Dr. Dehadrai has opined that in recent years the contribution and importance of fisheries sector is being given its due recognition. But he added that efficient governance, and good policies are required to take advantage of this changed scenario. Broad guidelines need to be developed as per the need of the people and the resources available. He amply praised Mr. Mathur for his leadership in catapulting Haryana as one of the most progressive State in growth of aquaculture.

Shri Samir Mathur, Principal Secretary, Fisheries, Government of Haryana. He described that the present workshop as a great event Haryana which is being inaugurated by His Excellency Governor. He welcomed all the dignitaries from outside the State as the State is fortunate to get the advice of learned people.

Mentioning that remarkable growth rate in aquaculture can be possible only with policy and pragmatic action plans expected from the workshop.

Dr. A. R. Kidwai, Governor congratulated the CIFE for conducting this workshop for Northern Zone States in Haryana. He mentioned that there is lot of untapped potentialities for aquaculture in the country, besides the prospects of fisheries in the wetlands and open water resources. He also congratulated the DoF for doing the excellent work in Haryana and said that there is still lot of scope in terms of taking two crops a year in aquaculture. Mentioning about his experience in prawn farming, he expressed that prawns were available in Patna in River Ganges before the construction of barrage in the downstream. During his stint in Patna as Governor of Bihar, he surprised the visiting DG, ICAR with prawns harvested from his ponds. Narrating the economic and nutritional importance of shrimp and prawns, he exhorted the State to train farmers for large scale adoption.

Praising the work of Mr. Kurian in AMUL, he wanted the AMUL model of milk to be replicated in fisheries sector through organised marketing efforts so as to bring about revolution in production and livelihood standards. Hoping that India would be a developed country by 2020 and one of the three super powers by 2045, he stressed the need to attain the agricultural growth rate of 5% which is possible only through 10% GR in fisheries sector.

Dr. S. C. Agarwal, Director, Fisheries, Govt. of Haryana proposed the vote of thanks.

3. Session I : Fisheries Development and Policy Issues - An Overview

The Inaugural Session was followed by the first business session - Policy Overview Session wherein the Directors from the participating States made detailed presentations on the relevant and pertinent policy issues and constraints confronting the fisheries sector in respective States. It was followed by Open Forum where all the stakeholders have given their respective policy perspectives. The Policy Overview Session was chaired by **Dr. P.V.Dehadrai. Dr. S. N. Ojha and Dr. A.K. Jain** acted as Rapporteurs. Following points emerged from the discussions

Dr. Dilip Kumar outlined the background of the workshop and crisply pointed out the specific objectives, expected outputs and the discussion format of the two day workshop and thus set the mood of the ensuing discussion.

Mr. N. Farooq, Joint Director (Fisheries), Jammu & Kashmir presented the status of J&K. He said that the Department of Fisheries got an independent identity only in 1978 as till then fisheries was part of Department of Forestry, Tourism and Hospitality. It was done in order to develop adequate infrastructure for cold water fisheries of carps, breeding of trouts, *Mahseer* angling, etc.

Following is the summary of his presentation. Sustainable development of a particular sector is dependent directly on the available resources and their judicious exploitation on modem scientific lines and developing necessary infrastructure for the same. Due to unprecedented increase in population, urbanization and industrialization, the natural resources have been under great stress. In order to cope up with the increasing demand of animal protein to the increasing population, the Fisheries Sector needs special attention.

The State of J&K is bestowed with natural water resources existing in the shape of torrential cold water streams, lakes, reservoirs, springs, sars, covering a total water spread area of about 0.40 lakh ha. Besides these, there are about 250 high altitude lakes located at an elevation of about 12000 feet above MSL. The natural water resources of the State have been under great stress due to pollution, encroachment, siltation, as a result of which the aquatic life in these water resources have been under threat of extinction. The multipurpose and excessive use of these natural water resources for activities like agriculture, power generation, drinking, etc; have also affected these waters. Deforestation in the catchment areas leads to the erosion of soil which is washed away into the waters during rain. The agriculture run off

contaminated with pesticides and herbicides have also affected the fish fauna of the water bodies. Some of the important natural water resources like Dal Lake, Anchar Lake, Manasbal Lake, River Jehlum, Tawi, etc, have shrunken in size. It is a high time to take necessary steps for restoration of these waters for sustainable development of fisheries in the State.

The Department of Fisheries has already taken majors for development of fisheries in the State by diversifying its activities and has undertaken various developmental programs like Cold Water Fisheries, Warm Water Fisheries, Reservoir Fisheries, Sport Fisheries, Recreational Fisheries, *Mahaseer* Fisheries, etc;

Under the Cold Water Fisheries the department has already achieved breakthrough in trout culture with the establishment of Kokernag Trout Project and 28 trout rearing units in the State. Similarly, under Warm Water Fisheries, the Department has established 18 fish farms including two national fish seed farms at Kathua and Manasbal. The Department has successfully introduced composite fish culture of commercially important fish species like Indian Major Carps (IMC) and Exotic Carps.

The Department has successfully introduced fish farming in the private sector and already 410 fish farming units have been established under Hon'able Prime Ministers Package at an estimated cost of Rs. 492 lakhs. The scheme is aimed at to provide employment avenues to the educated unemployed youth. The trout streams of the State are world famous for angling. The Department has developed the Sport Fisheries in the State by establishing new trout streams in the Districts of Kupwara, Baramulla, Anantnag, Budgam, and Pulwama. The Mahaseer Fisheries which was once regarded as one of the most famous sport fisheries in the State was badly affected due to construction of barrages across the river Jehlim. The department took up the rehabilitation of Mahaseer Fisheries by establishing Mahaseer Fish Farms at Uri, and Reasi respectively. The department has also taken up reservoir fisheries and opened for fishing for the professional fishermen of the State. During the past few decades, Aquarium Fisheries in the country has developed as an industry and a source of recreation. The Department of Fisheries has established aquaria at Bagh-E-Bahu Jammu and Gagribal Sriangar.

Suggestions for Policy Interventions

There is a vast scope of Development of Fisheries in the country which is constrained by the absence of a comprehensive Fisheries Policy at the National Level so that there is judicious

exploitation of natural water resources for fish culture without any adverse effect. The following suggestions are made to be incorporated while framing the National Fisheries Policy.

- Judicious use of natural water resources for other allied activities like irrigation, power generation etc;
- A provision for Development of Fisheries in the hitherto unexploited areas on the basis of feasibility and without affecting the natural environment of the water resource.
- Strict conservation policy by updating the existing laws on Fisheries presently in vogue at the National and the State Levels to regulate capture and culture fisheries by incorporating provisions like mesh size, closed season, declaration of certain areas in the natural water resources as closed areas (sanctuaries) for protection of chief spawning grounds, introduction of exotic fish species without prejudice to the indigenous fish fauna.
- Ban on extraction of sand, boulders and other minor minerals from the natural waters especially the trout waters.
- Declaring of closed season in other waters for extraction of sand and bajri/boulders especially during spawning period.
- Control of pollution and encroachment of natural water bodies, strengthening of existing laws.
- Proper demarcation of water resources to avoid future encroachment.
- Propagation of fish culture in the Private Sector by organizing awareness programs among the fish farmers/educated unemployed youth to motivate them to take up fish culture in the private sector as a viable fish farming units.
- Provision of subsidy on construction of ponds and inputs like feed/seed and manure for units to be established in private sector.
- Facilities for proper marketing of fish produced by the private fish farmers.
- Identification and Development of important fish landing centres and providing of hygienic marketing facilities to the fishermen.
- Strengthening of welfare schemes for fishermen regarding housing and insurance cover.

- Providing of scholarship and loan facilities to the fishermen.

- The natural waters of the State and the man made water bodies should be declared as the property of the State Fisheries Departments. The rights of other sister departments should be made subservient to that of the Fisheries Department.

- As the existing laws and regulations are very weak and needs to be strengthened. Fisheries Acts require modifications and compliance of such Acts should be achieved by involving a participation of the stake holders

- Hydroelectric projects do not consider its impact on fisheries at the construction stage which needs to be addressed. No fish ladder is constructed in hydro electric projects. Departments of Irrigation and Power should take NOC from the Dept. of Fisheries before the implementation the projects.

- Geology and mine dept. do mining without considering its negative impact on fisheries.

- Angling in J&K is among the most popular in world. This is deteriorating due to social unrest and poor infrastructure.

- Privatisation of govt. farms shall be encouraged. Trout farming shall be encouraged through public private partnership as the initial investment is high

- Vacancies in DoF shall be filled immediately

- Need to strengthen the welfare measures especially the insurance schemes. Fishermen from 18-70 years should be covered under the FISHCOFED Scheme

During the discussion on J&K, Mr. Balki remarked that fish marketing by women involves insecurity and threat to their safety from very security forces / police forces making them quite vulnerable in the strife torn State. Also, no cold storage / refrigeration are available. Dr. Seghel said that DoF shall estimate water requirement in dams for fisheries in different seasons so that proper planning can be done in advance. Dr. Dehadrai expressed that if the hydro electric projects consider the revenue earned from fisheries while calculating IRR, there will be greater recognition of fisheries as a viable and profitable economic activity and due water rights for fisheries development would be made available should be considered. He called for strengthening the linkages among different agencies, leasing of Govt.

hatcheries to private people, and steps to include the concerns of people in the downstream in the development process.

Shri **B.D. Sharma, Director cum Warden of Fisheries, Govt. of Himachal Pradesh** presented the review of present status of fisheries development and the constraints being faced in the State. Himachal Pradesh is blessed with variegated Fisheries resources ranging from glacier fed rivers & streams (3000 km), reservoirs (42200 ha), naturalhigh altitude lakes (725 ha), village ponds (1000 ha), check dams & kuhals. The resources on one hand are means of rich source of protein food in the form of fish, on the other are acting as source of livelihood to thousands of people.

The main constraints being faced by the Fisheries sector are as follows:

- Fisheries sector has been classified under Agriculture and named Agriculture and Allied activities but it is devoid of various incentives available to agriculture such as Electric tariff at par with agriculture as any electric supply to Fish farm/ tube well meant for water to fish farm, electric charges are levied on commercial rates,
- No provision of water to fish ponds from irrigation schemes;
- Hill States have tremendous scope for trout farming but schemes initiated by Government of India lack proper incentive oriented schemes on trout farming. There is no provision of assistance on first year inputs. Production of one ton trout requires 1.5 tons of feed & 5000 seed. This alone costs Rs. 1.25 lakhs. This high initial input has not allowed poor masses to adopt trout farming;
- There is no quality control or mark of quality on fish feed ingredients especially fishmeal produced in the country. Fear of unsterilized or pathogens loaded fish meal is always looming large over the head of trout farmers.
- Speedy Siltation of riverine and reservoir beds is not allowing proper planning and management of their fishery. Construction of roads and dumping of all dugout soil and stones on river banks has increased the siltation of these water bodies and fish catches are on regular decline due to the disturbances in the feeding and breeding grounds of fish. The situation has further worsened due to the construction of various hydel projects. The river waters are getting shrunken and breeding migration of fish affected. Constructions of large dams which result in to reservoirs no

doubt block the fish migrations but here we get a water body capable of fish production. In case of mini & micro hydel projects or say run of the river projects there is likely to be irreparable loss of aquatic biodiversity. Excavation of a trench weir across the river and drawing of drop to drop water to the power project faraway and then to turbines is likely not to leave any fish upstream weir. The portions of such rivers from trench weir to tail race become almost dry and thus no fish can migrate upstream or downstream. Union Government is according environmental clearances to hydro power projects without the enforcement of provisions of fish passes or ladders. Perhaps, the project clearance authority lacks the representation of Fishery biologist and Aqua Engineer. Himachal Pradesh Government has taken a lead for the safety of its aquatic life by making 15% release of water downstream weirs as mandatory in its power policy. A regulatory body to monitor this aspect has to be set up which may act as a saviour of our rich aquatic biodiversity.

- Silver carp and catfishes population are declining
- NFDB should encourage trout farming
- Unscheduled dumping of different wastes in rivers is destroying the riverine ecology
- No appropriate designs are available for fish ladders. They shall be designed by FRIs

Existing Acts and Regulations

All public waters in Himachal Pradesh such as rivers, streams and reservoirs are governed by H.P. Fisheries Act 1976 and Rules 1979. There are special provisions in the Act for the conservation of fish, its exploitation and marketing in and outside the State. Fishing in closed season of two months has been declared as cognizable and non-bailable offence. Overall, the existing Fisheries Act is favourable.

Man power in the Department of Fisheries

The Department of Fisheries in H.P. is headed by Director-cum-Warden of Fisheries and he is supported by two Deputy Directors, 10 Assistant Directors and other executive & ministerial staff. The Directorate of Fisheries is located at Bilaspur 90 Kms away from the State Capital at Shimla. The total sanctioned strength in the department is 385 out of which 313 are in position and remaining 72 lying vacant in different cadres.

Status of Fisheries Extension Services

There is no dedicated extension staff

sanctioned in the Department of Fisheries H.P. The staff posted in various districts for the conservation of riverine / reservoir fisheries is undertaking the extension work in addition to other duties. Under centrally sponsored extension & training scheme the funds are available for the assistance on various fishery activities only. States are finding it hard to overcome their financial crunch and under such circumstances are not able to provide staff for extension activities. The training centres have been set up under various central schemes but in the absence of staff their use is restricted to some months or even days in a year as the meager staff available with the department is unable to spare time from its prime duties of fish conservation, management of seed farms and reservoir fish exploitation monitoring.

Hence, it was suggested that fisheries extension machinery has to be created separately as the dual role of regulation and development does not work effectively.

Major **Programs during 11th Plan**

- Expansion of fish hatcheries and rearing space at carp, trout seed farms and increase seed production in the State.
- Massive seed stocking of State reservoirs to arrest decline in fish catches.
- Development of Fisheries in newly constructed reservoirs such as Koldam, Largi and Malana.
- Completion of the construction works of Mahseer seed farm.
- Construction of Brown trout seed farm in Kullu and intensify trout seed stocking programs in trout waters for the promotion of Angling Tourism.
- Initiation of ornamental fish culture and dissemination of technology to village youths.
- Construction and renovation of fish ponds in the villages so as to provide self employment to village youths

During the discussion Dr. V.V. Sugunan argued for adopting the bottom up approach to development. Dr. M. P. Singh Kohli said that regular stocking of fish seed in reservoir is must for making fisheries as viable activity.

Dr. Chauhan, Director, Fisheries, Govt. of Uttarakhand presented the status paper on the State's fisheries development and the future plans and strategies.

Uttaranchal has massive water resources with total River length of 2686 Km (4 major river systems Yamuna, Ganges, Kali

and the Ram Ganga-Kosi complex, natural lakes of 297 ha, reservoirs 24275 ha, artificial ponds of 628 ha, water logged area of 1000 ha.

Present production is only 3003 tons while the demand of fish @ 5 kg/person per year would be 7083 tons. Similarly fish seed production in the state is only 37 million whereas the fish seed demand is 76 million. There are 13 Fish Farms in the State. The commercially important Species are 7 species of major carps, 3 species of minor carps, 2 species of cat fish, 3 species of Mahseer, and 2 species of trout. About 26 threatened fish species are home to the State.

Some of the noteworthy activities were

- The Dept. has recently in 2002 brought out the policy document covering all aspects of fisheries development in the State and identified thrust areas. The salient features were presented.
- A Detailed Project Report (DPR) on overall fisheries development in the state has been obtained from NABARD consultancy services (NABCONS);
- For the development of trout fisheries survey work has been completed with the collaboration of France government and Concept paper has been prepared; Under centrally sponsored scheme on Welfare of Fishermen sixty houses have been constructed for the fish farmers; For the development of cold water fisheries trout race ways and running water fish culture ponds have been constructed and training is also imparted to beneficiaries; An amount of about Rs. 250.00 lakh is being earned per year by auction of reservoirs for fish catching; Fish production in the State is estimated to be 2575 tons per annum from different sources of water bodies.

Following ongoing Schemes are being implemented by the DoF.

- Fish Farmer Development Agency (75% central)
- Development of Cold water Fisheries and Aquaculture (75% central)
- Establishment of new hatcheries and moderation of existing farms/ hatcheries
- Creation of infrastructure facilities for fish marketing units
- Strengthening of Fisheries Department
- Tribal Sub plan & Special component sub plan

- National scheme of welfare fishermen (50% central)
- Fisheries Training and extension (80 % central)
- Strengthening of Data base and information network (100 % central)

Some of the New Schemes are

- Riverine Fisheries conservation and awareness program (75 % central)
- Conservation and propagation of fisheries in natural water bodies
- Establishment of laboratories at state level for water quality and fish health Investigations (75 % central)
- Mobile fish health clinic
- Management of fisheries recourses at fish farm
- Trout development project
- Development of Fishery in Tehri reservoir
- Publicity and Extension
- Feed development scheme
- National Fisheries Development Board (NFDB) sponsored Intensive aquaculture in ponds and tanks, Training and demonstration (100 % central) and Development of Post Harvest Infrastructure (50% central)

Of the total sanctioned strength of 93 staff in Dept. of Fisheries, only 48 are filled and the remaining positions are lying vacant.

One of the major constraints felt was thats the ownership as well as fishing rights in reservoirs is with Dept. of Forestry, Dept. of Fisheries is unable to take appropriate measures for its scientific management.

Dr. B. S. Chavda, Joint Director, Fisheries, Rajasthan presented the status paper on Rajasthan fisheries. According to him, the achievements in 2006-07 include Fish Seed Production & Stocking of 342 million fry, Fish Production of 22,000 tons, training of 1482 no. of Fish Farmers, Revenue earning of Rs.773 lakhs. The water area under semi & intensive aquaculture is 6,000 ha. Successful coverage of 4277 no. of Group Accident Insurances, 1300 no. under Saving cum relief, Development of 440 no. of Model Fisherman villages, 4 Community Halls and 16 Hand Pumps were some of the achievements during the last financial year.

Rajasthan has laid out one of progressive lease policy for water bodies. As per the present leasing policy of the State, the water bodies are classified into four categories namely A, B, C & D based on water spread area and the estimated leasing amount, and the fishing rights and associated responsibilities are accordingly distributed. While 'A' category of water bodies (44 No.) with Rs. >5 lakh lease rent will be leased out by DoF, 'B' category (147 No.) with Rs. <5 lakh & Rs. >0.5 lakh will be leased by Zilla Parishads, 'C' category (416 No.) with Rs. <0.5 lakh & Rs. >0.1 lakh will be leased by Panchayat Samities and 'D' category (1003 No.) with Rs. <0.1 lakh will be leased by Gram Panchayats.

Some of the constraints being faced by the State are as follows:

- Uncertain and irregular monsoon.
- Draining/pumping out of maximum stored water for irrigation and drinking purposes.
- Shortage of quality fish seed.
- Lack of traditional fisherman community.
- Lack of awareness among rural masses.
- Lack of technical know-how in rural sector for fish culture.
- Rajasthan as a predominantly vegetarian State places low esteem on the fishing activity and the profession, though the perception is slowly changing.
- Water bodies are encroached and hence protection and conservation are very essential.

Dr. Atul Kumar Jain, during the discussion, argued that the KVKs shall have fisheries staff in position to create awareness, school children shall be made aware about opportunities in fisheries so that in the long term it would bear fruits. The need for Fisheries Training Centre was also emphasised. Dr. Dehadrai said that the existing water bodies in Bharatpur and Udaipur should be explored for fisheries and aquaculture development. Similarly, Indira Gandhi canal has seepage all along its command area which can be easily tapped for creating ponds for aquaculture.

Mr. J. V. Sharma, Director, Fisheries, Punjab made a detailed presentation on the status of fisheries development in Punjab and the programs planned in XI Plan. Following is the summary.

State of Punjab, traditionally an agriculture State has already earned a place in the fisheries map of the Country by achieving highest average per hectare

fish production of 6094 kg. Total area under fish culture in this state is 10023 ha. Total fish production of the State is 86697 tons.

Being one of the earliest States to have fisheries legislation in place, Punjab Fisheries Act, 1914, Punjab Fisheries Rules, 1985 and Punjab Fisheries Amendment Rules of 1985-2006 provide the basis for regulation and development of fisheries in the State.

In order to encourage and promote fish culture in this state, Punjab Govt. has formulated many incentives programs. Besides providing best extension services to fish farmers it provides financial assistance in the farm subsidy. It also helps the fish farmers in arranging liberal soft loans on easy terms to start fishery unit. During the XI Plan following major programs are being planned to be taken up.

Besides using otherwise idle village ponds for fish farming, the agriculturists of Punjab have set up fish farming units in their agriculture land because of handsome return, easy culture practices, fewer risks and practically no marketing problem. As comparatively poor soils unfit for agriculture can also be used for fish farming. People of Punjab have now started converting waste lands (having the problem of water logging of Kallar) into fish farming units. Farmers of all income groups have been involved in the program of fish farming and hundreds of families from weaker sections are engaged in the marketing of fish for their livelihood.

Scientific work has established beyond doubt superiority of fish as food over other non-vegetarian items of food and now fish meat is at number 1 on the basis of nutritive importance, culinary values and curative quality. Against all India per capita fish consumption of about 5 kg against the requirement of 11 kg per annum, the per capita consumption of fish in Punjab is only 300 g. It is proposed to enhance the fish consumption producing more of freshly available local fish to provide the protein rich food to the common masses.

State has already set up 14 Fish Seed Farms to meet the fish seed requirement of culture fishes. Which are annually producing fish seed to the tune of 4.50 crore. The demand now has vastly increased. Four more Fish Seed Farms would be established and the existing ones would be renovated and modernized so as to push up its production to 18.00 crore by the turn of 11th five year plan period with a view to meet the increased demand.

Extension and training facilities are also required to be created and strengthened

so that there is a well-knit program for transfer of technology to the grass-root level. Strengthening of training program would go a long way in pushing up fish production and raising the economic standards of our people. It is also proposed to set up awareness centres with the purpose in view.

Dams, reservoirs and rivers in Punjab will be enriched with fish seed so that the fish fauna in these waters increase in the interest of maintaining the ecological balance. Fishing is also proposed to be developed for sports etc.

Southern Western districts of Punjab (Bhatinda, Mansa, Mukatsar, Ferozepur, Faridkot and Moga) have developed varying degrees of Salinity in the land, which has turned unfit for agriculture. It is proposed to utilize it for fish culture of suitable variety. A study has been entrusted in this behalf to Punjab Agricultural University and CIFA. The results of their findings are received, the same would be popularized, which would be result in helping the farming community to a great extent in these areas. Since the recommended saline water aquacultures will be new to the field officers and in the initial stage, it requires trial as well as demonstration for motivating the farmers to adopt this new saline aquaculture, so that socio-economic status of the farmers of south western Punjab could be raised

Scheme for value addition of fish for better returns: Punjabis are fond of cat fishes which are more tasty and fleshy than the other varieties of fishes, which are presently being cultured in the State. Carnivorous fishes having least pronounced bony structure (Mali, Sole and Singara etc) and marine fishes find a suitable market in Punjab because of the liking of these fishes by Punjabis, being tastier and less bony. Therefore, it becomes essential that our culturable carps are treated in such a way that they are locally consumed. The bones can be removed with the help of deboning machines so that they locally marketed. Value can be further added by preparing products such as Sausages. Breaded fish sticks, fish patties, fish pickle and cutlets etc can be prepared. Because of changing life style, ready to use foods are increasingly in demand in the market. Therefore, by doing so, on one hand the demand of the consumers would be met and on the other hand, fish farmers would have better returns from their produce.

It is proposed to have one to two societies of Fish farmers, registered under societies act in every district of the state and training to the members of such societies in preparing various products would be imparted. Before doing so, the personnel of the department of an appropriate level, would be sent for training in preparing these products at

CIFT who would in turn train the members of these societies. Thus in this way both the societies and the department would be imparting training to the fish farmers in making these products. It is also intended to make available items of common facilities such as deboning machines to transportation & refrigeration etc. where the fish farmers can come and avail of such facilities for better marketability

He said that one of the problems / constraints being faced in the implementation of various plans in fisheries sector is that though GOI provide funds under the central sector schemes these funds are released only at the fag end of the financial year. It creates many difficulties for the department to get the administrative approval to spend the money in time and approval. It was also suggested that electricity shall be made available at par with agriculture.

During the discussion, it was pointed out that Magur fish shall be banned from Punjab and need to educate farmers about damages caused by the cat fish which is already pronounced in Amritsar district. Also, Govt. shall not be revenue oriented in its approach but encourage fish farming for overall development. Marketing needs to be promoted, it was said.

Dr. S.C. Agarwal, Director, Fisheries, Haryana in his elaborate presentation gave an overview of the present status of development in Haryana, the constraints being faced and the outline of future programs.

Haryana State is a land locked State bounded by two hills and two rivers Yamuna and Ghaggar. There are 89 drains covering 2000 km area, 3 main canal systems like WJC, Bhakhra canal system and Lift canal system covering 22000 km area. There are 19 reservoirs, bundhs and lakes having 900 hectare water area and 190 micro water sheds. The fishing in these water bodies is regulated under Punjab Fisheries Act 1914 and Haryana Fisheries Rules 1996 made there under. The total water area is 85900 hectares which is 2% of the total land area of the State. At the time of creation of the State in 1966 only 58 village ponds were under fish culture. The fishing from natural waters was the main sources of fish production. The total fish production in the State was only 600 tons per year. The State has made landmark progress in the field of fisheries.

Development of Capture Fisheries

Haryana Govt. has declared upper reaches of river Yamuna as fish sanctuary. Angling competition is arranged every year for creating the awareness among the people for conservation of fisheries.

The fisheries are also being developed in the STP and ETP constructed along the bank of river Yamuna. Four Fish Landing Centres are being constructed at Yamunanagar, Kamal, Sonepat and Faridabad.

Development of Culture Fisheries

Haryana Govt. has established 18 Fish Farmers Development Agencies at district level to provide technical and financial assistance to the farmers. There are 10000 village ponds in the State and 80% of these ponds have been covered under fish culture. Village Panchayats are earning about Rs. 4 crores from leasing the village ponds for fish culture every year. In addition to this farmers have also constructed 2000 ponds in their own land. The total fish production from the ponds is 60080 ton per year with the productivity of 4914 kg per hectare. Haryana ranks 2ndin per hectare production. Haryana State has launched various programs for the utilization of water logged and saline affected areas in the State for fish culture. The Govt. has submitted a project of Rs. 165 lakh to National Fisheries Development Board, Hyderabad for providing assistance for the fisheries development.

Fish Seed Production

Quality fish seed is the basic requisite for the successful fish farming. There are 15 Fish Seed Farms in Govt. sector and 15 Fish Seed Hatcheries in private sector. In addition to this there are 50 Fish Seed Rearing Units in the State. The annual fish seed production and demand in the State "is 3300 lakh fish seed per year. Haryana is self-sufficient in fish seed production. New Fish Seed Farm at Ottu is under construction. It is also proposed to produce the fish seed of genetically improved varieties to get high fish yield.

Fish Production

The annual fish production which was 600 ton during the year 1966 it has now been increased to 60080 ton during the year 2006-07.

Fish Marketing

Haryana State has an advantage to be closer to Interstate Fish Market Gazipur at New Delhi. There are 3 fish markets at Faridabad, Panipat and Yamunanagar for the assistance to the farmers. The facilities for fish transportation are being provided in these markets. It is targeted to construct 2 new fish markets at Bahadurgarh (Jhajjar) and Gurgaon. The project is under consideration of Govt. of India. Haryana Govt. under Centrally Sponsored Scheme also provides the technical and financial assistance for' the' Development of Fish Marketing Infrastructure to Fisheries Cooperatives and NGOs.

Fisheries Training

Fisheries Department, Haryana provides various types of basic trainings in fish farming and fish seed production at district level. Aquaculture Research & Training Institute with the help of World Bank assistance was established at Hisar. In-service training, refresher courses for fish farmers and fishermen are being provided at this Institute. More than 2000 persons are being provided training every year in the State.

Fish Health Care Centres

Govt. has set up 20 Fish Health Care Centres one at each district, 14 Aquatic Poly Clinics at Govt. Fish Seed Farms and one State Level Diagnostic Lab at Hisar to provide help to the farmers for treatment of fish diseases and fish health care.

Diversification

Govt. has taken steps for diversification of traditional carp fish culture to high valued fish varieties. The Govt. has initiated Polyculture Project on pilot basis for enhancing the income of farmers. There are 106 Polyculture units during the current year. There are 5 demonstration Polyculture centres i.e. at Haryana Raj Bhawan, Chandigarh, National Fish Seed Farms, Jyotisar and Hisar and Govt. Fish Seed Farm, Saidpura (Kamal), Lisana (Rewarf). Desi Magur Hatchery has been set up at Govt. Fish Seed Farm, Badkhal (Faridabad) for providing the desi magur seed to the farmers. The rate of desi magur fish is more than three times than the carp fish which is being cultured at present. The hatchery shall produce 3 lakh fish seed per year. Ornamental Fish Hatchery has been established at Saidpura (Kamal) to carter the need of ornamental fish in the State. Culture of Singhara and Sol fish has also started at National Fish Seed Farm, Jyotisar as per need of the local people.

Employment Generation

There are 25500 families engaged in fish farming and fisheries trade in Haryana. It is targeted to provide technical and financial assistance to 36000 families by the end of 2006-07. It is proposed to motivate 24000 more families in rural sector for adoption of fish farming and fisheries trade for their livelihood. Thus by the end of 11th Five Year Plan Fisheries Department shall provide assistance to 60000 families for fish farming and fisheries trade.

Incentive provided by Haryana Govt. during the last two year i.e. 2005-06 and 2006-07.

Haryana State Govt. provided special incentive to the fish farmers of the State for the development of fisheries. The incentives are given below:

- Reduction in electricity tariff for fisheries from Rs. 4.29 per unit to Rs. 2/- per unit.

- VAT on fish feed and fish meal waived off.
- Establishing the Fish health Care Centre at district level, Aquatic Poly Clinic at each Govt. Fish Seed Farm and Fish Diagnostic Lab at ARTI, Hisar.
- Special financial assistance for integration of fish culture with Agriculture, Dairy, Poultry, Horticulture etc.
- Special assistance for soil and water analysis.
- Study tour of the farmers within country and abroad.
- Provided 100% subsidy for Poly culture on seed and inputs.
- Incentive and prizes are given to highest producers of fish at district level and State level.
- Steps have been taken for establishing 2 Fish Markets at Gurgaon and Bahadurgarh with a total cost of Rs. 84.60 lakh.

Highlights of Department activities during last 2 years

- 7795 Acre water logged and salt effected land was brought under fish culture.
- The increase of 705 per ha / year fish productivity.
- 4914 kg / ha / year average fish production.
- Haryana ranks 2ndin the country in per hectare production.
- Rs. 11000 per hectare in the income of the farmers by the sale of fish.
- Increase in the income of Panchayat from Rs.485lakh to Rs. 565 lakh) by leasing the village pond for fish culture.
- Increase of State income from Rs. 117 crore to Rs. 165 crore from sale of fish.
- Release of Website and documentary film of the department and computerization of all district level offices.
- Strengthening of Fish Seed Farm and establishing the New Fish Hatchery in private sector.

SWOT Analysis

Strengths

- Haryana State surrounds national capital Delhi from three sides. Good outlets for the sale of Haryana fish in Delhi market.

- More than 70% of the fish produced in Haryana is sold in Delhi market and out of this 80% are live fish, which is more remunerative as compared to other fish.
- Per village cattle population in Haryana is highest in the country. Cattle visit village ponds for bathing and drinking water and add fertilization in the shape of cow dung to the pond resulting in production of natural food for the fish.
- The productivity of village pond is high in Haryana and live fish is marketed in local market and other markets.
- The farmers of Haryana State are very innovative and have adopted fish farming along with other agriculture activities.
- Every village in Haryana is connected by road, hence there is no problem in transportation of fish seed and table fish.
- There are 114 fisheries offices in the field and easy for the farmer to contact them for guidance

Opportunities

- Present Haryana Government is well wisher of fish farmers and reduced the electricity tariff from Rs. 4.28/unit to Rs, 2.00/unit and waived off VAT on fish feed.
- Present Government has provided computer, internet and networking facility in all offices of the fisheries department for rapid communication.
- Good infrastructure for training at Aquaculture Research and Training Institute, Hisar, where the facilities of International standard are available.
- Soil and water testing facilities has been provided at each Block level.
- Website of the Department has been launched for the benefit of fish farmers and the general public.
- More than 40 scientists of Haryana Agriculture University, Traditional Universities, CIFRI, CIFE and CIFA Scientists are working in Haryana for fisheries research. Field functionaries of the Department and fish farmers have close contact with scientists for technical advice.

Weaknesses

- Most of the population of the State is vegetarian and 80% of the fish produce is sent to other State for sale.
- Climatic condition of the State is extreme hot & cold effecting the growth of fish.

- Ownership of water bodies is vested with different agencies.

- Fisheries has not been treated at par with agriculture

Threats

- There is a depletion of fish in natural water bodies due to abstraction of water, pollution and siltation.

- More than 60% of the land area is under-lain by saline water and water table is raising day by day creating problem of water logging and affecting the quality of water.

- Exotic fishes like African Magur, Tilapia, Silver Carp and Common Carp have entered in natural water bodies of Haryana.

Issues and Policies for Development of Fisheries in Haryana

1. **Fisheries not par with Agriculture**
   The facilities provided to fish farmers are not at par with agriculture. The rates for electricity tariff, water charges, stamp and income tax etc. are higher for fisheries. The fish farmers in Haryana State are basically agricultural farmers. The facilities provided to agriculture farmers should be extended to fish farmers also.

2. **Ownership of Water bodies**
   The ownership of water bodies in Haryana is vested with the different organizations. It creates the problems in effective implementations of the programme and Law & Act. The ownership and fishing rights of all the water bodies should be transferred to the fisheries department.

3. **Leasing Policy**
   There is no notified and fixed leasing policy of village ponds for fish farming. There is a provision of leasing of village ponds for 10 years under Panchayat Act, but minimum period has not been fixed. Village Panchayats normally lease out the ponds for fish farming for 1 to 3 years. The minimum period of lease should be 7 years.

4. **Certification of Fish Seed and Broodstock**
   There is no agency for certification of fish seed and adult fish. FFDA should be given the power for the certification of fish seed and fish.

5. **Fish Diseases Free Zone**
   Steps should be taken for establishing the diagnostic lab to check the fish dieses to avoid any mortality at juvenile and adult stage.

6. **Strengthening of Fish Marketing**
   The standard for fish market construction and marketing procedure should be made. National quality standard for fish, fish seed and fish products should also be made

7. **Ban on Exotic Fish**
   African Cat Fish, Tilapia, Silver Carp and Common Carp have entered in natural water bodies in Haryana. They are creating heavy loss to natural fish fauna. Steps are to be taken for eradication of these fish species.

8. **Conservation of Fisheries**
   Almost all the neighboring States of Haryana have constituted the fisheries act and rules. Haryana is following Indian Fisheries Act 1897 and Punjab Fisheries Act 1914. Haryana Fisheries Rule 1996 has been framed under the above Acts. The similar Fisheries Act & Rules be framed for all the neighboring States of Northern Region.

9. **Fish Biodiversity**
   Offences related to destruction of habitat and environmental aquatic life should be made cognizable and non-bailable. Aquatic Biodiversity be constituted in all the State as per need. The representative of fisheries department should be included in the State and Center Biodiversity Board.

10. **Change the Nomenclature of Fisheries Department**
    The name of the Fisheries Department should be changed to Fisheries & Aquaculture Department. It should have been the responsibilities of Fisheries Department to handle all wild and culturable aquatic plants and animal.

11. **Introduction of Inland Fisheries in concurrent list.**
    Like marine fisheries inland fisheries should also be included in the concurrent list of constitution as central subject. This would help in resolving the conflict of water bodies crossing the inter-State.

12. **Introduction of All India Fisheries Services**
    Like Forest Department All India Fisheries & Aquaculture Services be introduced in all the States. This would help in implementation of various national level programs in very effective manners.

4. Session II: Open Forum - Stakeholder Perspectives

Mr. B.K. Mishra, MD, FISHCOPFED made a presentation arguing his case for strengthening the fisheries marketing through the fisheries cooperatives. He also gave an overview of the activities being carried out by FISHCOPFED.

Mr. Sultan Singh progressive and award winning farmer from Punjab said that at present there is no mechanism for marketing of fish seed at present though this is a profitable venture. He also wanted transportation of live fish to be encouraged, processing plants to be introduced for making boneless fish, introduction of ready to eat products, revising the curricula of College of Fisheries, steps to bring down or support the high cost of trout production, etc.

Mr. Samir Mathur wanted the institutional mechanism for Public-Private Partnership to be in place to promote such ventures in fisheries sector. **Dr. M.Y. Kamal** recommended implementing social fisheries in shallow water bodies.

5. Session III: Lead Presentations on Policy Issues in Fisheries and Aquaculture

The second day (Saturday, 7th July 2007) started with lead presentations of experts on policy issues in different sub-sectors of fisheries and aquaculture including the policy issues in marketing, HRD and the service delivery systems. The flagged issues were then subjected to informal but intense and focused group discussions in four separate work groups. The specific inputs for policy guidelines that emerged from each of the work group were presented in the plenary session. The two days of deliberations have yielded both general and specific inputs to support the development of appropriate fisheries and aquaculture policy by the respective States.

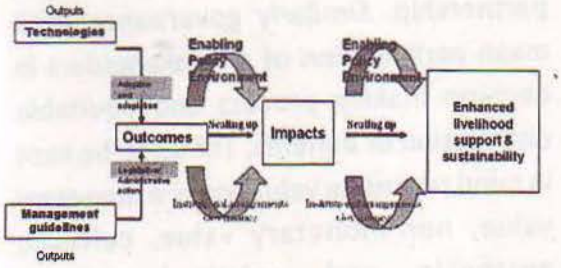
Dr. Kuldip Kumar chaired the Session while **Dr. R. P. Raman** and **Dr. S. K. Pandey** acted as Rapporteurs.

Dr. V. V. Sugunan, ADG (Inland Fisheries), ICAR presented a lead paper on **'Enabling Policy Environment for Enhanced Livelihood Support and Sustainability in Inland Fisheries and Aquaculture'.** He began saying that the water has already become a scarce commodity and Inland Water Resource Management (IWRM) will be the order of the day soon. Under IWRM issues related to Governance, Institutions and Valuation of resources cannot escape. He opined that new institutional framework need to be evolved that accommodates, Community/Co- management Institutions, Decentralized planning and implementation, Public-Private partnership. Similarly governance shall mean participation of all stakeholders in decision making *process and equitable* distribution of benefits. Things to be kept in mind regarding valuation are monetary value, non-monetary value, cultural, aesthetic and spiritual values, Environmental Flows, Incentives for sustainable practices, 'Polluter pays' principle, Certification and eco-labeling etc. He strongly suggested that there shall be a paradigm shift in policies some of which are outlined below:

- Integrated management of resources is not just sectoral sharing of resources
- It is a commitment to optimal use resources on a sustainable and equitable manner
- Empowerment of Communities / Stakeholders
- Community management Institutions in place
- Political will to make paradigm shift in policies

- Implement them through creating enabling Governance and Institutional arrangements

He also presented his view graphically as given below



Dr. K. L. Sehgal, Ex. Director, NRCCWF presented a comprehensive lead paper on **Policy Issues on Coldwater Fisheries in the States located in North-Western Himalayas.** The summary is given below. The coldwater fisheries or the upland fisheries, as it is sometimes referred to, confined primarily to the fisheries, lakes, wetlands, receiving snow-melt and combination of rheocrene spring + snow-melt waters. Based on the prevailing thermal regime of these water bodies it is possible to distinguish two groups of coldwater fishes. These are stenothermal (narrow range of temperature tolerance) and eurythermal or warm-stenothermal (Wide range of temperature tolerance).

The areas and States in attention are Jammu and Kashmir, Himachal Pradesh and Uttarakhand enveloped in the folds of N.W. Himalayas. The source of the rivers, which drain the three states, are mostly located on the southern face of the greater Himalaya (Jhelum, Chenab, Ravi, Beas, Yamuna and Ganga river system) The water stretch of two large rivers draining the region lie in the trans Himalaya (Indus and Sutlej river systems).

These riverine systems traverse through three parallels range of the Himalayan namely the Greater Himalaya, the middle Himalaya and the Shiwalik. In their downward flow two distinct zones can be recognized. The rhithron zone is characterized by low water temperature, high value of dissolved oxygen, fast velocity and colonization by stenothermic fish and other biota. Further downward to the rhithron zone has the potaman zone characterized by highest temperature lower value of dissolved oxygen, medium velocity and the inhabitants are eurythermal species. It is important to state here that there is no distinct demarcation line between the two zones. The stenothermic fish species (salmonds and schizothoracids) do migrate to the potaman zone during winter precipitation in the form of snow to avoid almost near-freezing water temperatures . On the contrary eurythermal species migrate upstream to rhithron zone to avoid warming of waters during summer months (Mahaseer and Minor carps) and in search of feeding and breeding grounds.

High floods, cloud burst phenomenon, avalanches, glaciers melt, debris permanent landslides, etc are other factors which have adversely affected fish yield. Construction of river valley projects in almost all rivers of N.W. Himalayan has adversely affected the fish life especially downstream of dam, weirs etc.

e. **Fish catch statistics**

As stated in the beginning riverine fishery in the three states is basically subsistence due to availability of small-sized fish and catch per limit effort is very low. The situation in the lakes, however, is comparatively better where commercial catches are taken. The true commercial fishing practiced in the reservoirs are published As far as rivers are concerned, we have no data per catch per unit effort and catch composition in the past two decades.

Policy Issues for the Region

Riverine Fishery: Single window control of all activities in riverine including power generation, extraction of building material from river beds etc. may vest with the fisheries department. The construction of high dam on the run of the rivers has resulted in completely drying of downstream during lean flow period. Removal of construction material from the river beds has destroyed the shelter for fish and other aquatic life which remains attached to the bottom of these stones. The gravel layer is used to lay egg and shelter for newly emerged hatchlings.

Indus riverine fishing using legal and illegal methods has to be controlled. Mesh-size regulatory rules have to be effectively enforced to protect juvenile stocks. Any effort made by each state to enhance the availability of fish stocks may not bear any fruit unless the fishing regulations are strictly enforced. Based on the administrative convenience in each state a suggestion is made to involve the Panchayats. The *sarpanch* of each Panchayat may be empowered to enforce fishing regulation strictly in natural waters in its jurisdiction. Users groups, voluntary agencies shall be involved.

Sock enhancement efforts have to be one of the top priorities so as to make the requisite and quantity and quality of fish to the commercial and sport fishers. This can be done by developing seed production facilities and solution of natural seed.

The data on catch per unit effort and catch composition is of utmost importance. We do have experimental fishing data per Km stream length for almost all the riverine system between 1965-89 further update is needed.

The census of sport fishing waters for brown trout and *mahseers* are based on the feedback provided by genuine anglers published in various journals and magazines. The result of three months of brown trout angling in Kashmir valley revealed that 66-100 % in their catches were below the legal- sized brown trout (25 cm/400g). Subsequent field checks made during 1969-72 in two important stream of Kashmir revealed that 75% of brown trout hooked by the anglers were less than 200 g. This team further recorded decline of 79% in angling pressure, 92% in the number of specimen hooked. More attention is to be given stock for enhancement of brown trout.

The condition in Himachal Pradesh especially in the Beas is equally alarming. The average size of brown trout hooked in 1965 weigh 200g which further declined to 172g during 1985-87. These data give indication of depleted sport fishery of brown trout.

The sport fishing for *mahseers* is of great importance all over the world published data provided by well known *mahseer* fishing expedition like Trout world fishing expedition reveled that during their four months of fishing in the Himalayan *T. putitora* catches ranged between 1300-1700 g. The husband (Powl Boote) and wife team spent about six months in the N.W. Himalaya in search of big sport. Their catch ranged 2-3kg of individual golden *mahseer.*

The management of sport / recreational fishing needs scientific approach to provide reasonable catch to an angler. The objective of management of sport fishing waters should be to serve the anglers' need while assuring that fish resources continue to flourish on recurring basis. The basic instinct among sportsmen going for fishing is to go for recreation rather than to eat fish. These anglers, when they visit fishing sites, may get disappointed about their catch. The State fisheries departments have to make available all the information to the anglers regarding fishing areas, time of fishing, best fishing season, lures to be tried. Such information can be generated through anglers who can be engaged for the purpose.

The feedback or creel census figure from each and every angler is of great importance in management of fishing activities. For this each state can be prepare a self-addressed postcard(pre-paid) which is issued along with fishing permit. It should be made mandatory that each angle send back the card giving all details about the stretch of the river fished, time and date of fishing , type of rod employed fished, time and date of fishing, type of rod employed lure used, individual length and weight of each fish hooked and number of undersize fish

released back. On the basis of the feedback received from the angling public and the expert anglers can regulate angling pressure to be allowed in each stretch of the river, density of stocking etc.

Another important aspect which is of great concern for the Himalayan Rivers is the impact of global warming on glacier melt. According to WWF the Indus and the Ganga are among the 10 most endangered rivers of the world. Glaciers account 30-40% of water in Ganga and this goes up to 70-80% in the Indus. Similar reports are coming about River Tsangpoo in Tibet and the Dibang in Arunachal Pradesh. Over extraction of water, emaciated tributaries and climatic changes are seriously degrading the Himalayan Rivers. The retreat of glacier in N.W Himalayan has been studied (Vohra 1978). The figures of recession of glaciers are given below.

Glacier Name	Periods	Years	Retreat meters
Pindari	1845-1966	121	2840 (23m/years)
Gangothri	1935-76	41	600 (14m/years)
Gara	1973-75	2	24 (12m/year)

It is suggested that the impact of climatic changes on river flow and the associated fish and other biological life may be though off in all the three states.

Lacustrine fishery

In the N.W. Himalayan region there are two kinds of natural lakes namely middle Himalaya and Himalayan lakes which are spread over Kashmir and Kumaon region of Uttarakhand. The fish yield in these lakes is of low order (10-30kg/ha/yr). In the absence of catch statistics of past 10 years the production trend cannot be known. Majority of these lakes have undergone eutrophication due to large scale encroachment in share area and introduction of exotic carps has been carried out at the expanse of endemic fishes. These lakes have to be rehabilated by judicious selection of species to enhance fish stocks

Reservoir fishery

The reservoirs created as a result of hydro power production and irrigation as a result of hydropower production and irrigation are well managed based on principle of stock and take.

Aquaculture practices

The aquaculture practices in the three states are primarily aimed to produce stocking material for stock enhancement in natural open waters for commercial exploitation and to sustain sport fishing waters.

It is felt that in each of the States the aim of the aquaculture has to be produce expensive trout for the elite category of

consumers and fish for the masses, the states of Jammu and Kashmir and Himachal Pradesh have already demonstrated commercial production of rainbow trout under foreign-aided projects since trout production facilities need heavy investment and expensive artificial diets the cost of production is very high. The involvement of corporate sector may be explored, if desired by the state administration.

Our experience in aquaculture of cold water fish has shown that mahseer and schizothorax are slow growing in comparison to exotic phenotypes of common carp *(C.Carpio)*. It is possible to spread extensive and intensive farming of this species in the three states primarily to provide cheap fish protein for the hill people. This species has almost domesticated and can be grown on conventional diets. The intensive farming of common carp for formulated diets to achieve quick growth rate. There are many options in the N.W Himalayas to cultivate common carp. These are uses of running water raceways or earthen ponds, unpounding nets, culturing nets and floating cages anchored in lakes, reservoirs and large irrigational tanks.

Research inputs for conservation stream ecology and fish fauna

- Turnover rate of benthic biota to prepare biomodels for each river system
- Life cycle pattern of major micro and macro benthic communities
- Grading of mountains stream based on quality and quantity of benthic invertebrates.
- Estimation of carrying capacity of typical mountain stream.
- Standardization of formulated diets for all cultivable coldwater fish.
- Improvement of existing stock of brown trout.

Dr. A. K. Jain, Aqua Entrepreneur made a lead presentation on **Policy issues for sustainable inland saline aquaculture development.** Reviewing the 25 years of R & D journey, availability of resources & its potential, seriousness of salinity problem, and progress in other parts of the world, he raised some serious questions about the R & D progress in inland saline aquaculture so far in the country and called for appropriate national level policy intervention based on rigorous SWOT analysis.

According to him, the elements of the policy shall include the following:

- Base Line Survey: Resource Identification and characterization, block-wise distribution of ISW

resources, Estimation of resource potential, Ionic characterization of saline resources, Mapping of suitable locations.

- Identification of Thrust Areas of Research : R & D gaps, Culture of *P. monodon* and *M. rosenbergii*, Optimization of ionic (K) requirements and salinity, Physiological and biochemical studies, Introduction of new species including sea weeds, Maturation and reproduction, Fish nutrition, Commercial use of hyper-saline water.

- R & D Network: Capacity building, Collaborative Programs (local colleges, KVK's, SFD), Seed Banks and Production Centers, Identification of seed supply centers, MOU with SFDs of Coastal states, setting up of hatcheries by SFD.

- Technology Development and Demonstration Centers: Saline Aqua farms in inland states, Training Programs for Development Officers, Study tours of fish farmers, News Reports in local Media (News Paper/ Radio), Documentary films on ISA.

- Risk Assessment and Management in terms of Social, Economical, Environmental and Technical (SEET) has to be in place.

- Environment Management Plans: Abstraction of saline groundwater, Seepage of saline water from ponds, Discharge of saline effluents, Introduction of new aquatic species, Techno-Entrepreneurship.

- Development Orientation: Land Banks, Saline Aquaculture SEZ, Allotment/Lease of Land, Developmental Support.

- Need of a common consensus - National Debate, Multidisciplinary Approach, Participation of concerned agencies.

Dr. S.C. Pathak presented a lead paper on Policy Issues in Processing and Marketing sub-sector which is given as below: Processing and marketing both are very broad topics and each can be dealt exclusively. Even then both are complimentary issues in the present economic scenario. As we all know, the national economy has been showing significant changes after the introduction of reforms in July 1991. This has resulted in economic growth. Unprecedented growth rate of over 8.5% achieved by India has been internationally commended. So much that India is ranked second among fast economically developing nations after China.

Despite economic success, issues like majority remaining under BPL,

unemployment, insufficient food and poor nutritional level in supplies have remained areas of challenge. On the other hand changes in economic atmosphere have also brought several socio-logical changes viz., break-up of joint family system, concept of nuclear family gaining currency, higher aspirations among youths etc. Consequently urban womenfolk are joining hands with their male partners to increase family earnings.

Changed living styles resulted in demands for 'Ready to eat', 'Heat and eat' food products like dairy products, bakery products, fruits and vegetative products, meat and fishery products in packed and value added forms etc. Besides, the present day consumers have also become very selective and health conscious. Increased demand for quality products created scope for quality processing and marketing for all eatables.

Inconsistent supply of raw material, unable to fulfill commitments, application of age old management tools, lack of standard processing, poor hygienic conditions in processing areas as also of workers, inferior quality of packing, delays in transportation, and attitude of exporters for short term gains rather than long term gains are some of the issues to be addressed. Coupled with this is a misconception that quality products cost more.

Processing and marketing is also difficult due to poor quality of fish catch from marine and fresh water bodies. Harvest quality is also affected by poor handling and improper infrastructure at landing sites as well as in market areas. Insufficient potable water, delays in transportation and unattractive displays of products are some of the other factors responsible for poor quality of materials and marketing.

Fishery products can be marketed under nine categories namely dried/Salted, Boiled/Steamed, Smoked products, frozen products - Block/IQF, Fermented, Canned, Fish meal, Live or in fresh conditions and Others. With the improvement in quality we can increase our sale in export as well as domestic markets. But to achieve this quality of market arrivals have to be of international standards. Somehow there is a concept that has developed that quality can be improved merely by frequent inspections. It is not the only ones needing improvement but other areas also need our immediate attention, for e.g. Process planning, purchase of raw material, engineering of plants and outlets, packing, dispatch, transportation, understanding perception of consumers, application of hazard analysis and control of critical points (HACCP) on European union and USA lines.

Unfortunately in India, promoters of processing units and exporters are not

aware with the concept of ISO, TQM and HACCP. It should be made known that while ISO is voluntary, HACCP is mandatory. Govt. of India has already introduced ISO:9000 for quality management. Similarly BIS has given ISO: 15000.

In general government has taken steps to liberalized policies of trade and degeneration of economy but still firm policies on specific areas of quality, marketing and export of aquatic products have to be addressed in policy document. A few of the areas need coverage in our national policy and are enumerated below: Credit policy should be further liberalized to encourage joint production and processing, Single window clearance for expeditious clearance of processing and marketing infrastructure projects, Subsides in kinds be given for promoting this industry. Areas like acquisition of project sites, electricity, water supply, transportation losses and wastes should be covered under promotional grants, Clearest guidelines on environmental issues and also use of ground water, Stringent quality control measures with clear Do's and Don'ts regulation, Concession for mordernising machines and marketing infrastructure, Compulsory upgradation of skills of workforce by exclusive areas specific training, Clause should also include social-welfare and health welfare measures, Both ISO and HACCP standards be merged for wider acceptability, Sub standard supply of product against agreed quality agreement should be made cognizable offence.

Framing national policy is easy but to implement various clauses is more important to built confidence of investors, consumers and importers. It is therefore imperative that all the policy issues are addressed keeping in mind promotion of the industry and wider acceptability. Existing policies of processing and marketing should also be modified and reiterated emphatically.

Dr. M. Y. Kamal, Former VC, SKUAST, Kashmir and **Dr. Kuldip Kumar,** Fisheries Advisor, Govt. of H.P made brief presentation on HRD and experiences from the process of policy making respectively that helped open up various issues for discussion in the subsequent work groups.

6. Session IV: Work Group Discussions

6.1. Work Group 1: Policy Issues in Inland Fisheries including Cold Water Fisheries

The work group discussion was chaired by **Dr. P. C. Mahanta. Dr. J.R. Dhanze and Dr. V.K. Sharma** acted as facilitators. Following issues and recommendations emerged after the focused group discussion.

- The absence of a comprehensive policy / legislation to sustainably harness and manage the inland fisheries and aquaculture resources (riverine fisheries, reservoir / enhance fisheries, other open water bodies like lakes, flood plains) is the most serious and critical impediment to the sector's growth. The proposed policy framework shall account for the specific characteristics and parameters of inland fisheries resources. Ecosystem-based fisheries management and improved fisher livelihoods are to be central elements. It should also review the Indian Fisheries Act (1897), their amendments and the rules made under the Act in the light of emerging issues such as global trade, biodiversity conservation, habitat restoration, pollution threat, and productivity enhancement through innovative approaches. The policy shall contain provisions for mandatory NOC from the fisheries department as a prerequisite for execution of all river valley projects. Aquatic biodiversity needs mandatory periodic assessment.

- Riverine fisheries resources: In the current scenario of steady depletion of riverine fisheries resources, there is a need for formulation of programs for the restoration of macro and micro habitats of streams and rivers, and the revival of fauna therein.

- Requisite minimum water flow of the river should be ensured to protect the aquatic environment and conserve biodiversity keeping in mind the interest of the downstream fishers. Depletion of *hilsa* fisheries in downstream Ganges due to obstruction of water flow as a result of construction of Farakka barrage upstream is a case in point. Effective mechanism may be resorted for regular monitoring by the stakeholders for effective environment conservation

- Due to competing user rights for water (irrigation, navigation, domestic and industrial use, fishing), the availability of water for fisheries

has diminished. Measures shall be undertaken for reconciling the priorities of development and conservation. In this context, open waters and wetlands shall be appropriately defined keeping in mind the debates around the contentious IUCN definition (livelihood development and conservation as mutually exclusive).

- Aquatic resources are to be conserved through introduction of uniform closed season for fishing during spawning season of depleted fish species in a particular riverine system. For the benefit of fishers during closed season, saving-cum-relief scheme similar to the marine sector is to be implemented.

- Process of declaring and managing fish sanctuaries need to be done in consultation with DoF. Their fishing rights should be vested with Dept. of Fisheries

- Lack of effective implementation of mesh size regulation (State Fisheries Acts) is leading to indiscriminate exploitation of juveniles. This needs to be addressed urgently by suitable amendment of Fisheries Acts giving enough legal teeth to implementing agencies and strong penalties for the violators, educating and empowering the fishing communities for compliance of the regulations with involvement of NGOs, and Community Based Organisations (CBOs), linking the legislations to the local customs and traditions to ensure effective compliance by the stakeholders, and linking the incentive structures / welfare schemes with the regulation

- There are inter-sectoral conflicts for resolution of which there is no coordination. The claims of riverine fisheries are to be acknowledged and effective institutional mechanisms to be evolved through policy and legislative measures like constituting inter ministerial / inter departmental coordinating mechanisms at Central and State levels, empowering the DoF for all matters related to fisheries management in inland water bodies would also be of help, clubbing of environment and forestry together in the legal framework needs to be delinked, and environment shall be treated as a separate entity in itself, river valley management is to be brought under concurrent list, and NFDB may be asked to coordinate in resolution of issues related to river management.

- Considering the importance and potential of fisheries sector in

national economy, employment, food security, forex earnings, there shall be a Ministry of Fisheries at the Centre as in the other Asian countries China, Indonesia, Thailand, Vietnam. This will lead to overall and holistic development of fisheries and aquaculture in India.

- There has to be appropriate management regimes for different kinds of water bodies. In large open water bodies, management regime should lead to developing sustainable fisheries and equitable benefit sharing, whereas in identified stretches of Hill regions / coldwater fisheries, the regime should aim at promotion of angling and eco-tourism. There shall be entirely different regime for managing urban water bodies accounting for their role in urban ecology.

- Leasing period for reservoirs and other open water bodies should be on long term basis (for a minimum period of 10 years) especially to promote investment in the sector. Common policy guidelines should be prepared to streamline the method of fixing the rent, priority of leasing, conditions of lease, etc.

- The existing fisheries cooperatives need to be revamped, revitalised by creation of effective governance system and equitable sharing of resources. Appropriate policy interventions should be initiated so that the existing co-operative societies are strengthened.

- Introduction of exotic species needs to be monitored carefully by stringent quarantine measures and its regulation. The existing regulations on introduction of exotic species, seed movement within and outside the country, monitoring and surveillance, etc need to be reviewed, revalidated and implemented strictly.

- Mechanisms for standardization and certification of fish seed and brood stock and their surveillance is to be developed.

- Suitable mechanisms and programs shall be evolved for regular stock enhancement of cultivable commercial species such as carps in inland water bodies.

- For ensuring compliance of Code of Conduct for Responsible Fisheries (CCRF), there is a need to integrate the international instruments like CCRF / CBD/ SSA / CITES / WTO agreements, etc into the fisheries policy.

- The present insurance policy shall be made more comprehensive and

inclusive by extending coverage to all fishers and their crafts and gear linking it with licensing and other incentives. Besides, both the content and delivery of the present welfare programs need to be oriented towards meeting the objectives of sustainable fisheries management. The subsidised welfare programs need to be changed into employment generating and alternative livelihood development programs.

6.2 Work Group 2: Policy Issues in Aquaculture

Dr. V.V. Sugunan chaired the group discussion, while **Dr. Usha Moza and Dr. N. K. Chadha** acted as facilitators. The outcome of the discussion is presented below:

- Aquaculture should be treated at par with agriculture for all purposes on the lines of Govt. of Bihar.
- Financial institutions and insurance agencies should extend credit facilities as existing in agriculture sector so that small fish farmers and fishers are also benefited.
- Leasing policy for water bodies should be driven by developmental needs rather that revenue generation. Public private partnership needs to be encouraged in quality seed production and distribution
- The Central Government should put in place an Agency for seed certification and accreditation
- The aim of the policy optimizing benefits on a sustainable basis rather than maximizing production
- Incentives for diversified aquaculture for fishes like cat fish, murrels, freshwater prawn, etc to be given.
- There is a strong need to promote organic aquaculture and marketing its produce under eco-labelling to cater to special niche markets
- An operational strategy for effective utilization of all inland saline areas should be evolved on the basis of a national multi-sectoral debate
- Scientific aquaculture in water bodies under PRIs is to be encouraged. through Fisheries Dept should be consulted by the PRIs while deciding on fishery management norms under their control
- Environmental issues related to cattle use in community ponds needs to be addressed
- Techno-entrepreneurship should be promoted by appropriate schemes like AC/ABCs to harness the potential of the sector

- Long term leasing should be for a minimum period of 10 years
- Ponds for which subsidy has been availed should not be allowed to remain fallow. Beneficiaries should be made accountable for the incentives received
- Centre should expedite formulating the model aquaculture act for the different States to follow
- Phase out subsidies and promote soft loans in their place (Subsidy needs to be delinked from the bank loans)
- There is no specific policy input on Cold Water Fisheries

6.3. Work Group 3: Policy Issues in Processing, Markets and Trade

Dr. **S.C. Agarwal** chaired the group discussion while **Dr. A. R. Yusuf and Dr. S. K. Pandey** acted as facilitators. Following are the issues and recommendations that has emerged through consensus after the participatory group discussion.

- One stop Aqua-Business Shops (on the lines of ones available in Jharkhand, W.B., and Orissa) to be established to provide all aquaculture related inputs to the farmers in addition to technical support. This may be supported by NABARD by promoting aqua-entrepreneurs (and linking to Agri clinics/agri business clinics scheme)
- With changing lifestyles, fish retailing in a more hygienic and attractive way will lead to an increased consumption and demand for fish. So fish retail outlets need to be developed on the pattern of Mother Dairy / HOPCOMs. Deep freezers and ice boxes to be made available at subsidized rates to the retailers. Cooperatives, SHGs and entrepreneurs should be provided with financial assistance in transportation; State should develop facilities for the sale of live fish by providing financial assistance for aeration and other facilities; Marketing of Value added fish products should be encouraged.
- A Freshwater Fish Marketing Promotion Agency (FFMPA) on lines of MPEDA should be established for covering all the issues related to marketing of the freshwater fish.
- There should be quality control inspection by the DoF to ensure sale of quality fish in domestic markets.
- At the district level there should be a

modern wholesale fish market having outlets in the relevant areas.

- Cooperatives, SHGs and corporates should be mobilized for improving the trade of fish and fish products. Credit should be made available for marketing of fish for the benefit of poor fishers through SHGs.

- Training programmes on upgrading the skills in marketing should be introduced.

6.4. Work Group 4: Policy Issues in Human Resource Development and Service Delivery System

Dr. M. Y. Kamal chaired the group discussion while **Dr. M.H. Balki & Dr. P. S. Ananthan** acted as Rapporteurs. After a participatory exercise, the following recommendations emerged through consensus.

- Fisheries Departments should be headed by a fisheries professional on a tenural basis to ensure continued leadership and accountability for sustainable development of the sector on long term basis. This will also lead to developing long term association and perspective of the sector which is mainly a technical one.

- All the technical positions in the state department should be filled by qualified technical personnel (BFSc).

- In line with Indian Forest Service, an Indian Fisheries Service should be considered for realizing the long term perspective of the sector looking into the potential and future role of fisheries in rural livelihood development, food and nutritional security and foreign exchange earning.

- All the fisheries officers of the State Governments should be periodically trained through need based short term trainings covering aspects of technology, social mobilisation, participatory techniques, extension, administration and management.

- Newly recruited personnel should also be trained through adequately long foundation courses. At this stage they should also be widely exposed to various aquaculture and fisheries development activities in different parts of the country.

- Need based training programmes may also be conducted for the fishers, entrepreneurs as per their requirements.

- Course curricula may be adapted by SAUs as per their regional requirements, priorities and nature of resources.

- DoF should encourage inter-institutional linkages for updating the knowledge and skills of its staff. Staff members be encouraged to participate in various workshops / consultations / discussions. Auxiliary technical staff should be trained at recognised training institutes.

- Strengthening, reorientation and reorganization of services delivery deserves highest attention to ensure quality delivery of services to the clients and effective implementation of projects and schemes. 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.

- R&D should play an enhanced role to promote optimally sustainable fisheries and aquaculture development. There has to be due attention on basic as well as decentralized participatory research in terms of resource allocation

- Research workers need to be adequately exposed to field conditions and problems of farmers / fishing communities and status of resource conservation. They also need to demonstrate their technologies in association with development / extension workers.

- With due consideration to limited field staff and resources, there is a strong need to develop and use innovative approaches, field tested and employed. Trickle Down System (TDS) approach may be considered as one of such approach where farmers and fishing communities would be partners in extension system.

- Potential of ICTs has hardly been utilized in fisheries extension and training. These tools need to be appropriately integrated with the mainstream extension system.

- In the ATMA model of extension, there is a need to have Project Directors from DoF in those districts having distinct competitive edge in terms of fisheries and aquaculture

7. Session IV: Valedictory Session and Workshop Recommendations

In the valedictory session, **Dr. Dilip Kumar**, Director, CIFE presented the suggested policy inputs which were approved with certain modifications. **Dr. P. C. Mahanta**, Director, NRCCWF, **Dr. V. V. Sugunan**, ADG (Inland Fy.), ICAR, **Dr. M. Y. Kamal**, Former VC, SKUAST, **Dr. S. A. H. Abidi**, Former Member, ASRB, **Dr. P. V. Dehadrai**, Former DDG (Fisheries), ICAR, **Mr. Samir Mathur**, IAS, Principal Secretary & Financial Commissioner, Fisheries Department, Government of Haryana have given constructive remarks and appreciated the initiative taken by CIFE in sensitizing and facilitating the process of developing the policy. **Mr. Naseem Ahmed**, IAS, Principal Secretary & Financial Commissioner, Environment Department, Government of Haryana was the Chief Guest on the occasion. **Dr. S. C. Mukherjee**, Joint Director, CIFE proposed the vote of thanks.

The overall recommendations of the workshop are given below:

1. An enabling and comprehensive fisheries and aquaculture policy is of *utmost importance* for sustainable fisheries and aquaculture development to harness the sector's potential for food, nutritional and livelihood securities.
2. Effective fisheries and aquaculture development is possible only when the resource owners and resource users work together for sustainable management and utilization of resources to augment livelihood security.
3. Knowledge-driven and innovation-led community empowerment should be the central focus and approach to the suggested policy framework.
4. In this context, the policy framework recommended by this Workshop will provide a basis for the respective States in formulating appropriate state-level policies depending on their needs, priorities, available resources and opportunities.
5. The policy framework developed in the Zonal Workshop can serve as an important input for developing a National level overarching Fisheries and Aquaculture Policy framework. This will go a long way in preparing harmonized fisheries policies of various states through bottom-up policy developmental approach that is sensitive to the concerns of all the states and stakeholders (current as well as future). FAO Code of Conduct for Responsible Fisheries (CCRF) should be taken into consideration as it provides a framework for policy

development. This will also help implementation of CCRF to which India is also a signatory.

6. In the light of its significant role in poverty alleviation, and creation of rural alternative livelihood, food and nutritional securities, fisheries and aquaculture should be treated or recognized at par with agriculture for the developmental purposes like credit, tax, energy, water use and land allocation.

7. Research and development system should play a dynamic role to provide scientific and technical backstopping to the sectors' transformation. There has to be proper balance and convergence among basic, strategic, applied, adaptive and action research to develop appropriate need-based technologies for sustainable development and management of fisheries and aquaculture.

8. The sector needs increased financial allocations commensurate with its quantitative and qualitative contribution to the national economy.

9. The present service delivery system requires a major overhaul. There is a need for paradigm shift from the conventional transfer of technology approach to participatory extension system wherein the potential and strength of target group is harnessed for demand driven and effective extension services delivery. Fisheries co-management and farmers participatory Trickle Down System (TDS) of aquaculture are some of several such innovative approaches.

10. Secondary and tertiary-levels of fisheries education should focus on producing job creators instead of job seekers. Professional Fisheries graduates should be given preference in allocation of water and land areas for fisheries/aquaculture ventures. Primary level education and HRD efforts should focus more on enhancing the entrepreneurial capabilities of the primary stakeholders.

11. To ensure a shift from ad-hoc based short term to a medium and long term development, it is a prerequisite that the functional leadership of Fisheries Department should be in the hand of Technical person who remains with the Department for long time (preferably a tenure of 5 years) and is accountable.

12. To harness immense untapped potential of resources on a sustainable basis, there is a strong need for creation of separate Ministry of Fisheries at the Centre.

13. Water is medium for fisheries and aquaculture and its actual consumption should be given the due priority in all those common property water-resources having competing multiple-utilities.

14. There shall be National Fisheries News Bulletin for dissemination of latest information to the stakeholders.

Annexure I

PROGRAMME SCHEDULE

5th Zonal Workshop on Fisheries and Aquaculture Policy: Sustainable Development and Livelihoods for Central States

6-7 July 2007 * Chandigarh

DAY I Friday 6th July 2007 **Venue: Haryana Niwas , Chandigarh**

9.00-10.00	Reception / Registration	**Dr. Rama Sharma and Mr. B. L. Kokkula**
10.00-10.10	Welcome Address	**Dr. Dilip Kumar** Director, CIFE, Mumbai
10.10-10.20	About the workshop	**Dr. S. C. Mukherjee** Joint Director, CIFE, Mumbai
10.20-10.30	Address by Guest of Honour	**Shri Samir Mathur** Principal Secretary & Financial Commissioner, Fisheries Department Chandigarh, Govt. of Haryana
10.30-10.40	Address by Guest of Honour	**Dr. P.V.Dehadrai,** Former DDG (Fy.), ICAR
10.30-10.40	Address by Guest of Honour	**Dr. S. A. H. Abidi**, Ex-Member, ASRB
10.40-10.55	Inauguration of the Workshop and Address by the Chief Guest	**Shri A. R. Kidwai** His Excellency, Governor, Haryana
10.55-11.00	Vote of Thanks	**Dr. S. C. Aggarwal** Director of Fisheries , Haryana
11 -11.15 am	**Tea Break**	
11.15 am – 3.30pm	**Session I: Policy Overview**	**Chair: Dr. P. V. Dehadrai** Rapporteurs: **Dr. S. N. Ojha and Dr. A. K. Jain**
11.15 - 11.20 am	**Workshop Theme and Design**	**Dr. Dilip Kumar** Director, CIFE
11.20 am – 1.00 pm	Presentations on Status of fisheries and aquaculture, Existing policies and regulatory environment, & Flagging of policy related issues in concerned States	**Department of Fisheries** Jammu & Kashmir, Himachal Pradesh, Rajasthan, Uttarakhand
1.00-2.00 pm	**Lunch Break**	
2.00-3.30 pm	**Session I: Policy Overview *(contd.)***	**Department of Fisheries** Delhi, Punjab, Haryana and UT of Chandigarh
3.30-3.45 pm	**Tea Break**	
3.45-5.00 pm	**Session II** **Open Forum** Stakeholder Perspectives on Policy Issues in Fisheries and Aquaculture	

DAY II Saturday 7th July 2007 **Venue : Chandigarh**

9 – 10 am	**Session III** **Lead Presentations**	Chair: **Dr. Kuldip Kumar** Rapporteurs: **Dr. R. P. Raman and Dr. S. K. Pandey**
1.	Policy Issues in Inland Fisheries	**Dr. V. V. Sugunan**, ADG (Inland Fy.), ICAR
2.	Policy Issues in Cold Water Fisheries	**Dr. K. L. Sehgal**, Ex. Director, NRCCWF
3.	Policy Issues in Aquaculture	**Dr. A. K. Jain**, Aqua Entrepreneur
4.	Policy Issues in Processing and Markets	**Dr. S. C. Pathak**, Retd. CGM, NABARD
5.	Policy Issues in HRD and Service Delivery Systems	**Dr. M. Y. Kamal**, Former VC, SKUAST, Kashmir
6.	The processes and modalities of developing the fisheries policy	**Dr. Kuldip Kumar**, Fisheries Advisor, Govt. of H.P
10–10.30 am	**Questions and Discussion**	
10.30 – 10.45 am	**Tea Break**	
10.45-1.30 pm	**Session IV** **Parallel Work Group Discussions**	
	Work Group A on Policy Issues in Inland Fisheries including Cold Water Fisheries	Chair: **P. C. Mahanta** Rapporteurs: **Dr. J. R. Dhanze and Dr. V. K. Sharma**
	Work Group B on Policy Issues in Aquaculture including Aquaculture in Salt Affected Areas	Chair: **Dr. V. V. Sugunan** Rapporteurs: **Dr. Usha Moza and Dr. N. K. Chadha**
	Work Group C on Policy Issues in Processing and Markets	Chair: **Dr. S. C. Agarwal** Rapporteurs: **Dr. A. R. Yusuf and Dr. S. K. Pandey**
	Work Group D on HRD and Service Delivery System	Chair: **M. Y. Kamal** Rapporteurs: **Dr. M.H. Balki & Dr. P. S. Ananthan**
1.30-2.30 pm	**Lunch**	
2.30-4.15 pm	**Plenary Session** Presentations by Rapporteurs of	Chair: **Dr. S. A. H. Abidi** Panel : **Dr. K. L. Sehgal/Dr. S. C. Pathak/**
	4 Working Groups and Discussion	**Dr. R. S. Chauhan**
4.15- 4.30 pm	**Tea Break**	
4.30-5.30 pm	**Valedictory Session**	**Dr. Dilip Kumar**, Director, CIFE
	Recommended Inputs for Policy Framework	
	Addresses by the Guests of Honour	**Mr. Samir Mathur**, IAS, Principal Secretary & Financial Commissioner, Fisheries Dept., GoH **Mr. Naseem Ahmed**, IAS, Principal Secretary & Financial Commissioner, Environment Dept., GoH **Dr. M. Y. Kamal**, Former VC, SKUAST
	Addresses by the Chief Guest	**Mr. Prem Prashant**, IAS, Chief Sec., GoH
	Vote of Thanks	**Dr. S. C. Mukherjee**, Joint Director, CIFE

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3. Dr. V. K. Sharma — Rapporteur
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12. Dr. Rama Sharma
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Policy Issues in Aquaculture including Aquaculture in Salt Affected Areas

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HRD and Service Delivery System

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