

Proceedings of the Two-day's workshop on "Co-management of Fisheries and Aquaculture in Sikkim" Jointly organized by College of Fisheries, Central Agricultural University, Imphal & Directorate of Fisheries, Government of Sikkim at College of Agri. Engineering & PHT (CAU, I), Ranipool between 22 and 23 June 2016

The inaugural function of the Two-day's workshop on "Co-management of Fisheries and Aquaculture in Sikkim" was started with the traditional culture of lighting the lamp followed by a warm welcome proposed by Dr. P.K. Pandey, Dean, College of Fisheries (CAU, Imphal), Lembucherra, Tripura to the Chief Guest of the inaugural function, Mrs. C.C. Wangdi, Hon'ble Secretary to Ministry of Animal Husbandry, Live Stock, Fisheries & Veterinary Services (Govt. of Sikkim), Prof. M. Premjit Singh, Hon'ble Vice Chancellor (CAU, I) and the President of the function, Mr. I. P. Chhetri, Director of Fisheries (Govt. of Sikkim), Dr. P.K. Srivastava, Dean College of Agri. Engineering & Post Harvest Technology (CAU,I), Ranipool, Sikkim, Dr. J.R. Dhanze, Ex-Dean COF (CAU,I) Lembucherra and all the farmers, Fisheries department officials and others who gathered in the auditorium. In his welcome speech, Dr. Pandey emphasized the need of developing linkage and synergy among stake holders, strengthening fisheries resource database of Sikkim and formulation of location specific package of practices for achieving the envisaged goals of increasing fish production.

Prof. J.R. Dhanze, Ex-Dean COF Lembucherra gave a brief account of COE-FAB project. He mentioned the urgent need to characterize the fish resources in North East regions of India. The region has rich fish diversity from which candidate species which are naturally available and having high demand could be selected for aquaculture. Since Sikkim has been declared as an "organic state", it is important that we start culturing fishes in the most organic way, especially in terms of feed. The high altitude areas of Sikkim provide ambient environment for trout farming hence the state government should ensure quality seed and feed to the local farmers for more production of trout in the state. At the same we have to ensure the conservation of endemic fish fauna while introducing the exotic fishes such as rainbow trout. He further mentioned the water harvesting and its importance in aquaculture as well as agriculture.

Mr. I. P. Chhetri, Director of Fisheries, Govt. of Sikkim stressed that North East region is blessed with rich bioresources, however, in recent years a variety of anthropogenic disturbances have hampered the natural environment which led to the decline of a number of fish species. The state government has been working on conservation of the fisheries resources by enacting and enforcing Fisheries act, 1980. At present, 249 state trout farming beneficiaries are there in state and in recent times, demand of trout seeds has been increasing. He then gave a brief idea of the ongoing farming activities in different districts of the state. He also thanked Dean, College of Fisheries (CAU, I) Lembucherra for organizing this workshop to help the fish farmers to learn

the various technologies on fish farming and thus meet the burgeoning demand of fish in the state. He also requested the organizers to actively involve in the fisheries developmental activities of Sikkim.

The inaugural function then progressed with self introduction of farmers and the various fisheries department officials of Sikkim State. A total of 18 fish farmers and 6 officials attended the workshop.

Prof. M. Premjit Singh, Honorable Vice Chancellor, CAU (I) and the president of the inaugural function gave a brief idea about the active involvement of various college of Central Agricultural University (Imphal) in the agricultural development of North east India. He brought to notice of the dignitaries and farmers that in the years 2012 and 2014, the University has been ranked second best Agricultural University in the country. With an area of around 796 sq. km. and altitude range of 300-5000m above sea level, fisheries in Sikkim is different from other north eastern states like Manipur and Tripura. Coldwater fisheries have high potential and focus need be made more towards this sector. He also mentioned that introduction of Self Help groups would be beneficial for the farmers in the long run. He then compared the farming methods in North-East region with other parts of India and stressed the need for popularization of crop rotation, multiple crop farming and integrated farming methods in NE region. He also mentioned the need to expand the fish culture area in Sikkim, however depend on the farmers demand, water resource availability, species (eg. trout or carps), location etc. He encouraged the fish farmers in Sikkim by citing several examples in Manipur and other states implementing more profitable ways for crop production. He also mentioned that there is also high scope for ornamental fisheries in Sikkim as there are many beautiful fish species in the state having high export value in the international market. He reminded that farming is not to increase production and earn profit but also to employ the unemployed youths in building their career. He cited the example of Manipur that a three months vocational training was given to 14 farmers and now 9 of them have started large scale farming and have been a source of employment to several other aspiring farmers. He stressed that Sikkim has a very good potential for fisheries and encouraged the farmers present to have the vision and invest a little bit of their time and energy in helping increase the production rate of fish in the state and not completely rely on riverine fisheries, which is gradually depleting.

The Chief Guest of the inaugural function, Mrs. C.C. Wangdi, Hon'ble Secretary to Ministry of Animal Husbandry, Live Stock, Fisheries & Veterinary Services spoke about the abundant water resources of Sikkim in the form of rivers, lakes and streams. She also expressed her concern about the declining endemic fish species in the state in spite of several measures undertaken by the state government after the implementation of Fisheries Act, 1980. She stated that around 429 trout farmers are currently under state as beneficiaries. The main problem faced by the fish

farmers in Sikkim are sufficient quality feed and lack of technical know-how. Right now two feed mills are in the final stage of construction. She thanked the COF for organizing this training program and also encouraged the farmers to contribute more for the fisheries development of the state.

The inaugural session of the workshop ended with the vote of thanks proposed by Prof. P.K. Srivastava, Dean CAEPHT Ranipool, Sikkim.

The Technical session of the workshop then started with the lecture by Dr. P.K. Pandey, Dean COF Lembucherra, Tripura, on the topic "Vision of College of Fisheries on the fisheries and aquaculture development of North East states". The Dean explained the present infrastructure of the college and gave a detailed idea of the different objectives of Centre of Excellence in "Fisheries and Aquaculture Biotechnology" Project implemented by the College.

Dr. N. N. Pandey, Principal Scientist, DCFR, Bhimtal gave a lecture on the topic "Promotion of trout farming for livelihood support in Sikkim". His talk started with a brief history of trout introduction and farming in India. He then explained the activities of DCFR for promotion of Trout farming in India, especially North eastern states. He detailed the different species of trouts cultured, the technology of production and hatchery management. He also explained the existing constraints and future prospects of trout farming in Sikkim.

Mr. I. P. Chhetri, Director of Fisheries (Govt. of Sikkim) in his lecture on the topic "Major activities of fisheries in Sikkim" briefed the fisheries developmental activities in Sikkim initiated by Govt. of Sikkim. He detailed the infrastructure available, different farming activities, growth of fish production, by citing recent statistics. He also mentioned the measures taken by Government for conservation of fish resources in terms of curbing illegal fishing practices.

Mr. Ugen Tseten, Block Officer, Directorate of Fisheries, North Sikkim gave a lecture on "An overview of fisheries in North Sikkim" where he mentioned the different farming practices in North Sikkim. His lecture was followed by Mr. D.B. Rai, Deputy Director of Fisheries, East Sikkim who gave lecture on "An overview of fisheries and aquaculture scenario of East Sikkim" where he briefed the fisheries infrastructure, farming and developmental activities in east Sikkim.

On the day 2 (23-06-2016) the technical session was started by 9.30. Prof. J.R. Dhanze, Ex-Dean and consultant COF Lembucherra, Tripura talked on the "Hydrodynamics of Runoff water harvesting technology a prerequisite for the sustainable farming system in the North Eastern hill". He briefed on the strength Sikkim with respect to water resources and its effective utilization for aquaculture. He then detailed on the different water harvesting techniques suitable for hilly areas and the technology developed in College of Fisheries (CAU, I) Lembucherra for fish culture and integrated farming. He also gave an idea of economics of integrated farming incorporating water harvesting system.

Dr. A. B. Patel, Associate Professor, COF Lembucherra, Tripura in his lecture on “Management strategies for production enhancement of carps in Sikkim ” briefed the present Aquaculture fish production statistics of different north eastern states of India. He then detailed the productivity factors, reasons for low natural productivity and scope for productivity enhancement in Sikkim. He also explained the different farming practices of carps: extensive, semi intensive and intensive systems, feed and feed formulation techniques and species combinations.

Dr. B. K. Singh, Asst. Professor, CAEPHT, Ranipool, Sikkim talked on “Aquacultural Engineering Interventions Suitable for Sikkim”. Dr. Singh detailed the engineering aspects of fish farming in Sikkim including site selection criteria and water quality requirements. He gave a detailed idea on the different accessories required and criteria and measures that should be taken while constructing raceways for trout farming.

The technical lectures was followed by plenary session, started by 1 pm. Prof. P.K. Pandey, Dean, College of Fisheries welcomed the various dignitaries present: Prof. Premjit Singh, Vice Chancellor CAU (I), Mr. I. P. Chhetri, Director of Fisheries, Sikkim, Dr. P.K. Srivastava, Dean CAEPHT, Dr. J.R. Dhanze, Ex-Dean COF Lembucherra and Dr. N. N. Pandey, DCFR, Bhimtal, farmers and all others who gathered in auditorium in to the plenary session.

Dr. A. B. Patel, Associate Professor, COF Lembucherra, Tripura, presented the plenary notes based on the deliberations made during technical session (Detailed plenary notes appended).

Prof. M. Premjit Singh, Hon’ble Vice Chancellor, CAU (I) after hearing the feedback from farmers mentioned the need to ensure quality seed and feed to farmers by effective collaboration between state government, KVKs (ICAR and others) and College of Fisheries. But he reminded the farmers that Self Help Groups should be formed among farmers itself for generating and distributing income from farming. He stressed the need to prepare a database on water resources of Sikkim. He suggested that Sikkim can also start integrated farming with either fish and poultry or piggery with fishery. He reminded the honorable Prime Minister’s statement that farmers are not only meant to produce but also to make profit monetary wise. He urged the farmers to flourish themselves as well as help the country in sufficient food production. He wished the farmers that much improvement in aquaculture will be realised in the near future.

Prof. P.K. Srivastava, Dean CAEPHT Ranipool, Sikkim in his speech complemented the various fishery development activities in Sikkim and wished that in near future the state would come out with better statistics in terms of fish production.

The meeting ended by certificate distribution followed by vote of thanks proposed by Dr. K.V. Radhakrishnan, state coordinator of FAB-CAU Project in Sikkim and Co-ordinator of the workshop.

Appendix

PLENARY NOTES

Emerged Issues:

General:

1. Two-third of local fish requirement is imported into the region hence, pressing need to increase local fish production
2. There is huge deficit in local feed resources/locally produced feed. It is important to explore local ingredients like root crops namely taro (colocasia), cassava, etc. as starch source and duckweeds as protein source.
3. Good potential of trout culture in raceways in upstream and carp culture (particularly Amur common carp and grass carp) in foot hills regions
4. District-wise resource inventorization including aquatic resources and locally available input resources and their nutrient profiling
5. Exploration of alternative indigenous fish species and utilization of local input resources
6. Integrated approach for augmentation of income of local farmer and local feed resources through promotion of growing rape seed mustard oil and oil cake
7. Strengthening of line department through renovation of farm infrastructure and additional human resource
8. Substantial area of reservoirs is there in the state but aquaculture production from these ecosystems is meager /negligible.
9. Emphasis on cluster approach and cooperatives for promotion of trout farming and sale and cooperation among farmers

Trout farming

- Availability of efficient and cost effective trout feed preferably utilizing locally available ingredients and appropriate feeding schedule chart.
- Working out low cost trout culture raceways module and care in site selection primarily on water availability and flow pattern for easy adoption by small and marginal farmers.
- Selective breeding and introduction of new promising/ improved strains for better growth
- Protocol development and Clarity is required about feed resource use in light of Sikkim declared as organic state
- Monitoring and Surveillance of disease for health management and advisories on trout culture practices.

Carp farming:

- Grass carp and Amur carp the most dominant species and cemented/lined system is dominant culture system

- Location specific standard package of practice including feeding and manuring should be developed to avoid environmental problem
- Alternative indigenous minor carp or other species

Planning and developmental issues

- Development of GIS based maps delineating suitable sites for trout and carp in different states for planning and development.
- Development and establishment of Brood bank facility for quality seed production and seed banking programme.
- Adequate training and skill development on trout farming and entrepreneurship building.
- HRD and technical support on processing and value added products of trout for marketing and profitability.
- Import proposals for new improved strains of rainbow trout preferably from France and Japan.
- Development of farm data reporting mechanism for rainbow trout production for centralized data compilation/generation.
