CHAPTER – VI

SUMMARY & IMPLICATIONS
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6.1. Summary

India has extensive wetlands of 2.02 lakhs ha. These are low-lying areas. These wetlands are mostly situated in floodplains of major rivers namely Ganga, Brahmaputra, Barak, Godavari, Cauvery and Krishna river basins. In most of the state, floodplain wet lands are locally called by different names. These floodplain wetlands together constitute important fishery resources in the State of Assam, West Bengal, Bihar, Manipur, Arunachal Pradesh, Tripura and Meghalaya.

Among the Indian States, Assam has maximum number of wetlands, commonly called as Beels and are associated with river Brahmaputra and Barak. It constitutes an important, most productive and potential fishery resources in the state and covers approximately 72.45% of total lentic water areas of the state. However, its existing average production is only about 173 kg/ha/year against the estimated production potential 1000-1500 kg/ha/year. Several factors viz. habitat modification, over exploitation, lack of scientific management, encroachment, etc., are responsible for low production of the Beel. Though some investigators have made strong attempts to study limnology and fishery aspects of selected Beels of Assam, systematic studies on the role of community participation on sustainable development of Beel fisheries is lacking. Thus, keeping in view, the instant study was conducted and on the basis of systematic and scientific analysis of data, the salient findings of the study are now listed below:

The Correlation Analysis indicated that 2 (two) variables namely community-based fisheries organization, management capabilities of BDCs have a positive and significant association (P<0.01) with all the three dependent variables viz. Beel user’s knowledge scores on community-based fishery management, sustainable development and management of Beel and community’s livelihood for sustenance. This indicates that due to improved management capabilities of the Beel Development Committee (BDC), sustainable development and management of Beel fisheries as well as community’s sustainable livelihood from Beel fishery resources may be ensured.

The study also revealed that for sustainable development and management of Beel fisheries, Beel users’ participation in development program, women empowerment, community-based fisheries organization, management capabilities of
BDC, availability of critical aquaculture inputs are the most critical factor due to their positive and significant correlation (P<0.01) with sustainable development and management of Beel fisheries.

Regression analysis (Stepwise) also indicated that 6 (six) independent variables namely involvement of NGOs, women empowerment, community managed market, community-based physical assets, socio-political empowerment, BDC's management capabilities were found to be most significantly contributing predictor variables that could explain 42% of total variance of Beel users knowledge level on community-based fisheries management. Regression analysis also made it clear that 9 (nine) independent variables namely management capabilities of BDCs, availability of aquaculture inputs, age, community-based fisheries organization, community-based physical assets, family size, Beel users’ decision making ability, involvement of NGOs and caste are the most significant predictor variables that could explain 50% of the total variance of sustainable development and management of Beel fisheries.

Factor analysis indicated that eight common factors namely pre income, knowledge scores of Beel users on community-based fisheries management, sustainable development and management of Beel fisheries, age, social participation, caste, land holding and availability of critical aquaculture inputs that were extracted after 18 iterations could explain 69.89% of total variance. So, based on study of these eight variables instead of twenty four variables, we shall construct that minimum data set which almost accounts for total variation under the study.

The mean comparison analysis indicated that Beel users having high knowledge scores on community-based fishery management were characterized by service holder, having high school and above level of education and had semi pucca house. They were the members of more than one organization with high scores on participation in development programme, decision making ability, women empowerment, community-based fisheries organization and involvement of NGO scores. Further, Beel users having higher mean of sustainable development and management scores were characterized by low level of community-based physical assets, higher participation in Beel development program, medium decision making ability, high women empowerment, high community-based fisheries organization and high involvement of NGO scores. The study also indicated that Beel users having higher mean of community’s livelihood for subsistence scores, were characterized by
service as their occupation, having membership of more than one organization, low level of community-based physical assets, higher participation in Beel development program, medium decision making ability, high women empowerment, medium community-based fisheries organization and low involvement of NGO scores.

Path analysis revealed that involvement of NGO was the most prominent predictor variable having the highest direct effect on \textit{Beel users Knowledge scores on community-based fishery management}. Also, education, annual income, women empowerment, community-based fishery organization, management capabilities of BDC had considerable direct effect on \textit{Knowledge scores of Beel users on community-based fishery management}. Like wise, community-based physical assets, socio political empowerment, \textit{Beel} users' decision making ability had considerable indirect effect on \textit{Knowledge scores of Beel users on community-based fishery management} via involvement of NGO. So the study revealed that the aforesaid variables were important factors for success of community–based \textit{Beel} fisheries management.

Path analysis also indicated that \textit{post CBFM income} and \textit{management capabilities} of BDC were the two most prominent variables that had the highest direct effect on \textit{sustainable development and management of Beel fisheries}. Similarly, age, occupation, social participation, community-based fishery organization, availability of critical aquaculture \textit{Beel} users participation in development program, women empowerment, community-based fishery organization had considerable indirect effect on sustainable development and management of \textit{Beel} via \textit{post CBFM income}.

With respect to study on effect of other variables on community’s livelihood for sustenance, path analysis revealed that \textit{pre CBFM income}, community-based fisheries organization and management capabilities of BDC, involvement of NGO had the considerable direct effect on community’s livelihood for sustenance. Similarly, age, education, annual income, social participation, \textit{Beel} users decision making ability had considerable indirect effect on community’s livelihood for sustenance via \textit{pre CBFM income}.

\subsection*{6.2 Implications}

Following implications for action and further research may be taken on community-based fishery management to ensure sustainable development and management of \textit{Beel} fisheries so that community’s sustainable livelihood is guaranteed.
i. Greater emphasis shall be given to educate the Beel users by involving Non-Government Organizations (NGOs) through participatory bottom up training and capacity building program so that they could understand about the Community-based Fishery Management (CBFM) for sustainable development and management of Beel fisheries. This will also help in building awareness among the Beel users to know about the values and importance of Beels and its sustain utilization and conservation.

ii. As community-based fisheries management program is gaining much importance through out the world due to its participatory approach of management, hence, introduction of CBFM approach in management of large water bodies especially flood plain wetlands/ Beel shall be ensured so that riparian Beel users community can wholeheartedly participate in each and every stage of Beel development program. This may widen a new vista for sustainable development of Beels in the near future. However, introduction of such types of community-based Beel fishery management approach in some of the Beels developed under World Bank funded Assam Agricultural Competitiveness Project (AACP) by the State Fishery Department is a really appreciable step.

iii. For sustainable development and management of Beel fisheries through community-based Beel fisheries management program, involvement of NGO in stages of development program, ensuring women empowerment, community-managed marketing, community-based physical assets, socio-political empowerment, BDC’s management capabilities are the most important variables. Also, success of CBFM depends on management capabilities of BDC, availability of critical aquaculture inputs, age of the Beel users, and community-based fisheries organization to a great extent. Therefore, the development planners, policy makers, etc shall give outmost attention in this endeavor.

iv. Timely available and uniform supply of critical aquaculture inputs is highly important for sustainable development of Beel fisheries. Procurement and effective application of such inputs by the BDC (i.e. community-based organization), under the wider perspective of CBFM
shall bring the ownership to the BDC members, leading to true community empowerment including socio political empowerment of the Beel users. So, attention shall be given to ensure uniform supply of critical aquaculture inputs by involving Beel users in the process of procurement and marketing.

v. For sustainable development of Beel fisheries, empowerment of women in fisheries and aquaculture through different fisheries activities such as net and boat making, fish seed raising, ornamental fish farming and rearing, involvement in integrated aquaculture practices etc. is essential. This is required because once they are empowered, their capacity and confidence will be boosted up, and organize themselves through certain actions for effective empowerment in the long run.

vi. Non Government Organizations (NGO) and Government led community mobilization and organization or such type of extension activities with respect to development and management of Beel fisheries through community-based fishery management shall be encouraged. Because, through this approach, Beel users will be able to choose their potential leaders and they will be able to perform better under such organized approach.

6.2.1 Implications for further research

The above points are important in order to achieve an effective development and management of Beel fishery in the state. A further research should be conducted for achieving the goal of sustainable development of Beel giving emphasis on following points.

- Need of Human resource development in the government, non-government organizations and local community level to ensure effective conservation, development and management of Beels.
- Need of introduction of population modeling approach for culture-based Beel fisheries and to determine suitable conservation strategies for endangered species of fishes.
- Need of introduction of participatory community-based fishery management approach in all other fisheries development scheme excluding Beel fisheries in the state.

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