CHAPTER – V

DISCUSSION
5.0 Discussion

Wetlands are locally called *Beel* (perennial), *Haor* (seasonal floodplain) and *Anua* (river-formed oxbow lake) in Assam. They constitute important fishery resources of the State and have significant contribution to the state’s fish production and livelihood to innumerable poor *Beel* users particularly the fisher folk. Detailed research findings of the study are below.

The findings of the study revealed that majority of the *Beel* users were in the middle-aged (31-50 years) group. Majority of them (46.5%) had high school level of education and belonged to medium size family (5-7 members). Most of them (54.5%) had thatched houses. Majority of *Beel* users (67%) were involved in agriculture as their major profession with average land holding 0.88 ha (S.D.= 0.817) and household average income of Rs. 28880.00 (S.D.= 20565.03 ). The present study is inconformity with Babare and Sawant (2009), who had obtained almost similar results after conducting a study on Makni Reservoir of Maharastra State and indicated that size of the fishermen family ranged 5-8 individual, 31% fishers had kutchha houses and 43% studied up to high school level. Most of them (80%) were engaged in agriculture with average monthly income ranging from Rs. 6000.00 to Rs. 8000.00. Similar result was also reported by Goswami (2003) who mentioned that the fisherwomen were from lower income-group with an average annual income and land holding of Rs. 8547.00 and 26 kathas respectively .The level of education was also found to be varied from primary to middle class. Goswami and Sathiadhas (2000), Maiti (2003) also observed that fishermen are generally the poorest of the poor, most disadvantageous with low education, income, poor basic amenities and infrastructure.

The result of the study indicated that age ($X_1$), family size ($X_3$), occupation ($X_5$) and annual income ($X_7$) of the *Beel* users were not associated with knowledge scores of *Beel* users on community-based fisheries management ($Y_1$), sustainable development and management of *Beel* fisheries ($Y_2$) and community’s livelihood for sustenance ($Y_3$). Our finding is inconsonance with research findings of Dana(1987), Goswami (2003), Hiremath and Raju (2008).

Dana (1987), Goswami (2003) indicated that age, family size and family type were not significantly associated with the attitude of the livestock owners and fish farmers toward artificial insemination in cattle and increase fish seed production respectively. Based on filed observation in semi arid areas of Gujrat state, Hiremath
and Raju (2008) indicated that family size, caste and other socio-economic status did not show strong correlation between technology adoption and those aforesaid variables. As Community-based Fisheries Management (CBFM) is a participatory development and management approach, its successful implementation depends on attitude, motivation and interest of the stakeholders involved. Hence, correlation may not exist with the age, occupation and annual income of the Beel users.

Education ($X_2$) level of Beel users was positively correlated ($r = 0.22$) with higher level of significance ($P < 0.01$) with the knowledge scores of Beel users on community-based fisheries management ($Y_1$). This is due to the fact that without proper education of the Beel users and their children, successful implementation of Beel fisheries program through community-based fisheries management is difficult. Also, from the mean comparison analysis, (Table 24), it is seen that higher the level of education, higher is the learning and positive attitude for gaining knowledge on community-based fisheries management. Our finding is inconsonance with the research findings of Makkar and Sohal (1974), Dana (1987), Khare and Punekar (2001).

Makkar and Sohal (1974) informed that farmers having higher level of education carry more favourable attitude towards scientific soil testing for enhanced crop production. Dana (1987) stated that educational level and knowledge of livestock owners about artificial insemination in cattle showed significant positive correlation with the attitude of the livestock owner towards artificial insemination in cattle. Khare and Punekar (2001) also reported that level of education was found to be positively and significantly correlated with attitude towards improved fish farming.

The study revealed that majority i.e. 109 (54.5%) Beel users were from higher caste which may be due to the fact that higher caste people dominated the whole locale of the study and irrespective of the caste, creed, level of education, they have chosen fisheries and aquaculture as profitable venture for livelihood.

The findings also revealed that type of constructed house ($X_4$) also have no association with the knowledge scores of Beel users on community-based fisheries management ($Y_1$), sustainable development and management of Beel fisheries ($Y_2$). Our findings were inconsonance with the findings of the Dana (1987), Goswami (2003) who also mentioned that type of house was not significantly associated with the attitude of the livestock owners and fish farmers toward artificial insemination in
cattle and fish seed production respectively. The study, however, indicated that type of constructed house (X4) was found to be positively significant (r = 0.16, P<0.05) with community’s livelihood for sustenance (Y3). From the mean comparison analysis (Table 26), it was observed that based on house pattern of Beel users, the mean land holding, annual income, pre and post CBFM income scores are changing significantly at 1% level of significance (P<0.01). This indicates that community’s livelihood depend upon availability of agricultural land and also income of the family. Our finding is similar with that of research finding of Hiremath and Raju (2008) who indicated that community’s livelihood for sustenance mainly depend upon food security and shelter and plays an import role in adoption of agricultural technology.

Land holding (X5) was found to have no association with the knowledge scores of Beel users on community-based fisheries management (Y1) and community’s livelihood for sustenance (Y3). Similar finding was reported by Dana (1987), Hiremath and Raju (2008) who stated that land holding was not significantly associated with the attitude of the livestock owners toward artificial insemination in cattle and adoption of agricultural technology by the farmers respectively. This may be due to the fact that Beel user may have a convenient size of land area, but may be complete lack of educational back ground, experience, self interest and motivation in fisheries and aquaculture practices or even may be void of social participation.

The findings of the study (Table 37) indicated that pre CBFM income (X19) and post CBF income (X20) of the Beel users were positively and significantly associated (r = 0.15* &0.25** and P<0.01 &P<0.01 respectively) with Beel users knowledge scores on community-based fisheries management (Y1). This attributed to the fact that knowledge level increases with the increase of pre and post CBFM income of the Beel users. This may be due to gathering of more information from different information sources like television, radio, news papers, etc on sustainable development and management of Beel fisheries by the Beel users.

Path analysis (Table 42) revealed that post CBFM income (X20) and management capabilities of BDC (X15) were the two most prominent variables that affected sustainable development and management of Beel fisheries (Y2) through their direct effect. Path analysis (Table 43) indicated that pre CBFM income was the most prominent variable that affected Community’s livelihood for sustenance (Y3) through its (i.e. X19) direct effect. As a whole, the study revealed (Table 13) that there was a
slight increase of income of the Beel users due to CBFM intervention. This may be due to the fact that more numbers of Beel users’ families were involved in CBFM project Beels, in comparison to the limited water spread area of the Beels and its production and income. Our findings were similar with the findings of Islam et al.(2006), Dickson M. and A. Brooks (2007).

Based on lesson learnt from the community-based fisheries management in Bangladesh, Islam et al.(2006), Dickson M. and A. Brooks (2007) indicated that the overall income of the CBFM householders were not increased substantially but their income were high and got more access to their livelihood assets and financial credit. Also, there were clear impacts on attitudes as regards issues such as compliance to rules on water body management, increased co-operation between individuals in CBFM household in comparison to non CBFM householders. This was supported by Prvin, J.(2006) and stated that CBFM plays a significant role in the building of social capital such as group memberships, trust, mutually collective action and has a significant effect on poor fishers’ household well being, income, health and education in comparison to non members of CBFM. Further, such impact of social capital on household members was positive on access to assets, access to credit and collective action and also had a strong effect on household non monetary well beings. CBFM improved household per capita income by increasing fish production.

The result indicated that social participation (X₈) was significantly associated with the community’s livelihood for sustenance (Y₃). This may be due to fact that higher the social participation, greater is the chances of social interaction with different section of people and higher is the knowledge on values and importance of Beel as well for its effective conservation and management. Such an effort shall ensure good profit as well as social benefit leading to sustainable livelihood to the Beel users. From the mean comparison analysis (Table 28), it is found that due to change of social participation scores, socio-political empowerment and community’s livelihood for sustenance scores change significantly at 1% level of significance (P<0.01). Beel users who are the member of more than one organization, have significantly higher mean of socio political empowerment, knowledge scores of Beel users on community-based fisheries management and community’s livelihood for sustenance scores. The study also indicated that Beel users who were the office bearer of one organization and also is the member of another organization have
comparatively the higher land holding and annual income scores which are very essential for community's livelihood for sustenance. Our finding is similar with the research findings of Khare and Punekar (2001), Dana (1997), Goswami (2003), Hiremath and Raju (2008).

The correlation analysis (Table 37) of the study also indicated that community-based physical assets (X9), socio-political empowerment (X10), Beel users’ participation in the development programmes (X11), Beel users’ decision making ability (X12), women empowerment (X13), community-based fishery organization (X14), management capabilities of BDC (X15), involvement of NGOs (X16), community-managed market (X18) are significantly associated (P<0.01) with the knowledge scores of Beel users on community-based Beel fisheries management (Y1) for sustainable management of the Beel. From the mean comparison analysis (Table 24 to 36), it is revealed that due to change of said variables, the mean knowledge scores of Beel users on community-based fisheries management are changing at 1% level of significance (P<0.01).

The result of the study (Table 37) also indicated that Beel users participation in development program (X11), community-based fisheries organization (X14), BDC’s management capabilities (X15) were positively and significantly correlated (‘r’ = 0.26** & 0.17*; 0.31** & 0.37** and 0.54** & 0.19** respectively) with knowledge level of Beel users on community-based fisheries management(Y1), sustainable development and management of Beel fisheries (Y2) and community’s livelihood for sustenance (Y3). From the mean comparison analysis, (Table 30 to 33), it is found that with the change of level of these variables, the mean of sustainable development and management and community’s livelihood for sustenance changes at 1% level of significance (P<0.01). Our findings were similar with the findings of Griffin (1988), Fellizer (1994), Carrere (1994), Kutan, et.al (1997), Kutty (1997), Bhaumik (1997), Baticados and Agbayani (1998), Mazumdar (1998), Thompson et al. (1999,2003), Sultana et al. (2002), World Bank Source (2004), Kar (2007) and Barman and Dana (2009), NIAM (2010).

Kutty (1997), Bhaumik (1997) indicated that fisheries sustainability is just impossible unless and until people participate willingly in the development program since its early stages of planning and implementation of development program, rather than at the end i.e. Beel fisheries sustainability on long-term basis is possible only
when there exists a strong participation of Beel users in the development program through the community group approach. Bhaumik (1997) reported that for successful fisheries program and for longer benefit, it is important to involve all groups of people including administrators, scientist, extension functionaries, fishers should participate in the process of formulating and implementing management measure for the development process. Based on Bangladesh Beel fishery management through community based management approach experience, Thompson et al. (1999, 2003) indicated under CBFM program, besides community participation in decision making, there were evidences of greater cooperation among fishing communities, compliance with local community set rules, increase of catches, conservation of local sanctuaries to restore some species and stocks and empowerment of poorer fishing household involved in the project. Khan et al. (2004) also added that CBFM was found to be successes due to good local leadership. Sultana et al. (2002) after conducting a case study on Goakhola Hatari Beel, South Bangladesh for CBFM, revealed that through community-based approach, the socio-economic condition of the fishers had changed and the social capital increased to a substantial level, over fishing was restricted, decision making was prompted, woman empowerment was raised due to local community’s involvement in Beel development and management process. Based on experience on forest management scenario in Africa, Asia and Latin America forest, Carrere (2004) indicated that the obvious solution forest crisis (considering the fact that forest continue to disappear) is to empower the local communities and to create necessary conditions for enabling them to manage forest adequately. Their participation and utilization of local knowledge is must for sustainable forest management through community-based forest management. It was observed that there was evidence of strong community mobilization and organization approach in the studied Beels. This is due to the initiative taken by the NGO and local fishery Department during the process of implementation of the schemes in studied Beel through training and capacity building program. Involvement of NGO as a facilitator for such capacity building program has been well recognized in many parts of the world (Foltz and Barber, 1996; Mulekom 1998). In our study, majority of the Beel users (69.5%) also indicated that NGOs involvement in training and capacity building helped them for easy understanding of the CBFM project activities and its field implementation. This indicated that for sustainable development and management of Beel fisheries, involvement of NGOs in each stage of project implementation is highly
required. Path analysis (Table 41) also revealed that involvement of NGO (X_{16}) was
the most prominent variable that affected the dependent variable, Beel users
Knowledge scores on community based fishery management (Y_1) through its (i.e.
X_{16}) direct effect. It was also quite visible that in all the three CBFM Beels, the NGO
took the active part in community mobilization, awareness building, and training on
pre stocking, post stocking management, environment and community record keeping
and social audit, leadership etc. to improve Beel users knowledge level on community
based fisheries management to ensure sustainable fisheries. As a result, the Beel users
of those CBFM Beels have exclusive access to use the Beel fishery resource as per the
BDC’s rule and regulation. They were able to decide who, when and where to procure
fish and other inputs requirement and thus were able to control over fishing also.
These type of activities were not seen in the controlled Beel i.e. Bhitorkuri Beel under
the study.

Our study revealed that among the three treated Beels, the management
capabilities of the Beel Development Committee (BDC) of Amuguri Bosapathar Beel
was found to be very sound due to able leadership of Secretary and President of the
BDC. Similar was the case with the other two treated Beels namely Talu Malu and
Kutuha Bar Beel. But, same was not seen in the controlled Beel i.e Bhitorkuri Beel.
Further, due to involvement of BDC under the guidance of local NGO entrusted by
the project management authority and District Fishery Department in the process of
Beel development program, the community mobilization and organization process
was strengthened and ensured effective empowerment of the Beel users in those
CBFM Beels. Also, there was evidence of increased participation in decision making,
greater cooperation and empowerment among fishing communities, compliance with
local community set rules, increase of catches, conservation of local sanctuaries,
building of social capital such as group memberships, trust, mutually collective action
and improvement of fish bio diversity due to implementation of CBFM project in the
three study Beels. These effects were not seen in non CBFM controlled Beel in the
instant study.

Regression (Table 38) analysis also indicated that four variables viz.
involvement of NGOs (X_{16}), women empowerment (X_{13}), community managed
market(X_{18}), community-based physical assets (X_9) were found to be most
significantly contributing variables and can predict 43 percent (R=0.66; R^2=0.43;
SE=6.56) of variance on dependent variable i.e. Knowledge scores of Beel users on community-based fisheries management (Y_1). This reveals that these variables are the important factors for sustainable development and management of Beel fisheries through community-based Beel fisheries management program for Beel users sustainable livelihood.

Regression (Table 39) indicates that four independent variables namely BDC’s management capabilities (X_{15}), availability of aquaculture inputs (X_{17}), age (X_{1}), community-based fisheries organization (X_{14}) were found to most significantly contributing variable that can predict 52 percent (R=0.66; R^2=0.43; SE=6.56) on dependent variable i.e. sustainable development and management of Beel fisheries (Y_2).

From our above discussion, it is clear that for sustainable development and management of Beels in the state, community-based fisheries fishery management approach is imperative. It is hope that this approach will widen up a new vista for sustainable development of Beel fisheries in the state in the near future.