This chapter is divided into two sub-sections for presenting a comparative picture of the two dimensions of sustainable development. This has been made to have a better understanding of the impact of both the Grameen Bank and BRAC on the study villages in two distinct ecological regions of Bangladesh.

9.1 Social Sustainability

Social sustainability can not take place when there is a rise in population growth, when the women are marginalised and their equity is denied, when the participation of people in development undertaking is denied, when education, basic health, sanitation and access to food is denied. Encouraging investment in primary health and basic education, particularly for the poor, is one way to accomplish overall objective by building up human capital of the next generation. Basic education promotes equity and generally yields social and economic rates of return higher. The economic pay-off of basic health care is often very substantial.

Given the above premises of social sustainability the impact of NGOs on poor households in two ecologically degraded regions of Bangladesh has been broadly assessed with focus on some of the most pertinent aspects like human resources development, poverty alleviation, peoples’ participation as follows:

Human resources Development

The findings of the present study reveals that both the GB and BRAC have made a distinct mark by engaging sizeable number of children from poor households in educational activities. Compared to this households under the control village have poor enrolment scenario for both the boys and girls is vis-à-vis the national achievement record on this count. Of the two NGOs the success of the BRAC is distinctly visible as it has successfully been able to increase the enrolment of poor boys and girls, most of them are drop outs from primary levels, in its non-formal education stream. Despite the fact that the GB has no structured mechanisms to impart education to the poor children of its clientele rather constrained with poor infrastructural facilities vis-à-vis the BRAC it also made tangible achievements in spreading education among the poor
households. The success of the GB on this count may be attributed to its 16 decisions that motivate its clientele to send their wards to school for informal education.

Both the NGOs have demonstrated their tangible success vis-à-vis the control village to attract boys and girls from poor economic backgrounds by extending sops like school uniform, books, stationers and so on which the government run schools can not afford to offer.

As regards to education of girl child in particular both the GB and BRAC have again made successful dent over the control village in ensuring greater access of girl child to non-formal schools run by them despite various forms of sops announced by the government in this regard. The reasons being mentioned that the timing of government run schools do not suit the girl child as they remain busy helping their mother in households chore. While the distance of government run schools and the lack of incentives in the form of school uniforms, books and stationers are some of the reasons cited by poor households for not sending their girl child to government schools.

The scenario in the saline ecological zone is no more different but it is rather worst as the extremely bad road communication in low lying areas, inundated roads and remoteness of schools are some of the factors that deter the poor households not to send their wards to school. Apart from the poverty factor the environment also come into play for poor enrolment of girl child in the study villages particularly in the saline affected areas.

Of the two NGOs the GB has made additional impact on its poor women clientele to compulsorily muster the skill of putting signature as conditionalities laid down by the Bank to become legible for microcredit. This also plays a role in sending their children to schools for receiving education from both the informal and formal education streams. However, in the real sense imparting informal education to the school drop outs will not serve the purposes in attaining social sustainability goal in the long run as the quality of education is so poor that the drop outs merely gain some knowledge to write and read only. It remains to be seen actually what percentage of these boys and girls who come to receive informal education go for further studies in the formal stream.
Population growth

Promoting sustainable development in a fragile ecosystem can be seen as a daunting challenge before the NGOs as the policy imperfections led poverty in perpetuity enforce the poor to go for increasing the family size. The findings of the study reveal that both the GB and BRAC have made definite dents on the poor households under their domain compared to the households under the control village by motivating a sizeable number of the poor to adopt contraceptive measures for keeping family size small. But it is again far from satisfactory as a sizeable number of respondents under NGO domain going by their own admission even today do not prefer contraceptive measures. This has obviously led to unabated population growth also in the households under NGO domain vis-à-vis the control village. That's how both the NGOs could not make any drastic impact on reducing population growth in the study villages.

On further desegregation of respondents for not adopting contraceptive measures it is evident that host of factors act as disincentives to use contraceptive measures. Religious factor partly stands in the way, which both the NGOs have been succeeded, to nullify compared to the situation prevailing in the households under the control village. Aside from this a sizeable number of respondents in the villages under NGO folds did not give convincing reply as to why they do not use contraceptive measures. From the findings it is amply clear that though both the NGOs made some impact in regard to motivating the poor to adopt contraceptive measures but a sizeable number of them even today do not use contraceptive measures for reducing their family size. Given the achievement level as per as contraceptive measures are concerned the lackadaisical performance of NGOs can be attributed to their failure to contain poverty effectively. It is certain that as long as the poor people's chances to remain below poverty line continue it will be very difficult to convince them to reduce their family size. Because it is for their own existence they will prefer to increase the number of child. May be because of their involvement with NGOs the poor will tend to partially reducing their family size. But in real sense population growth in the villages under NGO domain will not be reduced to the desired level in the foreseeable future if both the NGOs do not really pursue aggressive social sustainability goals.
Sanitation and access to safe drinking water

The findings of the study for flood plain ecological zone reveal that almost close to half of the total households in all the villages under the GB and BRAC have access to permanent latrines. There is no doubt that it is a significant achievement compared to the achievement level at 6 percent in the control village which show the pathetic state of affairs of performance by the government agencies at grassroots level. Given the continued presence of both the NGOs for a decade and more in the study villages it is expected that by the time almost all the households be provided with ensured access to permanent latrines to ward off poor households from the wrath of water born diseases.

The achievement level in the saline ecological zone by both the GB and BRAC is almost similar to that of in the flood plain ecological zone. The size of households under the NGO domain who do not have access to permanent latrine is still found on the high side.

As regards to access to pure drinking water by households under the NGO folds in the flood plain ecological zone the findings of the present study reveal that compared to the control village (30%) a sizeable number of households under the GB (88%) and BRAC (86%) have access to safe drinking water. In the case of saline ecological zone compared to households under the control village (33%) who do not have access to safe drinking water majority of households under the GB (86%) and BRAC (85%) have access to safe drinking water. This is quite a significant achievement compared to the scenario prevail in the villages where NGO intervention did not take place.

Poverty alleviation

The food intake deficit in terms of some major items consumed by poor households in the study villages under flood plain ecological zone reveals that compared to households under the control village bulk of which do not have access to fish (80%), meat (100%) and milk (73%) during the seven day period the households under NGO domain have better access to all the three essential food items. But facts remain that a sizeable number of households under the GB still can not afford to consume fish (47%), meat (73%) and milk (53%). So is the case with the BRAC where a sizeable number of poor households do not have access to fish (37%), meat (70%) and milk (47%). The intake of vegetables is most prevalent in the households under the GB (80%)
and BRAC (93%) at a frequency level of more than five days compared to the control village (53%).

The scenario in the saline ecological zone is almost identical in regards to households access to these three essential protein sources. But here the households are better poised in regards to their access to fish. Compared to households under the control village bulk of which do not have access to fish (60%), meat (100%) and milk (93%) during a seven day period the households under the GB and BRAC have better access to all these three essential food items of high calorific value. Inspite of NGO interventions for poverty alleviation for quite a long time a sizeable number of households under the GB can not afford to consume fish (40%), meat (87%) and milk (80%). So is the case with the households under the BRAC where 30, 80 and 83 per cent households can not afford to consume fish, meat and milk respectively. Compared to the flood plain ecological zone the households in the saline ecological zone have limited access to vegetables with a frequency of five or more during a seven day period. This can be attributed to creeping salinity in the homesteads where the poor households can no more grow vegetables for their own consumption. Moreover, the overall production of vegetables in the study villages has gone down over the years as most of the land is already been devoted to shrimp production. As the supply side is very stringent due to very low production of vegetables in the areas as a whole the poor people thus can not afford to buy vegetables. That's how the consumption of vegetables in the saline ecological zone may have gone down vis-à-vis the poor peoples access in flood plain ecological zone.

Surprisingly, though both the NGOs encourage their poor clienteles to grow more vegetables in the backyards and homesteads they have not come up with the right kind of technology package compatible to degraded environment that could have contribute to vegetable production. Nor they provide any technical assistance to them in this regard. This is one of the major grey areas of the NGO programmes that appropriate technology transfer do not receive genuine attention to help equip the poor households to withstand adverse ecological conditions, which they currently face. In view of the above, it can be safely concluded that poverty alleviation programmes undertaken by NGOs for ecologically degraded areas have not created desired impact as the ecological factors are not taken care of.

The extent of food shortage poor households face in two ecologically degraded scenarios also chosen as a major variable to ascertain the impact of NGOs on poverty alleviation. The
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The extent of food shortage poor households face in two ecologically degraded scenarios also chosen as a major variable to ascertain the impact of NGOs on poverty alleviation. The
a time when the ecological degradation reached its peak with most of the study villages remain under water for a period of over eight months. As regards to number of households face frequent deficit situation the difference is very marginal between the control village and the villages under the NGO folds. The control village does not have any households fall under balanced and well-balanced category.

The picture in the saline ecological zone is not better than the flood plain ecological zone. Compared to the households under the control village (33%) the number of households face year round deficit situation in GB and BRAC is less. Moreover, the control village does not have any surplus, well-balanced and balanced category households. The number of households come under more or less balanced category in case of control village is negligible (10%). Compared to this households under the GB (50%) and BRAC (36%) report that they are more or less balanced.

From the comparative analysis of the households under both the ecological scenarios it can be reasonably concluded that poverty has got direct links with the degree of environmental degradation a region or a locality face through. The more is the degradation the more will be the rise in poverty. Here, despite the NGO interventions in the villages under their domain more than half of the total poor households could not reach the level of more or less balanced category.

The study though suffers from inherent shortcomings due to time and space constraints the findings will show some important dimensions of crises coping strategy the poor households demonstrate in the ecologically degraded areas. It is revealed that majority of households under the GB and BRAC depend on group fund of samity while in case of control village they borrow money from informal sources at the time of distress situation. Moreover, they mostly adopt positive crisis coping strategy compared to the households under the control village who invariably resort to negative crisis coping involving asset sale/dissaving and borrowing at exorbitant interest rates and other form of injurious loans. Increased work effort to overcome crises has also been reported by poor households. Migration to urban areas has not been an important crisis coping strategy of the households resorted to escape poverty in the study villages.

Technology Transfer

Technology is a vital entry point for poverty alleviation through sustainable development. The findings of the present study reveal that a vast majority of households under NGO domain in
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Technology is a vital entry point for poverty alleviation through sustainable development. The findings of the present study reveal that a vast majority of households under NGO domain in
are marginally involved as a part of their efforts to uphold the traditional activities like poultry
and livestock raising, homestead gardening for benefit of the family.

Women's involvement in income generating activities as mentioned above under the
saline ecological zone has been found very marginal compared to the flood plain zone. This can
be attributed to harsh ecological conditions being in play in the study villages under NGO domain
and also in the control village. Women's involvement in pisciculture related activities are a most
common and preferred one. The other activities like cattle and poultry raising, homestead
plantations did not get much importance, though the poor women are very keen to engage them in
such activities. The homestead forestry did not gain much importance though the poor women:
are desperate to grow vegetable and fuelwood plants in view of acute shortage of fuel they
encounter.

Another study based on self-assessment of women in regards to benefits they draw by
involving in income generating activities reveals that a significant number of women in the flood
plain ecological zone accrue benefits at least in five areas like ensuring better food for husband
and children, schooling for children and so on. As expected in case of saline ecological zone the
women have reduced access to income generating activities other than involving them as wage
labourer. As the sole purpose of engaging women in income generating activities is to improve
living standard for self and family members the NGOs made some achievements on this count.
But again a sizeable number of women disclosed that they do not accrue benefits in any form as
mentioned above despite they have access to microcredit. It implies that women empowerment
programmes do not benefit all. The reasons must be many and even complex. Obviously the
degraded environment has the major role to play in frustrating self-employment generation
programmes undertaken by women with microcredit from NGOs. This is where NGOs have
failed miserably to take into account the degraded environment before undertaking income-
generating programmes for poor.

Peoples' participation

The study has been mainly confined to the BRAC's social forestry programmes for flood
plain ecological zone as the GB do not have such programme for any of the villages under its
domain. So a partial glimpse of a particular NGO can be have in course of impact study. The
findings reveal that BRAC has been successfully implementing roadside plantations with the
involvement of poor households in the two study villages under its domain. The road side plantations mainly consist of two plant species with better adaptability to withstand water logging and drought conditions the villages generally face because of its topography. The beneficiary households are found actively engaged in rearing plants by way of giving labour in different forms. The BRAC has successfully involved the beneficiary households in every stage of plantations right from conceiving the plans. The poor households have also accepted the benefit sharing formula under which their benefit has been shown maximum. The manifestation of the success of plantations is quite impressive given the 100 per cent standing of plants on the ground. The most pressing problems in roadside plantations as experienced in other cases is that the actual standing of saplings never remain intact due to predator factor. But here the conditionalities demand that there should be minimum of 80 per cent plant saplings on the ground. If it goes down to below 80 per cent level the benefit sharing agreement reached between the government and NGO stands cancelled.

The present study is incomplete in the sense that it does not provide any opportunity to compare the impact with that of other NGO or with that of the control village. From this viewpoint it is a mere presentation of facts as to how poor households through their participatory actions can contribute to greening the rural areas.

The other area where both the NGOs are active is promoting fish cultivation in group ponds under participatory management by beneficiary households. The findings of the study may not present the actual picture on the NGO impact on peoples' participation in pond water fisheries due to small size of subjects. But it, however, will give some insights into as to how group pond fisheries can be a productive venture with the participation of poor. The findings reveal that households accrue benefits in various forms by engaging them in activities related to pisciculture. This will definitely bound to have salutary effect on the rise in income of the beneficiary households. The NGO actions on this count have immense potentials to stabilise fish resources in the rural areas of Bangladesh.

9.2 Environmental sustainability

Environmental sustainability has been missing dimensions in development lexicon of Bangladesh. Till only recently the NGOs have started to recognise the needs for taking into account the environmental aspects of development as their grassroots experience demand that in
real sense poverty cannot be overcome by-passing the rural ecology and environment on which livelihood of the rural people depends. As mentioned earlier that the environment will be the main focus of the present study an attempt will, therefore, be made to have an insight into the impact of the GB and BRAC on environmental sustainability with particular emphasis on biological resources development, rural energy promotion, biodiversity and Common Property Resources as they play a crucial role in synergy in maintaining the integrity of village ecosystem and the carrying capacity as well.

**Biological Resources Development**

Biological Resources constitute a capital asset with great potential for yielding sustainable benefits. Sustainable use of biological resources can benefit the poor at the same time the ecosystem. Population pressure alone greatly contributes to unsustainable use of biological resources thereby vulnerability to stress and strain of the poor people increases. This is where the NGOs can play a crucial role in slowing down population growth and other factors exacerbate to exhausting biological resources.

**Biological Resources (Livestock)**

The findings of the present study for flood plain ecological zone reveal that poor households under NGO domain have more livestock compared to the households under the control village. Further desegregation of the impact study shows that among the livestock cow and goat dominate in the poor households. But the propensity to owning goat is higher compared to cow despite its high potentials to economic return in various forms. While in case of saline ecological zone poor households mainly possess cow and goat and a negligible percentage of them, however, own sheep and buffalo.

As regards to number of cattle head households own under the domain of NGOs in flood plain ecological zone it is evident that compared to the control village very few households own 4-5 cattle to reap maximum economic benefit. Given the size of the cattle head the poor households own one can conclusively say that despite microcredit support by NGOs for beef fattening, livestock raising, milch cow raising no significant dent could be felt. The scenario in case of saline ecological zone is rather worst. Compared to the control village where majority of households (82%) owns single cattle only the households under the GB (57%) and BRAC (44%)
own similar number of cattle. Like the floodplain ecological zone some households under the NGO folds have 4-5 cattle head but their number is very less. It is amply clear that both the NGOs could not make any significant dent in the study villages in augmenting livestock resources by involving poor households under their domain.

In the light of the above findings while efforts are made to find out the preference of cattle variety among the households it is revealed that almost all of them under both the ecological scenario cited their preference for local variety cattle. On further study on identifying the factors contribute to own local variety cattle it is evident that a combination of factors like less rearing cost, low mortality, disease resistance, adaptability to withstand adverse ecological condition come into play for owning local variety instead of genetically improved variety cattle. It is further evident that owner's preference comes into play that supplies cattle to poor households on profit-sharing basis.

The scenario in the saline ecological zone is almost identical to that of the flood plain ecological zone where poor households regardless of they are under NGO fold or not invariably raise local variety cattle.

For the poor households managing fodder for cattle is a real challenge in a scenario where the environmental degradation is at its peak. As already indicated landless poor invariably depend on the CPR for meeting fodder needs of their cattle. Therefore, any degradation of CPR or access to it is restricted it certainly bound to affect badly the poor and their livestock.

The present study depicts that households regardless of they are under the NGO folds or not invariably acknowledge the number one problem is reduced access to CPR followed by which is the shrinkage of marginal land for grazing of cattle. Some households, though their number is not high, cite lack of availability of fodder is one of the factors contribute to compounding cattle feed problems.

On being asked as to how they cope cattle feed problems in both the ecological conditions it is evident that the first and foremost strategy the poor households adopt is to collect fodder from far flung areas as the villages under the GB and BRAC virtually have very little common grazing land. Because of their access to microcredit some households report that they resort to purchase fodder from the market. Compared to this households under the control village can not afford to buy fodder for their cattle from the market. It is further evident that not a single
household under flood plain and saline ecological zone report that they feed their cattle from their own stock.

As regards to use of cattle dung by poor households the findings of the present study reveal that in the flood plain ecological zone majority of households under the control village (71%) burn cattle dung for cooking food. Compared to this a sizeable number of households under the GB (49%) and in the BRAC (41%) straightway burn cattle dung, as they do not have any other options. The findings also reveal that compared to the control village where not a single household apply dung as fertiliser a few households under the GB (19%) and BRAC (30%) apply dung in their homestead garden and agricultural field. The use of cattle dung for preparation of compost and green manure also reported by some households under the GB and BRAC. The hard pressed poor households for increasing their income often resort to selling cow dung with or without value addition.

In the saline ecological zone compared to the control village poor households (66%) in both the villages under the GB (57%) and BRAC (61%) tend to burn cattle dung for cooking and other purposes. A small number of households under the NGO folds use cattle dung for preparation of green manure while in the control village not a single household neither apply cattle dung as bio-fertiliser nor it use dung for the preparation of green manure. This may be attributed to acute shortage of fuelwood in the ecologically degraded villages.

It is amply clear that NGO actions at micro-level have potentials to directly contribute to refurbishing the already degraded topsoil to the much benefit of the rural biophysical environment and thus strengthening the foundation of the village ecosystem. In the context of sustainable development both the NGOs need to focus more on rural environment upliftment while undertaking anti-poverty measures. In fact this is where the GB and BRAC have made very little impact if one compares the scenario prevailing in the control villages in both the ecological conditions.

**Biological Resources (poultry)**

In the rural economy poor households traditionally raise poultry as an income generating activity. In the face of cash crunch to meet emergency need households invariably resort to selling poultry and ducks to meet the household’s needs. The poultry and ducks have also got
ecological functions to play in stabilising biodiversity in the village ecosystem. The poultry birds are very susceptible to environmental stress and strains due to change in biophysical environment.

The present study reveals that the poultry growth has not been taken place in real sense in the households under NGO domain in the flood plain ecological zone despite both the GB and BRAC keeps on pumping microcredit to poor households generously for raising the income level. In terms of number of poultry birds the households under the NGO domain could not increase their birds compared to the households own under the control village. Similarly, the growth of poultry birds in the villages under the NGO folds in saline ecological zone has not taken place to the desired level. Compared to the flood plain ecological zone a higher percentage of households own 4-7 poultry birds. On this count the NGOs have definitely made some dents in the saline area but it can be viewed as an achievement compared to the control village where also a reasonable number of households own 4-7 poultry birds of different sizes despite the onslaught of fragile ecological condition in place.

Access to poultry vaccines by poor households has a direct bearing on the growth of poultry birds. There is a wide body of criticism against the government agencies in Bangladesh that they can not deliver goods in augmenting poultry resources in the rural areas. Given the scenario the present study while seeks to investigate actual impact on the access to poultry vaccines by poor households it is evident that most of the households under NGO domain have access to poultry vaccines. Compared to this households under the control village mostly depend on market sources for vaccines.

For the households under NGO fold vaccines come from earmarked NGO vaccinators. As evident further from the findings despite the BRAC has full fledged institutional mechanism to ensure sustained supply of vaccines under the supervision of one programme officer the growth of poultry has not taken place in the villages under its folds vis-à-vis the control village.

The situation is no different in the saline ecological zone. Like the flood plain ecological zone the majority of households here report that they have access to poultry vaccines. As regards to sources of poultry vaccines the households under the NGO domain report the identical views as in the case of flood plain ecological zone.

Though the poultry growth in the study villages has not taken place to the expected level the present study seeks to ascertain as to what percentage of households use poultry excreta in the
homestead garden and for other various other purposes to the advantage of biophysical environment. The study reveals that a sizeable number of households under the NGO domain in the flood plain ecological zone compared to the control village preserve poultry excreta for purposes like use as fish feed, apply to the homestead garden, preserve for compost making and so on. From ecological viewpoint both the NGOs have effectively mobilised the poor households to preserve poultry excreta for the purposes as mentioned above.

It remains to be seen as to what actually constraining the growth of poultry population in the study areas despite both the GB and BRAC are active since a decade and more to promote poultry development. With this aim in view the present study attempts to focus on both ecological and non-ecological factors that may come into play for not taking off the poultry growth in the two ecologically degraded areas.

As regards to factors constraining to poultry growth in the villages under the flood plain ecological zone it is evident that water logging, high incidence of chick mortality, shrinkage of homestead land and shrinkage of dry land are some of the visible reasons that play as disincentives to poultry production by poor households. The factors cited above contributing to low growth of poultry is applicable to all households regardless of they are under the NGO domain or not. But facts remain that the households under NGO domain feel the pinch more as they cannot raise poultry despite their easy access to microcredit.

On the other hand the disincentives that play into the poor growth of poultry in the saline ecological zone are water logging, high incidence of chick mortality, shrinkage of homestead land and creeping salinity, shortage of dry land for movement of poultry birds. Majority of the households irrespective of they belongs to NGO domain or not cites that water salinity alone act as major disincentives to poultry raising. Followed by which high incidence of chick mortality due to creeping salinity in the homesteads also cited as disincentives to poultry raising.

The findings reveal that both the GB and BRAC despite their policy objectives in place to promote poultry raising in these two areas could not leave mark due to poor households non-willingness to undertake poultry raising venture primarily due to water logging in flood plain ecological zone and salinity in the saline ecological zone. Here both the NGOs keep on pumping microcredit to poor households but no tangible gain has been seen in real sense.
As regards to non-ecological factors constraining the poultry growth the present study reveals that quite a good number of households under the NGO domain in flood plain ecological zone do not have access to microcredit because they are identified as habitual defaulters. They fail to clear weekly instalments compulsorily be paid in against of loans taken for poultry raising. The default households argue that when there is an outbreak of contagious disease in epidemic proportion, which is again is very common in sight, they do not get vaccines as a result of which the venture becomes unprofitable for them. That’s how they cannot pay weekly instalment to be compulsorily paid by loanee households. For the households under the control village it is the initial capital money they lack for starting poultry venture. All these factors as cited above also come into play in case of saline ecological zone. The failure to promote poultry development in the households under NGO domain may be attributed to inherent limitations of both the NGOs in streamlining the income generating activities given the adverse ecological regimes prevailing in the two ecological zones under study.

**Biological Resources (Fish)**

Similar to livestock and poultry resources fish, as an important constituent of biological resources, also have distinct ecological functions in stabilising bio-physical environment of a particular geographical region or a landscape or a ecosystem. To be precise fish as a major constituent of human food chain continue to receive importance since time immemorial. Though Bangladesh once known as a paradise for fish resources it is now loosing this precious natural resources primarily due to rising population pressure coupled with host of other factors like policy imperfections, water pollution, unplanned construction of embankments, polders so on. The gap between demand and supply of fish has been increasing in tremendous pace. In view of the dwindling fish resources some NGOs are actively engaged in generating fish resources by involving the poor in various types of aquaculture activities. The GB and BRAC also have come into this venture by engaging their loanee households in aquaculture.

The present study on the impact of the GB and BRAC on augmenting fish resources in the flood plain ecological zone reveal that the poor households under their domain do not have access to fish cultivation in their own pond as is evident in case of households under the control village. Compared to the households (2.5%) under the control village very few households under the GB (20%) and BRAC (24%) have access to fish cultivation. The scenario in the saline ecological zone is slightly better where a sizeable number of households under the GB (27%) and BRAC (29%) are involved in pisciculture related activities compared to the control village (14%).
These are fish net making, fry production, fishmeal preparation, and fish fry catching, guarding ponds/shrimp land and give labour to pond excavation and cleaning so on.

As mentioned earlier that the findings of the impact study in flood plain ecological may not reflect the actual position as the number of subjects involved in pisciculture has been found very low. But it will give some insights into the impact of NGOs in developing rural fish resources through effective participation of stakeholders.

**Homestead Forestry**

The homestead plantations play a crucial role in the village ecosystem as a source of food, fodder, and shelter for the village dwellers. As mentioned earlier that due to degradation of ecology in the flood plain and saline ecological zone the standing vegetation in the homesteads has been threatened. Given the situation the GB and BRAC encourage their members to grow plants in their homesteads. The present study, therefore, attempts to assess the impact of both the NGOs in regards to variables directly linked to homestead forestry on the composition of plants, no. of households engaged in plantations, benefits derived by households involving in homestead plantations, type of fertiliser used by households in homestead gardens and constraints to homestead plantations.

As regards to standing vegetation cover in the homesteads own by households in the flood plain ecological zone the findings reveal that vegetable plants dominate in the homestead plantations under the GB (54%) and BRAC (41%) compared to the control village (22%). Followed by which is timber yielding plants that too visible only in the homesteads under the GB (16%) and BRAC (22%). Some presence of fruit plants is visible in the households under the NGO domain. The standings of other plants like fuelwood, fodder, bamboo, which is crucially linked to sustaining livelihood of poor, has not been visible. It means that both the GB and BRAC have made some dents in motivating the poor households to grow primarily vegetables and timber yielding plants and to some extent fruits plants also. But this is not enough to ensure sustainable livelihood security of rural poor at times they are progressively loosing their grips over the CPR.

As expected due to creeping salinity the standing vegetations in the homesteads will be hard hit to the extent that their existence may be threatened. The findings show that actual standing of vegetations in all the households irrespective of control village and the ones under the
NGO folds is frustratingly low. Of the total vegetation cover coconut plant dominate in the households under the GB (45%) and BRAC (44%) compared to the control village (18%). Followed by which is vegetable plants that too visible only in the homesteads under the NGO folds. Timber, fuelwood, fodder yielding plants and bamboo are almost missing in the total vegetation standings. It means that salinity alone has drastically reduced the vegetation cover in the poor household’s homesteads under the study villages. The fallout of which is already been manifested in the form of reduced access to livelihood security of poor households.

In terms of number of households engaged in homestead plantations the findings for the flood plain ecological zone reveal that quite a sizeable number of households in both the villages under the GB (46%) and BRAC (55%) are engaged in vegetables cultivation compared to the control village where a very few households (16%) cultivate vegetables.

Though it is not a significant achievement some households in the study villages under the GB (30%) and BRAC (38%) in saline ecological zone grow vegetables compared to the households under the control village (20%). The propensity to grow other plants like fuelwood, timber and fruit plants and so on has been found mixed. The findings further reveal that compared to the control village the households under NGO folds have greater propensity to grow plants in their homesteads. Though the GB and BRAC made some dents in the villages under their folds vis-à-vis the control village the impact is very marginal. It might be primarily due to their failure to extend technical support to poor households in selecting right kind of plant species compatible to physiographic and edaphic condition of the ecologically degraded areas. The other factors constraining to homestead plantations have also not been adequately taken into cognisance by both the GB and BRAC. This lead to vary marginal impact on the promotion of homestead plantations in the study villages in two ecological zones of Bangladesh.

In the context of sustainable development the types of fertiliser used by poor households in their homestead plantations also came up under close scrutiny during the present study. The findings of the study reveal that a substantial number of households in the villages under the GB (51%) and BRAC (47%) compared to the control village (13%) apply fertiliser to their homestead garden to maximise yield of vegetables and other annual crops. Further desegregation of households to ascertain the types of fertiliser used by them it appears that majority of them apply animal dung and poultry droppings as well as green manure to their homestead gardens.
The findings also reveal that the use of chemical fertiliser in the villages under the NGO domain has been substantially brought down. On the contrary a small number of households under the saline ecological zone use cow dung and poultry droppings in their homestead garden. This might be due to non-availability of cattle dung, which the poor people invariably collect from distant places for use as fuel for cooking purposes.

Given the scenario where a vast number of households in both the flood plain and saline ecological zone do not have any vegetation in their homesteads the present study attempts to look into the factors that come into play in the under development of homestead plantations despite NGO interventions.

The findings reveal that at least five factors contribute to under development of rural homestead plantations. These are dispute over ownership right, fragmentation of homestead land due to increased family size, wilting of saplings due to water logging, salinity, non-availability of salt tolerant plant species and lack of technical know-how in selecting plant species compatible to degraded environmental condition.

For flood plain ecological zone the predominant factor constraining to homestead plantations is the fragmentation of homestead land followed by which is dispute over ownership right among the family members. For the saline ecological zone it is the salinity of soil alone that come into play as predominant factor contributing to poor development of homestead plantations. The other factors play a very marginal role.

Rural Energy needs

The findings reveal that majority of poor households in the study villages under the flood plain ecological zone regardless of they are under the NGO fold or not depend absolutely on biomass fuel for their energy needs. Further desegregation of the findings show that compared to the control village (66%) the households under the GB (36%) and BRAC (40%) predominantly burn cattle dung for cooking and energy intensive self-employment activities supported by NGO microcredit. The percentage of households uses wood, as fuel is very marginal.

The findings further reveal that compared to the control village both the GB and BRAC made some little dents in a limited scale on the poor households under their fold in reducing the
use of cattle dung for cooking and other purposes. But fact remains that compared to the BRAC which made some marks in this regard by engaging a few poor households in social forestry programme under the study villages, the GB could not contribute to the growth of homestead plantations despite one of its 16 point decisions encourage the loanee households to plant more trees in their homesteads. The contributions of BRAC in this regard will definitely bound to improve the rural energy scenario in the long run if it sustain its programmes by including more households in the ecologically degraded areas of Bangladesh.

With majority of households in saline ecological zone predominantly depend on naturally available peat soil the impact of both the NGOs is far from satisfactory, as they could not generate minimum plant resources in the villages under their domain. The poor coverage of plants in the homesteads of poor households may be due to soil salinity but the NGOs are not serious enough to extend technical know-how in selecting right kind of plants for saline soil.

As regards to source of energy in the flood plain ecological zone the study reveals that a large section of households depend on the local market for their fuelwood needs. Since the study villages are chronically deficient in vegetation cover the poor households also depend on cattle dung, which they procure from the temporary CPR.

With no visible sign of homestead plantations in the households regardless of they are under the NGO fold or not in the saline ecological zone they primarily meet their energy needs from temporary CPR. Following which a certain percentage of households also meet their needs from the local market. The contribution of homestead plantations in both the ecological scenarios is very marginal. It is, therefore, amply clear that both the NGOs specially the GB did not adequately taken care of energy needs of poor households though it encourages poor women to undertake energy intensive economic activities.

The findings as regards to principal use of biomass fuel in flood plain ecological zone reveal that poor households primarily use it for cooking purpose regardless of they are under NGO fold or not. For households under the NGO domain additional demand for biomass fuel is created due to energy intensive self-employment generation scheme promoted by them. This has caused tremendous amount of pressure on the wood and other biomass fuels.
The scenario in the saline ecological zone is rather worse compared to the flood plain zone. The findings of the study reveal that basically the poor households draw fossil fuel for cooking purpose. A certain percentage of households have to depend on temporary CPR for meeting additional fuelwood needs to generate income from energy intensive self-employment activities. This is also an area where both the NGOs could not adequately taken care of additional fuelwood demand generated for carrying out self-employment activities.

Biodiversity

The findings of the study for flood plain ecological zone reveal that all the households in the study villages regardless of they are under the NGO fold or not virtually own very little biodiversity in respect of indigenous rice, vegetables, fruit and timber plants and fish. Compared to the control village some households under NGO domain have HYV vegetables, poultry birds and fish that too is not widely visible. The study, however, concludes on the basis of survey of the villages by RRA method that compared to biodiversity the small, medium and big farmers own the poor households under NGO domain own very marginal number of biodiversity. This implies that both the GB and BRAC could not make any tangible impact on empowering the poor with more biodiversity of plants and animal. It means the poor households under the NGO domain continue to remain vulnerable to any kind of natural and man made stress and strain that may directly affect the livelihood security of poor.

It is strongly evident that there is very little institutional mechanism or policy objectives on the part of both the NGOs to stop erosion of biodiversity in the study villages under the two ecological zones. Special emphasis, therefore, be given for the preservation of biodiversity as this will reap benefits for the poor in the long run. This is absolutely necessary to sustain and improve agriculture, homestead forestry, livestock and fisheries production systems in the rural set up to keep future options open as a buffer against harmful environmental changes.

Common Property Resources

The findings reveal that bulk of the energy sources in the flood plain ecological zone comes form CPR. So is the case with the fodder and fish for which a sizeable number of households depend on CPR. This is amply clear that NGO actions could not substantially reduce the dependence of poor on CPR. It means that whatever natural resource base the study villages
have it may erode in course of time if poor people’s dependence on CPR could not be reduced immediately by both the GB and BRAC. It is again alarming that the stock of CPR is gradually dwindling. In a situation like this the poor people may face extreme hardship in the days to come in meeting their basic needs for which they depend on CPR. In case of saline ecological zone the poor households can only meet their fish and energy requirements from CPR. It means that options of the poor people in saline ecological zone have been drastically reduced due to degradation of environment.

The problems encountered by poor households in catching fish from CPR has been deliberately chosen for the purpose of impact study as it is one of the major visible activities where poor households remain engaged for procurement of fish. The present study intended to see as to what specific problems the poor really face in hunting and gathering fish from CPR. The findings for the flood plain ecological zone reveal that the gradual shrinkage of CPR is attributable to encroachment by influential persons or groups who own the water bodies from government on lease. As the dry season sets in the big farmers tend to end up using the water for agricultural purposes thus reducing the access of poor people. Even the poor are not allowed for hunting fish. The impact of both the GB and BRAC is very marginal in the context of reducing dependence of poor households on CPR for fish.

In case of saline ecological zone the poor households have very little opportunity to catch fish from CPR as most of them are already been brought under shrimp farming. This is how poor peoples access to CPR have been squeezed in the saline ecological zone.

The present study though not a complete one, however, it attempts to throw some insights as to what extent the two NGOs have attained the twin objectives of sustainable development given the scenario where ecological degradation continues to erode natural resources. It is amply clear that compared to the environment sustainability goal, both the NGOs have succeeded on some counts like ensuring poor people’s access to safe drinking water and hygiene, increased enrolment of girls child, creating opportunities for non-formal education to drop-outs from primary level. But on other fronts like population growth and poverty alleviation though they made some dents but the achievement level is not upto the mark. The aspect of technology transfer for poverty alleviation through increasing productivity found backseat in the NGO programmes.
Though the women empowerment is the stated explicit goal of both the NGOs going by the available findings it is amply clear that they have partially succeeded to attain on this count. The major aspect of empowering women by technology transfer has lost sight of both the NGOs. Thus the poverty in real sense has not been alleviated, as both the NGOs could not make any dent on this count including the core areas of social sustainability goal vis-à-vis the villages not included by NGOs.

On the contrary environment sustainability objectives has not been achieved as their impact has been very marginal in terms of ensuring sustainable livelihood security of the poor by augmenting rural biological resources, reducing their dependence on CPR, improving energy scenario and biodiversity.

9.3 Testing of Hypotheses

(1) The poverty alleviation programme as pursued by both the GB and BRAC although have various components and some of which of course are pertinent to the livelihood security of poor households has not been found very effective. From the findings of the various anti-poverty programmes it is evident that the environmental aspects found backseat given the villages facing tremendous amount of degradation. This led to the failure of the anti-poverty programmes without any significant impact on the livelihood of poor households. In the long span of a decade and more nothing tangible is achieved by both the NGOs. It is manifested that a sizeable number of poor households even today can not manage three essential proteins in their food basket and even a great number of people are vulnerable to silent famine which is a regular feature during two crucial Bengali months.

It has been proved beyond doubt that poverty alleviation programme for ecologically fragile areas cannot be sustained without integrating the environmental concerns.

A great majority of poor households do not own livestock and poultry. Those who own the number of which is very less compared to the villages not covered by NGOs. As per as livelihood security of poor households is concerned it is important to note that the livestock, poultry, homestead vegetables, fruits, timber production has got direct bearing on households food security and improved nutrition. Despite both the NGOs continue to pump microcredit generously to poor households for undertaking these ventures no tangible benefits has been drawn by them as none of these ventures found profitable as the local environmental condition is not
conducive to undertake all these activities. What NGOs could have done is to technology transfer compatible to degraded environment, which they did not. As a result no income generating activity found sustained. Since these has not been adequately generated by NGOs it is a matter of concern that despite NGO interventions these programmes were not picked up to their full potentials.

The GB still continues to engage poor in stereotype income-generating activities with uncertain and often problematic marketing outlets. Here both the NGOs tend to become rather "paternalistic" about their poor clients by continuously investing on the same beneficiaries instead of setting definite time frame for their graduation from poverty. This implies that the if poverty is not reduced the NGOs remain paternalistic due to strategic reasons. If poverty is removed once for all where does the NGOs stand?

(2) Essentially the empowerment of poor depends primarily on the degree to which credit programmes for employment generation are accompanied by supportive human development training and essential skills and management training. Here, the GB is averse to the idea of human development training, as it believes that poor people particularly the women are traditionally capable to undertake activities for which they need no training. While the BRAC continues to impart training for undertaking self-employment generating programmes. But as per as impact is concern it appears to be very frustrating in a scenario where poor people are the direct victim of ecological degradations is in place.

Empowerment for sustainable development means giving the poor and women the true capacity to cope with the changing environment for higher level of economic participation and the utilisation of new insights into ecological process of change and self-renewal as they strive to enter the transition towards sustainable pattern of development. The capacity in terms of access to technology and education by poor has been seen to be very frustrating given the poor performance of both the NGOs in diffusion of technology and imparting technology related education. As education can be seen as a fundamental tools in empowering the poor with its potentials to reduce inequalities in the size and distribution of income and to increase the productivity and earnings of the poor the GB and BRAC on this count made some success but the time frame it took does not say it is indeed an achievement.
The findings show that no real empowerment from socio-economic viewpoint has taken place in the study villages as majority of the women continue to have very little options due to ecological reason to undertake diversified income generating activities by which they could have become empowered. Both the NGOs even miserably failed to understand the importance of technology for increased productivity and thereby increase earning and disseminate environment friendly technologies with particular emphasis to genetically improved technology for boosting production and reducing drudgery of the poor women. Leaving a vast majority of poor women unschooled and unlettered and to the vagary of nature sustainable development cannot be achieved.

(3) Biological resources have been seen as key to secured livelihood of poor men and women. But the GB and BRAC could not generate adequate biological resources in the study villages due to combination of factors. The poor traditionally depend on biological resources for their livelihood. Since no serious efforts has been taken for generating biological resources for a great majority of poor the opportunity for living with livelihood security got reduced. As the poor people’s access to CPR has been drastically squeezed, it is expected that they will intensify poultry, livestock raising. This did not happen as the salinity and water logging crippled the local economy the survivability of poor also threatened.

On the contrary a sizeable amount of homesteads area are still under-utilised in the households under NGO domain. This is attributable to salinity and water logging that affected the households. Even today most of the households are unable to meet family requirements of vegetables and fruits, spice, timber needs from the homesteads plantations. Even they are not in a position to supplement family incomes by selling homestead products. On this count both the NGOs failed miserably.

(4) In the rural set up energy needs is extremely crucial for sustainable development. The source of energy for majority of households particularly the poor come from biomass. It is either obtained from the nearby forests, homesteads or from CPR. Usually the poor depend on CPR for their fuelwood need. It is evident that since the villages under study in two ecological zones are devoid of any natural forests and homestead plantations due to water logging and salinity the poor households invariably explore their fuel needs from the CPR. Given the harsh ecological conditions are in play both the NGOs though have some edge over the households outside the NGO folds it is not upto the mark. It is evident the NGOs have failed to promote homestead plantations adequately in the homesteads of households under their domain. As the ecological
condition demand that salt and water tolerant plant needs to be grown in the homesteads which NGOs could not ensure.

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Despite the search for sustainable solutions for natural resources management in the ecologically degraded areas is complex even then; of the two NGOs the BRAC has been able to involve the poor people in roadside plantation programme in the flood plain ecological zone under study. Given that the area is deficient in natural forests the programme got through under an agreement between the government and the BRAC. The choice of species and plantation techniques has potentials to environmental regeneration in the area. It, however, remains to be seen if the programme receives similar enthusiasm among the poor when the replication takes place. Here the beneficiary people are found active in protecting and taking care of the plants. Equity aspect has been taken into consideration all the way from programme formulation stage through benefits sharing. The rules and regulations agreed upon through mutual understanding between the government, BRAC and the beneficiary itself prove to be most effective. It is, therefore, proved beyond doubt that if people’s participation is ensured sustainable development can be achieved. This hypothesis may not be tenable as the impact study involves only two roadside plantation programmes in the flood plain ecological zone. Nonetheless, it is indicative that given the prevailing standing of plants and the stakeholders commitment the programme will definitely push through to the benefit of the environment and the poor as well.

9.4 Recommendations

In the light of the findings during the course of study following recommendations being made for promotion of sustainable rural development for flood plain and saline ecological zones of Bangladesh:

1. Poverty issues should not be tackled solely with economic perspective. The nexus among development, population, environment and poverty alleviation should be fully under stood and a holistic approach should be taken,

2. To effectively reduce family size of the poor households reproductive rights of women must be ensured. The rights rest on the recognition of the basic right of all women to decide freely and responsibly the number, spacing and timing of their children and to have the information and means to do so.

3. For ecological reason, meaning to fit in the carrying capacity of the villages,
Efforts must be intensified to relieve the pressure of population on land and other natural resources,

4. Population programmes should be implemented along with natural resource management and development programmes at the local level that will ensure sustainable use of natural resources, improve the quality of life of the poor people and enhance environment quality,

5. Focus on the empowerment of women should be geographically and ecologically specific,

6. Appropriate planning for technology transfer be made to empower the poor to raise productivity of income generating activities,

7. Self-reliant households programmes favouring sustainable development of renewable energy sources and improve energy efficiency need, if necessary, be undertaken,

8. Formulate energy policies under which technologies should promote a mix of cost-effective fossil and renewable energy sources that is itself sustainable and ensures sustainable development. Also efforts should be made to best utilise full potential of homestead forestry, as well as CPR, as sources of renewable energy,

9. Small power units be set up based on biomass burning in rural communities to cater to the rural energy needs for poor. These can be fuelled by biomass grown in sustainable manner in village woodlots and utilise a variety of biomass sources,

10. Redevelop village ecosystems through the introduction of appropriate technology to relieve drudgery and improve energy efficiency cooking stoves and also undertake biogas based energy supply to poor households,

11. Considering the high ecological value natural resources like livestock, fisheries, which constitute the primary foundation for growth, be protected from overuse and degradation. Efforts be made to stabilise biological resources to cater to the needs of the carrying capacity of villages,

12. Subsistence planting of trees for fuel wood and other purposes need to be transformed into marketed commodity so as to increase earning of the poor households out of homestead plantations,

13. For sustainable rural development planning concentrations be given on natural resource base with focus on the profile of principal elements like land, water, biological diversity/forests and renewable energy sources,
14. To ensure sustainable livelihood security of the poor biological resources like livestock, poultry, fish and trees should be generated with credit support.

15. Identify and strengthen local level institutions that are already available to implement sustainable development programmes.

16. For poverty alleviation effectively genetically improved technology for important biological resources should be explored. Only ecospecific technology should be handed over to poor households for increasing their income.

17. Generalist approach to solving ecospecific problems should be abandoned as it is evident in case of the GB where staff members play the role in overcoming problems.

18. For ecologically degraded areas given the colossusness of the problems GO-NGO co-operation link has to be established without which NGOs can not single handedly contribute to poverty alleviation and promoting natural resources in a degraded ecological scenario.

19. Massive social forestry programmes for the saline affected areas with already available salt tolerant plant species be taken by both the NGOs involving the poor households to arrest further degradation of environment. Distribute salt tolerant vegetables, fruit and timber plants to poor households for plantations in already barren homesteads.

20. Traditional income generating activities promoted by NGOs, the GB in particular need to be reconsidered as these product do not ensure sufficient income.

21. Village ecosystem may be considered as appropriate unit for convenient handling of the issues involved in sustainable management of natural resources.

22. Rural development planning goals at the village level need to focus on sustainable livelihood security, equity, environmental regeneration and afforestation in homesteads, roadsides and barren spaces.

23. For establishing communal rights over CPR for promoting sound management of natural resources efforts be made by the NGOs to obtain lease from the government.

24. The government may encourage the NGOs to undertake eco-specific activities for Ecologically degraded areas with fragile ecosystems.

25. For ecologically degraded areas ecological sustainability aspects be compulsorily incorporated in NGO programmes while pursuing socio-economic programmes.

26. An Eco-development Board may be set up to monitor and implement GO-NGO programmes for ensuring sustainable development.
27. Institutional capacity building of the NGOs need to be further strengthened to cope up with the eco-specific needs where concentration of poor is very high,
28. Economic activities injurious to ecological health must be stopped,
29. For increasing and retaining the traditional bio diversity the NGOs can extend support to their clienteles to maintain bio-diversity registers. This is essentially needed to monitor the impact of development on bio-diversity as well as to safeguard their intellectual property rights,

The above recommendations based on the findings of the present study on the impact of two NGOs in two ecologically degraded areas may be a basis of new framework that integrates demographic trends and factors like ecosystem, health, technology, human settlements with socio-economic structures and access to resources for pursuing sustainable rural development goal at the grassroots level in Bangladesh.