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EIA and Green Productivity : Bangladesh Context

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Abstract: *Environmental Impact Assessment (EIA) and Green Productivity focused on integrating socio-economic development efforts to harmonize environmental protection and nature conservation for sustainable development. The objective of the sustainable development is to improve the quality of life in terms of increasing consumption and comfort without compromise of the status for the future generations.*

Bangladesh is very densely populated country that caused a serious stress on natural resources and environment of the country. The study attempted to examine current state of environment of Bangladesh and measures undertaken to make the environment clean. Despite all the efforts made, there is a good number of constraints such as inconsistencies in sectoral issues, inadequacies in sectoral law and regulation and above all weak mechanism and implementation agencies.

In order to achieve higher green productivity, there is an urgent need for maintaining ecological balance, bring changes in the attitudes of the people towards nature and ensuring socio-economic justice in every sphere of life. Towards attaining these goals current efforts appears to be inadequate.

Thus the study stressed the need for creating more awareness amongst the people and imparting training for the managers to understand the science along with hands-on experience at every aspect of developinent efforts.

The importance of cooperation within agencies at local level as well as regional collaboration is also highly emphasized.

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Introducing Green Productivity

The concept of Green Productivity refers to integrating socio-economic aspirations and a means to harmonize environmental protection and economic development. The key aim of the sustainable development is to enhance people's quality of life.The Asian Productivity Organization (APO) as a regional organization is spearheading productivity promotion efforts in the Asia-Pacific region, to embrace the concept of Green Productivity, integrate it in all its program of activities on human resources development, technical assistance and information dissemination and continue extending its activities aiming at Sustainable Management of Environment (SME) to help them apply cleaner production systems, upgrade their absorptive capabilities for ISO 14000 standards and take steps to set up networks for the effective promotion of the transfer of technology and south-south cooperative activities. Role of NGOs, academicians, mass media, trade and business association and all types of stakeholders are very important to make the program a success.

The concept of Environmental Impact Assessment (EIA) is well-known to development practitioners now a days, which is a set of activities designed to identify the information pertinent to environment for any human action. Previously the main concern were social and health effects including the well being of the ecosystem on which man's livelihood depends (Munn, 1985:159; Beanlands and Duinker, 1983: 18 and Clark, 1983:4). But currently the dimensions of the definition of EIA has been extended to broader sense as a *technique* to improve the data base for decision-making through a process of information generation pertinent to the identification, prediction and assessment of the effects of project implementation. This focuses on resource planning in such a manner that the development will sustain. To this end, EIA is redefined as: a process of environmental planning

that provides a basis for resource management to achieve the goal of sustainability" [Smith, 1993: 95]. Thus, EIA integrates the science of environmental and economic analysis with the appropriate necessary policies of resource management to maximize potential benefits and minimize adverse impacts.

Objectives

Green Productivity focused on increasing the productivity of the economy adopting cleaner technology in order to ensure that development is sustainable, especially in the Asia Pacific region with the initiative of APO. With the given framework of APO, the objectives of the study are to;

* Examine the state of resource base of the country against the high population density;
* Evaluate the current legal and policy framework to increase the productivity without any compromise of degrading the environment and depletion of natural resources.
* Emphasize the need for human resource development by imparting training for technical soundness and managerial efficiency;
* Identify the constraints in mainstreaming green productivity and extend green development efforts through multi-sectoral cooperation, regional and international collaboration.

The study is organized as follows: Section II highlights the state of environment of Bangladesh, Section III focuses on the need for green productivity for sustainable development, Section IV describes the role of government in achieving these objectives, section V discusses the methodology for green productivity and its initiatives in Bangladesh and Section VI outline the constraints of mainstreaming green productivity in development efforts. Finally, conclusion and recommendation is presented in Section VII.

II. State of Environment in Bangladesh

Bangladesh is a small country with large population of 129.0 million with an annual growth rate of 1.4 percent (Census 2001). The total area of the country is 147,570 square kilometers. The density of the population is 835 per square kilometer. The economy of the country is predominantly agricultural; the environment is very vulnerable, because of interfacing the I-Iimalayan at the top, the Bay of Bengal and the Indian Ocean to the bottom. Considering the ecological condition of the country, necessary precautionary measures need to be taken in every development effort.

Terrestrial Ecosystem: Bangladesh has three broad types of landscape- flood land, terrace and hills. Floodplain is composed of recent alluvial deposits and it covers 80% of the total area of the country. The terrace occupying about 8% of the area includes Madhupur tract in the centre and Barind tract in the north. The hills occupy about the remaining 12% area of the country in the south-eastet-n area of Chittagong Hill Tracts (CHT). The three broad types of landscapes can be divided into 20 physiographic types of landscape units (FAO, 1998 and State of Environment Report, 1998). The agriculture is the very vital sector of the economy; the main component is the crop production. In 1997, the man/land ratio was 0.11 hectares that declined from 0.16 hectares in 1981. About 75% of the population are engaged in agricultural activities directly or indirectly and this sector contributes about 30 % to the GDP (BBS,1997).

Natural Resources: Bangladesh has been endowed with untold reserves of natural gas. About 70% of the power plants and all fertilizer factories are based on natural gas. Forestry coverage is about 17% of the total area of the country, which is inadequate for balanced environment (NCSIP 1, 1999). The higher population growth caused for higher encroachment of forest land. The

demand-supply gap of fuel wood energy and timber resulted in depleting forest stock of the country.

Loss of fish habitat is the major concern of the country, more than 70% of animal protein in average comes from fish and about 12 to 13 million people are employed in this sector (Qamrul, 1999). Fisheries biodiversity includes some 259 species of freshwater and few hundred of marine fin fish, 63 species of shrimp, turtle and tortoise (NCS IP-1, 1999 p117). Due to undertaking different water resource development projects (Flood control, drainage and irrigation) and siltation of the waterways, huge areas of aquatic environment and habitat have been degraded. Pollution of water bodies and overexploitation of fishery resources are the other causes of resource degradation of the country. The Coastal area is about 710 km long measured along the shore of Bay of Bengal with wide varieties of biodiversity is currently under threat of degradation.

III. Importance of Green Productivity

The **Asia** Pacific being the tropical countries are quite rich in terms of biodiversity and other natural resources such as natural gas in Bangladesh, oil, mine and tin in Indonesia and other ASEAN and SAAKC member countries. The region is also the habitat of more than half the global population. Considering the strong resource base of the region and high population density, the promotion of sustainable economic development needs appropriate management that may ensure higher economic growth, greater employment opportunities and better standard of living of the people. This may lead to reduce the global environmental degradation. Apart from these, this region can play a unique role as a good model for the other developing countries in the world.

In Bangladesh, the higher density of the population has created a tremendous stress on natural resources and on the environment of the country. Being a tropical country it is very much resourceful

in terms of biodiversity and natural resources like gas. In order to achieve higher economic growth, special care should be taken, increasing productivity need to be attained with proper care of the environment, not at the expense of resource depletion. The objectives of Green Productivity are to;

i. maintain ecological balance of the country and the region;

ii. bring change of attitudes of people towards nature, lifestyles as well as re-orientation of ways to produce goods and services;

iii. promote equitable socio-economic development;

iv. Ensure economic sustainability.

To achieve the above objectives the following considerations need to be taken care of;

Promotion of Clean Technology: Industrial development is the key agenda for higher growth of the economy that should be pursued more vigorously by promoting clean technology and emphasis on the development of indigenous capacity for adoption of green products and green production processes to conserve natural resources. The industries need to abide by the prescribed emission standards for air, water, noise, smell and other elements of the environment mandatorily. The disposal of industrial waste is regulated by Rule 13 of "Environment Conservation Rules 1997" of Bangladesh which states that the emission standards of liquid and gaseous wastes should not exceed the standards fixed by the Schedules 9, 10, 11 and emission standards of industrial wastes should not exceed the standards fixed in Schedule 12 of Environment Conservation Rules 1997.

Environment Friendly Service Industries: Service industries like eco-tourism, recreational amenities are the very vital sector for higher economic growth, promotion of these sectors may ensure the consideration of damage to environment and attitude

towards conservation of nature. India, Malaysia and Indonesia developed a very potential eco-tourism contributing to the economy substantially. Cox's Bazar sea beach, Sunderbans wildlife movement and uncommon scenic beauty (where approximately 4,400 mammals; 9,200 birds and 9,700 reptiles, and amphibian species are found) and unique landscape of Garo hills have the potentiality of tourism industry in Bangladesh.

On 6th December 1997, The World Heritage Committee of UNESCO has declared the Sunderban (Mangrove forest of Bangladesh) as "World Heritage Site". Government of Bangladesh has also undertaken a project named "Biodiversity Conservation in the Sunderban Reserve Forest (1999-2005)". Through this project all the rare species of plant and animals shall be conserved. The first "Botanical garden and Eco Park" of the country in Chittagong district of Bangladesh was inaugurated on 17th January 2001. This park will help conserve biodiversity and improve eco-tourism. Another eco-park at Sylhet district of Bangladesh called "Madhabkundo and Muraichora Eco-park" was inaugurated on 15th April 2001. This will also conserve biodiversity and enhance eco-tourism. In 1999, "Bangobondhu Sheikh Mujib Safari Park" was established in Cox's Bazar district of Bangladesh to conserve different species of plant and animals of ecological importance.

Environment Friendly Agriculture Development: Agricultural development for the developing country like Bangladesh is the backbone of the economy. The contribution of agriculture sector to GDP is around 22% (BBS, 2000). This sector should be re-oriented towards applying environment-friendly methods and practices to ensure sustainable food and nutrition security for the growing population and increase of employment opportunities, welfare and amenities for the rural people. The use of modern agricultural inputs that pollutes the waterbodies and degrades land and biodiversity.

Eco-friendly Market Mechanism: Comprehensive market-based instruments should be instituted to enhance regulatory approaches in order to accelerate the shift to Green Productivity. The production process that causes harm to the environment should be discouraged. The "Environmental Policy 1992" and the "Environmental Conservation Act (ECA) 1995" of Bangladesh provided appropriate guideline to make relevant sectoral policy pertinent to environment.

Practice of GP in Small and Medium Industries: In order to achieve sustainable and equitable socio-economic development as a whole, necessary strategies should be adopted to the needs and requirements of developing countries. Labor intensive low cost small and medium enterprises that use least resources should be introduced before taking up any sophisticated technologies. Good house-keeping and good engineering practices need to be promoted for pollution prevention, as such by reducing waste and managing them well. Frinciple of establishing industries and maintaining the ambient quality of environment with respect to small and medium industries is regulated by Rule 7(2) of Environment Conservation Rules 1997.

IV. Role of the Government of Bangladesh

Government needs to institute macro-level frameworks and systems such as national development policies, legislation, regulations and economic measures and implement them effectively along with complementary micro-level systems to promote Green Productivity and encourage creation of green product alternatives through various measures including taxation, financing and human resource development. The "National Environment Policy 1992" was adopted to manage the environment of the country for the first time. The Government of Bangladesh, with a view to providing for conservation and improvement of environment quality, and mitigating the pollution of environment enacted the Environment Conservation Act (ECA)

1995. Under this Act Environmental Conservation Rules 1997 was promulgated.

Regulation of EIA in Bangladesh: Section 12 of Environment Conservation Act 1995 stipulates, "No industrial unit or project shall be established or undertaken without obtaining environmental clearance from the Director General, Department of Environment (DG, DOE) in the manner prescribed by the rules". There is provision of making rules in section 20, which states that government can make rules under this act through government gazette notification; and clause (2) (f) of this section requires that rules be made to "evaluate, review the environmental impact assessment (EIA) of various projects and activities, and procedures be established for approval". Nevertheless, conducting an EIA study and preparation of reports are the responsibilities of the project proponents to get this done through multidisciplinary experts. Department of Environment was supposed to bring out appropriate guidelines outlining the procedures of preparing EIA and reviewing them. So far, Bangladesh has prepared EIA guidelines for industries (DOE. 1997). Another guideline for water sector is under review for finalization. The Local Government Engineering Department (LGED) is also using an EIA guideline for their development work. In Bangladesh EIA procedures pass through three tiers in order to measure the impacts on the environment (EIA Guidelines for Industries, 1997):

- Screening
- Initial Environmental Examination (IEE) and
- Detail Environmental Impact Assessment

Screening decides whether EIA process should be applied to a deveiopmcnt project, if requires. its types i.e. IEE that decides whether the EIA is necessary and EIA. which refers to achieve the goal of sustainability. The screening exercise is carried out based on several criteria such as types of its size and location. In Bangladesh, normative screening has been preferred. according to

which industries have been divided into 4 categories viz: Green, Amber A, Amber-B, and Red Initial Environmental Examination (IEE) helps in initial understanding of potential extent of environmental changes and finding ways to mitigative measures based on available information, past experiences, or stand operational practices. EIA procedures refers to baseline studies, impact identification, impact prediction, impact evaluation, mitigative measures and monitoring program towards ensuring sustainability.

V. Methodology for Green Productivity and Initiatives in Bangladesh

In order to examine the environmental impact in undertaking development efforts and to improve productivity the process needs to be followed are;

Formation of Green Productivity Team for Survey: GP process is marked by the formation of a GP team and a walk-through survey to gain base-line information and identification of problem areas. At this stage it is vital to get the support of senior management to ensure that adequate manpower and resources are available for successful GP implementation. In Bangladesh there is EIA guidelines for industrial sector and the draft guidelines for water and other sectors are under review for finalization. The guidelines stipulate to carry out EIA prior to undertaking any development project consisting of members with multidisciplinary backgrounds. The EIA report is examined by the experts from the Department of Environment for clearance. The Ministry of Water Resources, Government of Bangladesh is going to undertake a project named as "Gorai restoration project". The river Gorai is the largest distributory of the Ganges River, it supplies fresh water to the southwest region of the country for hundreds of years. The

flow of fresh water of Gorai is very crucial for maintaining the ecological balance of the Sunderbans ecosystems and controlling the salinity intrusion in the region. Closure during the dry seasons has resulted in a number of morphological and environmental impacts. The project proponent arranges to carry out an EIA with a multidisciplinary group. The group comprises of Economist, Sociologist, Fishery specialist, Hydro-morphologist, Agriculture and soil specialists, GIS specialist and Ground water specialist (EIA of Gorai River Restoration Project, 2001, p2). The "Gorai restoration project" will be a glorious example of mitigating the downstream environmental impact of Farraka, which was a regional concern.

In order to promote this sort of multidisciplinary team BPATC can play a unique role where officers from all cadres and with diversified background at different levels are undergoing training. There is an opportunity to make regional training program by establishing SAARC or Asia Pacific regional network.

Planning: In preparing planning, information is gathered in the walk-through survey, a number of analytical tools such as material balance, benchmarking, eco-mapping are adopted to identify the causes of environmental problems. In order to achieve those objectives and targets perfosrnance and evaluation indicators are set. For examining, the viability of the projects financial and economic analysis is carried out. Financial analysis refers to firms and individual perspective using market price. Economic analysis is carried out from the government or societal perspective using accounting price or shadow price to reflect opportunity costs. The current approach is taking into account the stress on environmental resources, which is known as social benefits cost analysis (SBCA). The new rule for estimating social benefit and cost analysis is as follows:

$$NPV=\sum_{t=1}^{n} (B_t - C_t \pm E_t) / (1+i)^t > 0$$

Where:

NPV= Net Present Value.

B_t = Benefit at time t.

C_t = Cost at time t.

E_t = the environmental loss or gain (negative or positive externality).

i = the discount rate, low discount rate can be preferred to reduce high concern of environmental degradation.

t = time in year.

Generation and Evaluation of GP Options: It involves both a review of pollution prevention and control procedures that have already been devised or implemented and the development of new options. Options are screened and prioritized in terms of their economic and technical feasibility and their potential benefits. They are then synthesized into an implementation plan. This is the case of promoting multidisciplinary evaluation and environmental auditing team. Currently, in Bangladesh, Implementation, Monitoring and Evaluation Division (IMED), under Ministry of Planning is evaluating the post development project in conventional way. The EIA Guidelines for Industries (1997), laid out the evaluation procedures in section 4.5 considering regulation, acceptable standards and acceptability to the local community. Section 4.5 of the EIA Guidelines for Industries (1997) is as follows:

"We have seen that the prediction would provide to us with an idea of the extent of changes in the environment, in quantitative or qualitative terms. But then we must see if these changes matter at all. This exercise is called evaluation; and it determines whether they are significant enough to warrant mitigation. This judgement of significance is based on one or more of the following considerations:

- Comparison with laws, regulations or accepted standards;
- Reference to pre-set criteria such as protected sites, features or species;
- Consistency with government policy objectives;
- Acceptability to the local community or the general public;
- Severity of the impact (reversible or irreversible);
- Prevalence (eventual extent of impact);
- Duration and frequency of the activity causing adverse impact;
- Risk (probability of serious environmental effects);
- Importance (local, regional or national);
- Mitigation (are solutions available to prevent or reduce severity of adverse impacts to acceptable level);

The possible evaluations using the above criteria are:

a) No impact;
b) No significant impact without, or with available and practicable mitigative measures;
c) Unknown significance (may be due to lack of project or environmental data);
d) Significant impact;
e) Residual impact, with available and practicable mitigative measures.

In order to carry out environmental auditing, there is an urgent need for capacity building and skill development. Bangladesh Public Administration Training Centre (BPATC) may take initiative to impart training for evaluation and environmental auditing by forming a team from the relevant department and ministries. This arrangement can be made developing some separate programs alternatively; some curriculum can be introduced in Advanced Course on Administration and Development ACAD; which is designed for the Deputy

Secretaries and of equal ranking officers to the government) and Senior Staff Course SSC; which is designed for the Joint Secretaries and of equal ranking officers to the government) for orientation of environmental concerns.

Implementation of GP Options: The implementation of the selected GP options involves two steps: preparation and execution. Preparatory steps include training, awareness building and competence development. This is followed by the installation of equipment and systems along with operator instruction and practical training. There is system of specialized training under different specialized Departments and Ministries in Bangladesh. Rut due to the lack of intersectoral coordination some time makes it difficult to utilize available skill. In Bangladesh, "EIA Guideline for Industries (1997)" has made a provision of implementation schedule under section 4.7 (iii), which says, "This schedule should indicate the timing of the work plan as to when the protection measure is to be installed and /or be operational". The guidelines have the provision for manpower requirement under section 4.7 (iv), which states, "This should include the management, technical and support staff and any resources required to implement the protection measures". BPATC can provide such training; in addition, it can also promote collaboration among different organizations and agencies through training from foundation to a higher level.

Monitoring and evaluation: Once the selected GP options have been implemented it is vital to check whether they are producing the desired results. This involves monitoring the overall GP system to ensure that it is proceeding in the right direction and that targets are being achieved as per the implementation plan. Findings are reported for management review. The EIA Guideline for Industries (1997) of Bangladesh stipulated a provision under section 4.8 for monitoring post project program to identify

monitoring location, parameters to be monitored and frequency of monitoring.

Sustaining GP: In light of the findings of the GP evaluation, corrective actions can be taken to keep the GP program on target. In some cases targets and objectives themselves will have to be modified. As the program progresses a feedback system should be implemented so that new problems and challenges will be highlighted and appropriately dealt with. EIA Guideline for Industries (1997) of Bangladesh stated the provisions under Section 4.6 for undertaking the mitigative measures. A simple matrix of environmental parameters versus mitigation measures containing brief description of the effects of each measure can be narrated.

Section 4.6 Mitigation Measures

If the exercise of evaluation of impacts reveal that the potential changes do matter, then the EIA study proceeds to seek solutions for preventing or reducing the impacts to acceptable levels. These solutions are the mitigation measures which need to be properly analyzed. A wide range of measures are available to prevent, reduce, remedy or compensate for each of the adverse impacts evaluated as significant. The possible mitigation measures include:

- Changing project site, or routes
- Changing processes and raw materials
- Changing operating methods
- Changing disposal routes or locations
- Changing engineering designs and methods of construction
- Introducing pollution control in the plant and waste treatment
- Personnel training, public education and social services
- Landscaping, afforestation, green belt

- Offering compensation in cash to affected persons or restoration of damaged resources, resettlement, rehabilitation

All mitigation measures cost something and this cost must be quantified. The various measure are then compared and trade-offs between alternative measures are weighed. Finally an action plan is prepared, which is a combination of a number of measures. The action plan may include, besides technical measures, the following:

- Integrated management scheme
- Monitoring plan
- Emergency response plan
- Project scheduling

Implications of adopting different alternatives should be analyzed to help make a clear choice. For this purpose the techniques available are:

- Cost-benefit analysis, in which all quantifiable factors are converted to monetary values and actions are assessed for their effect on project costs and benefits.
- A simple matrix of environmental parameters versus mitigation measures containing brief description of the effects of each measures.

In Bangladesh each and every sector have their own strategy and policy to get the work done sustainably, but in certain cases, some sectoral conflicts are found. In order to resolve the conflicts, BPATC can arrange dialogue amongst the multidisciplinary and multisectoral officials to come up with adoptive and time befitting strategies.

Tools for Green Productivity

Project Cycle: Development of a flowchart and process flow diagrams provide a graphical method of representing activities

processes and material flows for assessment of material inputs and outputs. Bangladesh is also following the steps of project cycles in implementing a development project. But major constraint here like other developing countries is the lack of intersectoral cooperation and coordination. In order to facilitate multisectoral skill and coordination, local regional workshop, seminar and training need to be organized.

Gap Identification of Sectoral Policies: To identify gaps in performance by comparing the current achievements of a department or company against what others have done; for example, Environmental problems can be identified using eco-mapping - a simple and practical visual tool that provides a bird's eye view of a company's operations and thus a quick inventory of practices and problems. For interstellar cooperation National Environmental Management Action Plan has been implemented (1992-1995) by the Ministry of Environment and Forest of the Government of Bangladesh, where comprehensive action plan is prepared to take care of the environment of **all sector.** As a next follow up action UNDP funded "Sustainable Environmental Management Program (SEMP)" is in progress where both government and NGO agencies are implementing 26 components of different environment sectors.

Remedial Measures: GP options are generated and assessed using cost-benefit analysis which facilitates the coinparison of alternatives in terms of the monetary costs involved and the benefits that can be obtained. Typically the tool is used in feasibility studies. In feasibility studies and examination of the viability of project are also in practice in Bangladesh. But incorporation of environmental costing is progressing at limited scale. This is because of constraints of both budget and professional skills.

Technique Applied to Bring Changes

GP techniques are used to bring about the changes that will result in better environmental performance and improved productivity. These range from simple housekeeping technique to designing "green" products.

Awareness Creation: GP techniques include awareness programs and the management techniques, which focus on keeping processes, equipment, workplaces and work forces organized, neat, clean, standardized and disciplined. Other good housekeeping techniques relate to measures that prevent the loss of materials, minimize waste, conserve and save energy, and improve operational and organizational procedures. Good number of awareness creation programs have been undertaken by the Government of Bangladesh and civil societies, such as all national and international Days like World Environment Day on 5th June every year is observed in a colorful manner. In order to encourage tree plantation competitively selected institutions and bodies are awarded (Prime Minister's Award for Tree Plantation) for the contribution of tree plantation and week long tree fair is arranged in mid June all over the country. These programs created immense impact among the people on environment.

Design Change: The environmental impact assessment is canied out by taking environmental considerations into account during project planning and design. This also refers to mitigative measures as stipulated in EIA Guideline for Industries (1997) under Section 4.6 (Stated before) in Bangladesh.

Process modification by replacing inefficient or old processes with new technology for total change in the production process: This also refers to some mitigative measures as stipulated under Section 4.6 of EIA Guideline for Industries (1997).

Waste Management: Waste stream segregation and the promotion of recycling, reuse and recovery are two broad

techniques used to reduce the amount of waste a company produces and to improve management of waste. Discharge of industrial waste or waste of any project is regulated by Rule 13 (stated before) and Schedule 10 of Environment Conservation Rules 1997.

VI Constraints of Maintaining Green Productivity in Bangladesh

Inconsistencies in Sectoral Issues: Despite all the efforts made for the conservation of biodiversities (BIOD), there are many limitations of their own due to sectoral approach, lack of inter-sectoral coordination, necessary practical laws, by-laws, weaker mechanism and their implementing agencies. In addition to these sectoral policies and laws, they are sometime inconsistent rather conflicting to each other. For example, environmental policy emphasized the need for "encouraging the land use systems compatible with various ecosystems" and stressed the need for "preventing spread of salinity and alkalinity on the land". The export policy 1993-95 has a conflict with it, urging for expansion of intensive shrimp cultivation to increase export earnings (cited by Amin and Nishat 1999). A similar trend is observed for conversion of wetlands into paddy field in the name of food autarky.

There is conflict of authority in Bangladesh, for example, Land Management Manual 1990 vested the responsibility of wetlands (jalmahal) with the Ministry of Land, while the Ministry of livestock and fisheries looks after the management of fisheries.

Inadequacies of Sectoral Laws: Inadequacies in sectoral laws, Forest Act 1927 with amendment of 2000 defined BIOD related issues, but no other laws has defined the issues of BIOD to address in other ecosystem such as the wetland management, coastal and marine resource management. The lack of explicit conservation law consistent with other sectoral issues is the main pitfall in

conservation of BIOD in Bangladesh. For example, in contravene to forest law random use of pesticide and indiscriminate application of fertilizer in agriculture sector is encouraged to increase food production. Similarly, expansion of High Yielding Varies (HYV) of rice, vegetable, fruits, timber and fuel production caused the enormous destruction of genetic variety. Hardly any such study has yet been carried out to assess the extent of genetic and species depletion and impact of possible danger and disaster it may entail in future.

Weak Mechanism and Implementation Agencies: As regard implementation there are serious lacking as well. For example, Tanguar Haor, in Sunamganj district of Bangladesh is a very rich wetland with wide variety of fauna and flora especially with rare migratory birds. This haor was used to lease out every year for about TK 5 million by the Ministry of Land. An economic analysis of only tangible resources showed that this hour could provide benefits of worth Tk 290 million for a year (Billah et al 2000). Moreover, it has immense ecological value yet to estimate. Considering both the economic and the ecological importance this haor was declared as RAMSAR site (World Heritage). It has been approved by the highest authority to hand over this haor to the Ministry of Environment and Forest. But the Ministry of Land is still very hesitant to comply it. This tussle allowed to destroy BIOD of the haor till date.

Despite the available law in the country, hardly any actions have been taken against the on going anti-environment activities, for example, there are wide coverage in media against Hill cutting in Chittangong city, encroachment of Buriganga along with specific photo and picture (Amin and Nishat 1999) and dangerous pirates committing damage in Sunderbans, even forest official alleged that police are not extending their cooperation, because of the fact that these people are associated with different political parties and they have alliance with power politics. For killing of wildlife and migratory birds there is Breach of Wildlife Order 1973 punishable, with a policy for conservation of nature but

enforcement mechanism is very poor. For trading of wildlife species, there is law of banning it but cross border illegal trading is very common despite existing laws. This is also due to weak implementation mechanism.

Recent Major Initiatives: The Red List of Threatened Animals of Bangladesh has just been published by International Union for Conservation of Nature (IUCN) country office. The National Herbarium is preparing a Red Book of Flora. Under Section 1 of Subsection 5(1) of "Environmental Conservation Act, 1995", which states that the Government can declare an area as Ecologically Critical by Gazette notification, if it thinks that the Eco-system of any area is critical or going to be critical due to the environmental degradation, the Government of Bangladesh has declared, seven areas of the country as Ecologically Critical Areas, they are: (i) St. Martin Island (ii) Hakaluki Haor (iii) Tanguar Haor (iv) Marjat Boar (v) Sonadia Island (vi) Himchari- Technaf and (vii) Cox's Bazar Beach. The management plan for these areas are yet to develop.

Regional and International Collaboration: In developing tourism industries, Bangladesh has no proper manpower to develop. It should seek assistance of World Tourism Organization and Pacific Asia Tourism Association (PATA) in this regard. The possibility of joint collaboration for development, marketing and managing the project should also be seriously explored. Collaboration with relevant agencies, support the concept of Green Productivity and have it reflected in all their development activities, provide special supporting funds for projects having significant components of Green Productivity, and make constant efforts to create favorable environment towards Green Productivity enhancement.

VII Conclusions and Recommendations

Caring the environment in undertaking development efforts is the prime consideration in order to maintain the green productivity. Based on the principles adopted at the Rio Earth Summit the economic sustainability is given top consideration for

overall socio-economic development of the world. World Summit for Social Development also reached in consensus that equity and justice in every action of human activities must be ensured for the welfare of the society.

The Asia-Pacific region is home of almost half the global population and the recent years remarkable economic development in the region has facilitated the improvement of living conditions of the majority of its vast population. Unfortunately, unplanned development process caused degradation of natural environment and depletion of natural resource base, which eventually will result in environmental disaster for the humanity.

Considering the strong resource base of the region and high population density, the promotion of sustainable economic development needs appropriate management that may ensure higher economic growth, greater employment opportunities and better standard of living of the people. In return, this may lead to reduce the global environmental degradation and ensure sustainable, economic development. The success story of sustainable growth of this region can be of good example for other developing countries in the world.

The highest density of the population in Bangladesh, resulted much stress on natural resources and on the environment of the country. Bangladesh being a tropical country is very much resourceful in terms of biodiversity and natural resources like gas, flora and fauna etc. In achieving higher economic growth, special care needs to be taken in undertaking development efforts, increasing productivity should not be attained at the expense of resource depletion and environmental degradation.

The Government of Bangladesh undertook a good number of measures to manage the environment of the country very efficiently such as national development policies, legislation, regulations and economic measures and implement them effectively along with complementary micro-level systems to promote Green Productivity and encourage creation of green

product alternatives through various measures including taxation, financing and human resource development.

But, constraints of maintaining Green Productivity in Bangladesh still remains, such as- inconsistencies in sectoral issues, inadequacies of sectoral laws, weak mechanism and implementation agencies. In order to resolve this crisis locally, intersectoral cooperation and collaboration need to be developed. For achieving those targets, professional skills and expertise need to be enhanced through training and research. Thus academicians, researchers and trainers can play a vital role through motivation and training and develop group leadership. Local, regional collaboration can be sought, to address the transboundary issues of environment.

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