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**SYSTEMS AND NATIONAL LEVEL EXPERIENCES
FOR PROTECTING TRADITIONAL KNOWLEDGE,
INNOVATIONS AND PROTECTIONS:
EXPERIENCE OF BANGLADESH**

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SYSTEMS AND NATIONAL LEVEL EXPERIENCES FOR PROTECTING TRADITIONAL KNOWLEDGE, INNOVATIONS AND PROTECTIONS: EXPERIENCE OF BANGLADESH¹

Introduction

Bangladesh lies 20°34' - 26°38' N and 88°01' - 92°41' E. It is bounded by the India to the west, the north and the north-east, by the Myanmar to the south-east and by the Bay of Bengal to the south.

The country is mostly low and flat with hilly areas restricted to the north-east and south-east and scattered higher land in the north and north-east (FAO, 1988). The floodplains account for about 80% of the land, hills account for 12% and terraces occupy 8% of the country (Brammer, 1990). The country enjoys a sub-tropical monsoon climate with a distinct dry season. Although there are six seasons in a year, three seasons viz. winter, summer and monsoon are prominent. In the winter (November-February) the temperature varies from 5° - 23°C, in the summer (March-June) the maximum temperature shoots up to 40°C while monsoon starts in July and persists until October (FAO, 1988). This period accounts for 80% of the total rain fall (FAO, 1988). An analysis of the isohyet map of the country indicates that mean annual rainfall varies from 1250 mm in the extreme west to 6000 mm in the north east corner of the country, although mean annual rainfall over much of the country is in the range of 1500-3000 mm (FAO, 1988).

The following statistics will describe the current situation of the country. At current prices, contribution of agriculture to GDP is 30 % and provides more than 65 percent of employment and accounts for roughly 32 % of export earnings. The crop sector alone accounts for 73 % share of agricultural output followed by fisheries (9.9%), livestock (9.6%) and forestry (7.4%).

Total area of the country	14.75 m ha
Population Density	900 per sq.
Net cropped area	9.03 M ha
Total cropped area	13.7 M hectare
Cropping intensity	180 %
Per capita land	0.05 ha
Per capita income	US \$ 350
Total area under irrigation (minor and major)	3.8 M hectares
Rice production growth during 1980-1993	2.66 %
Area occupies by rice	75 %
Other major crops grown	Jute, Tobacco, Sugarcane, Potato, Sweet potato, Oilseed, Pulses, vegetables, Spices etc.
Rice yield	National average 1.8 t/ha (irrigated boro 2.5 t/ha)

There has been a rapid change in the agricultural scenario of the country over the past 25 years. Rice production nearly doubled from 10 to 19 million tons bringing the country on the verge of achieving self-sufficiency in food grains. This achievement has been based on a substantial intensification of farming: modern rice varieties (MVs) now account for 55% of the harvested rice area; the cropping

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intensity rose from 143% to 180%. The national indicators on health, literacy and life expectancy at birth have all improved and the proportion of people living in poverty has declined.

Land use systems in Bangladesh

The total land area of the country is about 14.75 million hectares of which 12.98 million hectares (88%) are land surface (agricultural land 65.3%, government forest land 15.19%, tea garden 0.76%, housing and settlement 4.38%, cultivable and uncultivable wastes 2.37%) and 1.77 million hectares (12%) are covered by the rivers and inland water bodies (BBS, 1994).

CONSEQUENCES OF MODERNIZATION IN AGRICULTURE

With the introduction of modern varieties of rice, though the productivity has increased manifold, some problems in agriculture have emerged. These includes loss of soil fertility, low organic matter contents (more than 60% has below 1.5%) in the soil, low level of nitrogen in almost all soil types, deficiency in P, deficiencies in Z, S and B, etc.

Nutrient imbalance is also a major problem that emerged due to improper use of chemical fertilizers. The chemical fertilizers applied to the soil is far below the recommended dose particularly the P and K. In some cases, excessive nitrogen is applied. This has created nutritional imbalance as well as acute depletion of nutrient elements in soil particularly in intensively cultivated areas. The annual rate of depletion is estimated at 250kg/ha while only 100 kg/ha is returned to the soil in the form of added fertilizers.

Sedimentation due to upstream deforestation, inappropriate cultivation practices and low organic matter content in soils contributes to soil erosion that in turn leads to sedimentation in downstream rivers, lakes, etc. This results into flash flood and claim productivity of crops.

Genetic erosion due to the introduction of modern varieties of crops is a serious problem in agriculture. The country has been the abode of some 5000 species of higher plants (angiosperms). There were some 8500 cultivars of rice alone in the early 1960s, which has been reduced to only a few dozens of rice cultivars to be found in farmers' fields.

Importance and scope of traditional knowledge (TK) in Bangladesh

Bangladesh is predominantly a rural country with agriculture being the mainstay of the economy. The majority of the population is either directly or indirectly connected with agriculture. In such an agrarian society, farmers have relied upon indigenous knowledge for centuries, organizing production on the basis of local knowledge transmitted from previous generation where it is built upon, modified and refined to suit current circumstances. Farmers grow and retain these cultivars mainly due to (i) non-availability of improved varieties and/or their seeds, (ii) low input requirements by traditional varieties, (iii) their adaptability to specific ecological niches (e.g. deep water rice, salinity tolerant varieties of crops, etc.), (iv) their resistance to pests, (v) their specific quality(ies) like finer grain, aroma, specific tastes, etc. It is significant to note that traditional varieties suited subsistence farming which is still, the very feature of Bangladesh agriculture.

Today farmers are exposed to modern knowledge of farming but they have not abandoned their indigenous knowledge, and this remains true for other traditional occupational groups such as carpenters, potters, weavers, blacksmiths, herbal practitioners and fishermen. These groups also

continue to draw on their local knowledge heritage, intrinsic to daily life, when producing their goods and products.

We can no longer afford to ignore the value of indigenous knowledge and by continuing to view the knowledge and practices of local people as 'Primitive', unscientific and as a hindrance to development, the desired goal of achieving sustainable development in the country's many sectors may continue to remain unrealized. It is essential that planners, policy makers, and development practitioners endeavour to understand the indigenous knowledge and practice of the community in which they are working. Through an understanding they will be better able to integrate local knowledge with modern scientific knowledge, and in doing so instigate development initiatives that are both environmentally and socially appropriate and hence more sustainable.

Recent strategy documents for environmental management and agricultural extension indicates that the govt. of Bd. is increasingly laying emphasis on IK, particularly that relates to natural resources mgt. The NEMAP (1995) includes in its recommendation that actions on land resources must integrate indigenous land out practices, to increase efficiency of the production system and its application. The NAEP (1996) states further that, "It is recognized that farmers' own IK is often environmentally sustainable, and efforts should be made to support and learn from farmers, as well as the formal research system." It also says that farmers' are actively engaged in their own experimentation, as part of their daily agricultural lives.

The relatively small resources that indigenous knowledge research requires will yield a large dividend in furthering poor people's advance forwards. There is no reason for scientists to feel threatened, it should not take resources away from their valuable research, nor undermine it. On the contrary, it should enrich and improve it.

Estimated economic value of TK in these and other areas

There is no study to find out the quantitative value of the TK being practiced in the country. Studies conducted so far on TK involves documentation of knowledge systems in crops, forestry, fisheries and livestock (Silletoe, 2000, Khan and Sen, 2000). Haque (2000) made a qualitative assessment of loss caused by hydroelectricity project in Kaptai, re-settlement in the Chittagong Hill Tracts, Forest Development Project, Waterlogging in Beel Dakatia, Narayangonj-Narshingdi Irrigation Project and Shrimp Cultivation in Chakaria and Sunderbans. Similarly, Rahman, et al (2000) recorded indigenous knowledge of plant use in a hill tracts tribal community which identified 30 plant species being used for medicinal purposes. There are several others who recorded traditional knowledge but none attempted to find out quantitative value of the TK.

Existing or envisaged systems for the protection of TK

The idea of protection of indigenous knowledge is recent. With the implementation of CBD, government of Bangladesh initiated drafting legal instrument to biodiversity and community knowledge and new plant varieties developed by the public and private sectors.

A draft list of plant genetic resources has already been prepared, which includes local and scientific name of species, species attributes, habitat, status (exotic or indigenous) and uses (Khan and Ahmed, 2000). Bangladesh Academy of Agriculture (1997) documented 100 useful indigenous agricultural technologies that encompass crops, forestry, fisheries and livestock. As mentioned earlier, there are many other publications that documented hundreds of other

technologies related to traditional knowledge. These technologies and farmer's practice will be further refined, verified and covered under *sui generis* system in the process.

Farmers have been growing and retaining cultivars. So far, there is no legal instrument in force to protect these knowledge or cultivars.

The role of customary law in protecting TK and regulating its transfer

There is no system in operation for protection of intellectual property rights of plant and animal genetic materials. However, in case of industrial microbiology, patenting are made. There is a council for industrial research (Bangladesh Council of Scientific and Industrial Research) which generates industrial technologies. The organization patents microbes as a part of the total process. Citric acid fermentation, baker yeast from molasses, etc. (Feroza, 2000 Personal communication) are few industrial microbial technologies patented by the organization under customary law of patenting.

Conservation of genetic resources by ARIs

Agricultural Research Institutes (ARIs) are involved in genetic materials collection and conservation. There are three gene banks with limited facilities in three Agricultural Research Institutes (ARIs) namely, Bangladesh Agricultural Research Institute (BARI) that conserves genetic materials of crops other than rice and jute, Bangladesh Rice Research Institute (BRRI) conserves rice genetic materials and Bangladesh Jute Research Institute (BJRI) conserves genetic materials of fibre. The list of genetic resources conserved in those gene banks are documented in plant genetic resources of Bangladesh (Khan and Ahmed, 2000). Other ARIs are also involved in in-situ conservation.

Activities of NGOs in genetic conservation

Among NGOs, UBINIG, Bangladesh Seed Foundation and BARCIK are note worthy in genetic conservation and documentation. UBINIG is involved in community gene bank with the local participants with special emphasis to women. They conserve mainly traditional varieties of crops and practice organic farming.

Bangladesh Seed Foundation (BSF) performs almost similar type of activities. The participants conserve the seeds voluntarily as a group member of the organizations. BARCIK is involved in documentation of traditional knowledge.

NATIONAL COMMITTEE ON PLANT GENETIC RESOURCES (NCPGR)

Recognizing the needs for conserving traditional varieties and knowledge and as an obligation to TRIPs and CBD, government has constituted a committee named "National Committee on Plant Genetic Resources" to identify national genetic resources and draft related acts to conserve the biodiversity and community knowledge protection and new plant varieties. The committee organized a national workshop during 1997 with representatives from related national and international bodies and recorded status of plant genetic resources in the country (Hossain et al. 1998). The workshop recommended to draft acts for protection of biodiversity and community knowledge and new plant varieties. Two draft acts have been prepared and are in the process of approval by the appropriate authority. The salient features of the acts biodiversity and community knowledge protection act are as follows:

Biodiversity and Community Knowledge Protection Act

The main objective of the biodiversity and community knowledge protection act is protecting the sovereign rights of the Communities that have knowledge of biodiversity, and have managed, maintained, conserved, reproduced and enhanced biodiversity, genetic resources and traditional knowledge, culture and various forms of practice related to these resources and to create the legal and institutional environment.

The specific objectives are,

- (a) to ensure the conservation and sustainable use of biological and genetic resources and related knowledge, culture and practice in order to maintain and improve their diversity as a means of sustaining the life support and healthcare system of the people of Bangladesh.
- (b) to protect biological and genetic resources and the related knowledge, culture and practice from pollution, destruction and erosion;
- (c) to protect and support the rights, knowledge, innovations and practices of local and indigenous communities and national scientific and research institutions with respect to the conservation, use and management of biological and genetic resources;
- (d) to provide an appropriate system of access to biological and genetic resources and related knowledge based upon the Prior Informed Consent of the concerned local or indigenous communities and the State;
- (e) to promote appropriate mechanisms for a fair and equitable sharing of benefits arising from the use of biological and genetic resources and related knowledge and technologies;
- (f) to ensure participation and agreement of concerned communities in making decisions regarding the distribution of benefits which may derive from the use of biological and genetic resources;
- (g) to promote and encourage the building of national scientific and technological capacity relevant to the conservation and sustainable utilization of biological and genetic resources;
- (h) to promote new innovations and discoveries to reproduce, manage and enhance biodiversity and genetic resources;
- (i) to ensure that the transfer and movement of biological resources and the knowledge of the community take place in transparent manner and in accordance with this Act; and
- (j) to protect the biological and ecological environment of the country from all pollution, particularly from the potential hazards of biological pollution caused by the release of genetically modified organism in the environment or may be caused by the genetic engineering technology;

General Provisions

The proposed act covers all biological and genetic resources and related knowledge as well as their derivatives within the jurisdiction of the country, both *in situ* and *ex situ*. It implies all varieties of life forms including plants, animals, fish and aquatic life forms and microorganisms belonging to all genera/species and varieties, wild or cultivated, occurring naturally or modified in any manner whatsoever through any process, and to their cell lines, genetic material, characteristics, traits, products and the processes involved therein.

The people of Bangladesh are constituted into diverse communities and localities, diverse life styles and cultures in various ecosystems in accordance with the fundamental premise of biodiversity and genetic resources and the knowledge, intellectual practice and culture related to them. The Act shall provide legal protection to safeguard their lifestyles and livelihood practices from degeneration, erosion and/or destruction. Accordingly, the access and use of biological and

genetic resources will be guided by these values. The Act shall be the enabling instrument for the people of Bangladesh to exercise their sovereign and inalienable rights, formal and/or informal, over the biological and genetic resources and related intellectual and cultural knowledge. These rights shall be exercised either through traditional and customary laws, practices, values, moral institutions, community arrangements, institutions or through various laws and regulations of the State, including the new provisions enacted by this Act. This Act prohibits violation of Common Property Regimes that include various rights, relations, arrangements and cultural practices whether or not they have legal expressions or recognition though legal precedence by which Communities own, use and have access to biological and genetic resources. This Act shall ensure that no citizen of Bangladesh is prohibited from access and use of biological and genetic resources and the related knowledge, intellectual practice and culture as long as such access and use do not fall outside the cultural, traditional, customary practices and/or do not constitute activity to make economic profit.

It is recognized that the life supporting and life affirming system of the people of Bangladesh is a matter of national security. This system is traditionally and historically based on biological diversity and constituted by the biodiversity-based regeneration and production activities in order to ensure food, fiber, medicine, energy, construction materials and other vital necessities of life, including nutritional and ecological security, healthy environment and valuable knowledge and culture of survival. Consequently, any development and project activity shall be prohibited and/or deemed illegal if they erode, destroy or become detrimental to the biological and genetic basis of national security.

The Act protects and develops systems that are based on biodiversity and genetic resources and related knowledge and culture, such as agriculture, forestry, fisheries, animal husbandry, medicine and other relevant systems. Any intervention, technology or otherwise, in these systems, causing irreversible damage, destruction, and/or negative short term or long term consequences according to this Act is prohibited and illegal.

The Act shall protect and encourage diversity in life and production practices, diverse knowledge and cultural systems, various formal and informal innovations and practices of the Communities, particularly Local and Indigenous Communities and the Communities holding Residual Title, with respect to the conservation, management, use and generation of biological and genetic resources.

The Act shall protect, develop and strengthen the integrated, interconnected and unique feature of the biodiversity based agriculture of Bangladesh, which is holistic in spirit and practice and includes fishery, animal husbandry, poultry, use of microbes, forestry and various domesticated and undomesticated plants, animals, birds, fish, microbes and other life forms.

The Act shall be the legal basis to protect the biodiversity of genera and species of all life forms in general or of particular forms belonging to plants, animals, insects, microbes, fish, birds or others of forests, wet lands, marine environment, river and other eco-systems.

The Act shall protect and encourage the ingenuity of the various Communities for the national interest as well as for the common good of humanity, particularly the innovative talents of primary food producers such as farming and fishing communities, communities living in forests etc.

The Act shall be the legal basis to promote and support different ways of generating knowledge and technology in various forms and contents, by giving priority to the material and cultural development in order to achieve qualitatively higher life standards and happiness of the people of Bangladesh.

The Act shall recognize a ‘Community’, a ‘Local Community’ or an ‘Indigenous Community as having legal person and their rights inscribed in this Act as inalienable.

The Act prohibits all forms of monopolization of biological and genetic resources and related knowledge and culture.

By this Act the State shall uphold the Common Property Regimes as against any private claim over the biological and genetic resources and the intellectual and cultural knowledge and practice related to these resources in case of legal conflicts.

NEW PLANT VARIETIES PROTECTION ACT

The main objectives of the act are:

- a) to allow for legal protection over commercial plant varieties in Bangladesh;
- b) to provide an incentive for private sector breeders to invest in the development of commercial plant varieties in Bangladesh;
- c) to provide the relevant Ministries and Universities in Bangladesh a legal mechanism to control the use of commercial plant varieties developed by them or to claim benefit sharing for said varieties, as appropriate;
- d) to fulfill the commitment of the Government of Bangladesh under Article 27-3(b) of the TRIPs Agreement of the WTO; and
- e) to provide for awards recognizing the contribution of new plant varieties which may supplement or replace commercial incentives.
- f) to allow for legal protection of communities as
 - (a) owner, user, custodian, and steward of plant varieties held in common,
 - (b) residual title holder as stipulated in Biodiversity and Community Knowledge Protection Act, and
 - (c) farming community with Farmers’ Right

The Act will provide appropriate institutional mechanisms for the effective implementation and enforcement of this legislation.

The Bangladesh Plant Variety Rights Authority (PVRA) shall be the executing agency of this Act and shall have the authority to grant a New Plant Variety Certificate as well as Citations of Recognition and Awards. The Bangladesh Plant Variety Rights Authority shall be the administrative body for this Act. The Authority shall have the rights and responsibilities of grant New Plant Variety Certificates, establish rules and regulations for examining and granting New Plant Variety Certificates, arrange for regional cooperation in the examination of plant varieties and in the exchange of information relevant to Plant Variety Rights, determine procedures for operationalizing Farmers’ Rights and establish and manage the Plant Variety Development Fund.

The Plant Variety Rights Authority will be chaired by a person of eminence in agriculture and consist of officials from relevant ministries and agencies.

On the date of commencement of this Act, at least 15 genera or species, and within a period of 10 years from the date of commencement, all plant genera and species will be entitled to variety protection.

NATIONAL BIODIVERSITY AUTHORITY

A national inter-sectoral body at the highest level, composed of relevant representatives from the public sector, scientific and professional organizations, people's organizations, women's organization, development and environmental organizations and representatives of local and indigenous communities, shall be created as a regulatory body to ensure proper implementation and enforcement of the provisions of this legislation. This body will be called as The National Biodiversity Authority and will function as an independent and autonomous body. This will be represented by the representatives of related NARS institutes and one member of Parliament and six members representing different communities (The National Biodiversity Authority shall also be the implementing agency of the New Plant Varieties Act of Bangladesh as well as other Acts related to biodiversity and innovation in other areas.

All genetic resources should be identified and registered under NBA. Local government will be involved in all steps of registration. Thus if there is any exchange, communities will be informed of the process. The National Biodiversity Authority may approve the granting of access to the material requested with or without conditions. An agreement shall be signed between the Collector and the National Biodiversity Authority on behalf of the community/communities as well as the State as soon as the application is granted.

Access and benefit sharing

Access to biological and genetic resources shall only be given to individuals, community, research institutes or any other public or private organizations involved in the improvement of varieties. Collector(s) must provide written commitment that all research reports and results associated with the Specimen collected from Bangladesh is provided to the National Biodiversity Authority and the concerned Communities.

If there is any benefit accrued due to the utilization of genetic materials and the material is commercially utilized, benefit should be equitably be shared. There will however, be a limit on the sizes of the Specimen that the collector may obtain and/or export based on the status of the species.

Access and Collection for Commercial Purpose

Access and collection for commercial purpose or any bioprospecting activities with direct or indirect intention for commerce shall have to meet all requirements of general provisions for access and collection.

The Collector shall have to agree to National Biodiversity Authority that any damage that may be caused knowingly or unknowingly by the commercial activity or activities will be compensated by the Collector to National Biodiversity Authority, or to the affected Community as decided and directed by the Authority. The Collector shall have to pay a fee for commercial collection to be decided by the National Biodiversity Authority.

In addition to fair and equitable benefit sharing in terms of technology transfer and the sharing of knowledge and scientific skills, at least 50 percent of the commercial profit generated in such activities will have to be shared with the Community/ies.

FUTURE ACTIVITIES

ESTABLISHMENT OF NATIONAL INSTITUTE OF PLANT GENETIC RESOURCES

Bangladesh has affixed high priority in conservation and utilization of genetic resources. A National Institute on Plant Genetic Resources is in the process of establishment. The institute will be responsible for genetic resource exploration, collection, characterization, evaluation, conservation, utilization, documentation, exchange and training to create awareness among the stakeholders and end-users.

Though the institute is emerging as only plant genetic resources institute, in course of time, it will cover activities related to animals and the institute will then be converted into national institute of biodiversity.

Initially, the institute is being launched with local resources but as it needs technical assistance in evaluation and utilization of genetic resources, foreign assistance would be required. Moreover, there is serious dearth of trained manpower in the discipline. An effort will be made to develop human resources to work on genetic resources conservation and utilization.

SUPPORT NEEDED

As mentioned earlier, Bangladesh is in the process of developing legal instruments to protect the biodiversity and community knowledge. Strong support in implementation of the legal instruments, establishment of the national institute in general and technical aspect such as expatriate consultants, human resource development and equipment in particular would be needed to operationalize the institute.

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