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Resilient Bangladesh - Environment and climate change policy brief

This brief has been written in January by Olof Drakenberg and Göran Ek at Sida Helpdesk for Environment and Climate Change in collaboration with Knud Falk at the request of Daniel Klasander, Embassy of Sweden in Dhaka, Bangladesh. In the context of the upcoming strategy process for Bangladesh the Helpdesk has been assigned to provide input on how resilience can be applied as a concept and possibly a results area in a future strategy. The draft has benefited from discussions with Daniel Klasander and Louise Herrman and Åsa Bjällås, Sida Stockholm.

Table of contents

1. Introduction to a development perspective on resilience	1
2. Environment and climate change risks and opportunities and impacts on resilience .3	
2.1 Selected environment and climate change impacts in rural and urban contexts	3
2.2 Opportunities	4
3. Institutional capacity to manage environment and climate change risks and opportunities	4
4. Ideas on resilience as a result area	7
4.1 New result area: "Environmental management and basic services to build resilient communities"	7
4.2. Integration of a strengthened resilience perspective in existing initiatives.....	10

1. Introduction to a development perspective on resilience¹

Sida has chosen to adopt the following working definition of resilience: *The ability of an individual, a community, a country or a region to anticipate risks, respond and cope with*

¹ This text builds on ongoing work within Sida and should be considered work in progress.

shocks and stresses, while addressing the underlying root causes of risks, recover, and continue to develop.

A pragmatic attempt to translate the thinking into actions from a Sida perspective means:

- Resilience can be considered a 'merger' between other 'agendas' including disaster risk reduction (DRR), climate change adaptation (CCA), food security, environmental management and restoration (maintenance of ecosystem services), social protection etc. It serves as a unifying concept, and is useful because people experience their lives holistically: people live in complex, interconnected systems. Note that Sida's definition includes the vision of continuing to develop – and be ready for change.
- A resilience approach requires more "cross-sector" planning so several aspects of vulnerability are addressed in parallel (see characteristics below). Resilience is about 'adaptive capacities' – about managing change and eventually thrive. Uncertainty and change is accepted, and handled by becoming flexible and have multiple options when facing new challenges.
- Promoting resilience from a developmental/humanitarian perspective means to focus *mainly* on vulnerable peoples' ('individuals' and 'communities' in the definition above) ability to meet short- and long-term challenges to their livelihoods, safety and potential for development.
- However, the community level impact needs to be supported by higher level efforts to change the deep-rooted causes of vulnerability, including social, political and cultural inequalities etc. So policy dialogues, support to governance and political reforms as well as, for example, sector support to government agencies are important in establishing an 'enabling environment' for community resilience building.
- At least, do not undermine resilience: Guide any EIA processes to ascertain that no programming may risk eroding any groups' resilience (add to the risks/ challenges) – i.e. ensure proper analysis of potential side effects on vulnerable groups of any kind of infrastructure projects, and unintended effects in other sectors.
- The thinking is also applicable in post-disaster situations to bridge the relief and development gap: do not rebuild vulnerability.
- Identify if there are any opportunities to modify existing programmes in order to contribute to enhanced resilience – including 'adaptive capacity' – and strive for contributing to *several* of the following 'characteristics' of a resilient community², which:
 - ...is *knowledgeable and healthy*. It has the ability to assess, manage and monitor its risks. It can learn new skills and build on past experiences
 - ...is *organised*. It has the capacity to identify problems, establish priorities and act.
 - ...is *connected*. It has relationships with external actors who provide a wider supportive environment, and supply goods and services when needed.
 - ...has *infrastructure and services*. It has strong housing, transport, power, water and sanitation systems. It has the ability to maintain, repair and renovate them.

² Arup (2011) Characteristics of a safe and resilient community

- ...has *economic opportunities*. It has a diverse range of employment opportunities, income and financial services. It is flexible, resourceful and has the capacity to accept uncertainty and respond (proactively) to change.
- ...can *manage its natural assets*. It recognises their value and has the ability to protect, enhance and maintain them.

2. Environment and climate change risks and opportunities and impacts on resilience

In the last 20 years Bangladesh has made tremendous progress in health and education reaching more advanced levels than richer neighbouring countries like India and Pakistan.³ The combination of better health, a more educated population and higher incomes has increased the resilience of the Bangladesh society and a majority of its population, although many vulnerable groups are not included in those improvements. To some extent these positive developments have eroded the functioning of critical ecosystems thus threatening overall resilience. Declining fish stocks, diminishing levels of ground water, eroding mangrove forests, degradation of agricultural lands and forests are examples of diminishing natural capital.

Key drivers for the diminishing natural capital include economic development and population increase in combination with lack of non-natural resources based livelihoods alternatives, tenure insecurity, subsidized water, energy and electricity tariffs, weak government capacity, and inherent challenges in managing common goods and downstream externalities such as water pollution.

Climate change and natural disasters is the key environmental related issue in Bangladesh with a large negative impact on the resilience on society at large and in particular on poor men and women. The country often ranks as the most climate vulnerable country in the world, being exposed to a number of weather and non-weather related hazards due to its geographic location, topography and population density. Flooding and cyclones are already major hazards and are expected to increase in the future due to global climate change. Melting glaciers and modified rain patterns calls for improved, equitable and transboundary management of water resources. Disaster and climate and environmental risks are not gender neutral. Due to different roles, norms and laws, access to resources etc women tend to be more exposed to risks and have less flexibility to respond to change.

2.1 Selected environment and climate change impacts in rural and urban contexts

Bangladesh country specific impacts of environment and climate risks include loss of lives, livelihoods, health and migration and conflicts. Natural disasters causing loss of livelihoods has led to an increase in migration to urban areas and associated land conflicts.⁴

At country level, the loss of natural capital and pollution affect economic activities and health and education in different ways. Air and water pollution and inadequate hygiene is accountable for about 20% of the burden of disease. Furthermore it has been estimated that climate vulnerability in combination with multiple interrelated environmental challenges account to annual economic losses in the order of 4 % of GDP (this figure includes health

³ The Economist Nov 3rd 2012

⁴ World Bank, 2010 Country Assistance Strategy for FY11-14

costs)⁵. The damages to housing represent the greatest asset reduction in the event of a cyclone induced inundation, the value of lost agricultural income and foregone education are also very high.

In the Rural Context

Water - Dry season river flows are significantly lower, water tables are falling and domestic water is often contaminated from arsenic, agriculture or poor sanitation leading to health problems and associated costs. Unavailability of water is becoming a constraint to irrigation and agricultural production and climate change is expected to decrease agricultural GDP by 3,1 % each year.⁶ A related problem is fragmentation of fish habitats, declining fish stocks and species loss of both flora and fauna that reduce the resilience of ecosystems.

Land – Due to incipient desertification and rising sea levels expected through climate change total arable land area is falling. Declining yields in low productive areas and the requirement for increasing inputs suggest that land quality is also falling. Diversification of crops and income sources can increase resilience.

In the Urban Context

Urban infrastructure in terms of housing, water and sanitation, energy, waste management etc is grossly inadequate. Urbanization is rapid, leading to unplanned settlements in unsuitable areas affecting drainage systems etc increase vulnerability to natural hazards. Urban wetlands are lost and unsanitary conditions and insecurity prevails for vulnerable groups. Weak chemicals management expose workers, soils, water bodies and communities to health risks, reduce opportunities for urban farming.

Water demand is likely to exceed possible supply in the near future. Dry season supply is already below acceptable standards and unreliable. Many towns will require total water supply and sanitation solutions.

2.2 Opportunities

Improved management of Bangladesh's natural resources including tariff reforms and implementation of legislation and disaster risk reduction actions could increase agricultural productivity, reduce health costs, reduce vulnerability to natural disasters, slow down migration patterns and create fiscal space for greater investments in a knowledgeable and healthy population. It requires a concerted effort, cross sectoral collaboration and a sequenced approach that acknowledges political challenges involved.

3. Institutional capacity to manage environment and climate change risks and opportunities

Government in Bangladesh has considerably improved its capacity for disaster risk reduction through better organisation, legislation such as Disaster Management Act and higher allocation of resources. Climate change adaptation and disaster risk reduction are addressed jointly and with an emphasis on disaster risk reduction and integration of the

⁵ World Bank, 2010 Country Assistance Strategy for FY11-14

⁶ World Bank, 2010, The economics of adaptation to climate change

issues across government sectors. Investments in physical disaster preparedness infrastructure such as cyclone shelters and non- physical infrastructure such as early warning systems have substantially increased the resilience of the population at large to the large-scale cyclones. This means that there are fewer deaths and injuries but also smaller damages on properties and infrastructure than previously. The success of the Cyclone Preparedness Programme has not yet been translated into similar effective warnings and contingency planning for the inland river floodings, and the preparedness programmes may also still have room for improvements in relation to supporting special vulnerable individuals and households (disabled, elderly people etc.) having difficulties in heeding warnings etc.

The sixth five year plan includes provisions for both disaster risk reduction and environmental sustainability, including conservation of natural resources, efforts to reduce air and water pollution, water management and climate change that signals an awareness of key issues and underlying drivers. Yet cross sectoral collaboration for instance between water and health or energy and environment remain insufficient and may be conflicting. Issues like subsidized energy tariffs are putting great pressure on the government budget, mainly benefitting richer segments in society and leading to greater congestion and health problems due to air pollution and discourages necessary investments.⁷ Similarly water for industrial use is often heavily subsidized leading to water scarcity instead of much-needed water conservation, including leakage control. In case of climate change the country has developed a national action plan together with key donors developed a fund to facilitate adaptation and resilience, Bangladesh Climate Change Resilience Fund. Thorough assessments have been made to help sequence adaptation actions with a focus on actions that address current climate related risks, to improve design standards for infrastructure and over time to address challenges like reducing settlements and economic activity in areas with high risks and transboundary cooperation on water resources. Donors and civil society may advocate more for ensuring climate change adaptation funding is not largely directed towards safeguarding infrastructure, but that a large proportion is channeled towards assisting vulnerable people in adjusting their livelihoods to more uncertain future.

However problems of policy planning and coordination remain and Bangladesh suffers from weak institutions and implementation mechanisms, large corruption problems, and substantial problems in delivering quality services for citizens. As an example the government's commitments regarding land distribution and tenancy contracts are not implemented, thus delaying tenure security and investments to increase food security. The Transparency International Bangladesh Household survey for 2012 showed that 60 % of households that had received services from the land administration sector were victims of corruption and harassment⁸. Reports of land grabs where powerful interests claim ownership rights are a problem which is also increasing due to climate change that increase migration and competition for land.

⁷ In 2012 Bangladesh energy subsidies amount to more than 4 % of GDP, equivalent to what the government spends on education. Prices for fuel and electricity are set lower than market prices. Some are like kerosene subsidies are mainly benefiting low income households, other like petrol mainly benefits richer households. http://www.iisd.org/gsi/sites/default/files/ffs_bangladesh_czguide.pdf Protests against subsidy reform in January 2013 illustrate the political challenge of reform.

⁸ <http://www.ti-bangladesh.org/files/HHSurvey-ExecSum-Eng-fin.pdf>

Although foreign aid only contributes to 2 % of GDP its share of government spending is large, not least in the area of environment, disaster risk reduction and climate change adaptation. Multilateral and bilateral actors are supporting government with large coordinated programs and funds and smaller and less coordinated projects.

NGOs/Civil Society Organisations in Bangladesh are vocal, and have the capacity to play an active role in service delivery, microfinance etc. thus contributing to more resilient communities – and where done well also in building resilient households. The success in terms of improvements in health and education status, and the cyclone preparedness programme, is partly attributed to the involvement of CSOs at national and community level. At advocacy level NGOs, often with donor support, have played important roles for instance in the development of a Right to Information Act and the establishment of a National Commission for Human Rights. Difficulties in implementing the RTI act and operations of the NCHR may be explained by a relatively weak ownership from government. The capacity for civil society has improved somewhat under the current government including greater media freedom although HRW report abuses of human right workers and journalists.

Knowledge centres such as universities, independent private or public research institutes and training centres abound in Bangladesh. Several of them are in the frontline of practical research into climate change adaptation and other aspects of resilience building⁹ – and have strong international linkages to agencies and programmes also supported by Sida.

Business in Bangladesh is on the one hand dominated by small scale farmers and on the other the ready-made garment industry (RGM) accounting for about 75% of exports from about 5000 factories employing about 3,5 million people¹⁰. Small scale farmers are vulnerable to natural disasters and dependent to access to information such as weather forecasts, extension services, access to secure tenure, markets and credit. The industry is not particularly sensitive to climate risks as most raw materials are imported. However, business face risks general risks like damage to property, delays deliveries, higher costs for insurance and problems of water availability¹¹. Climate risks are increasingly integrated in business decisions. The Garment industry is located mainly in the Dhaka Metropolitan Area and Chittagong. Prospects for continued growth in the sector are good not least due to rising salaries in competing nations like China. Minimum wages are low and working conditions are often poor. Environmental awareness in the RGM industry is low but emerging, partly in response to pressure from buyers and government efforts to address pollution problems. Other important business sectors include jute, leather and shrimps, the

⁹ e.g. The Bangladesh Centre for Advanced Studies (BCAS) http://www.bcas.net/event-details.php?event_id=4&title=Action%20Research%20for%20Community%20Adaptation%20in%20Bangladesh%20%28ARCAB%29 and International Centre for Climate Change and Development (ICCCAD): <http://centers.iub.edu.bd/icccad/index.php/courses/about-us>

¹⁰ McKinsey, 2011, Bangladesh's ready-made garments landscape- the challenge of growth

¹¹ IFC estimate that the washing, dyeing and finings sub sectors release about 56 million tonnes of waste water and 0.5 million tonnes of sludge every year. Substantial savings can be made which would help reduce problems of acute water scarcity in Dhaka affecting availability of drinking water http://ei.wtin.com/article/LDGZL1668u2/2012/10/12/regional_profile_bangladeshs_tc_industry_moving_towards_a_su/.

second largest export sector. Shrimp farming that encroach on mangroves has typically reduced the resilience of society and ecosystems by reducing storm protection and other services that are not compensated for by increased incomes from the shrimp farm.

4. Ideas on resilience as a result area

As explained in the introductory section Sida has decided to define resilience as *The ability of an individual, a community, a country or a region to anticipate risks, respond and cope with shocks and stresses, while addressing the underlying root causes of risks, recover, and continue to develop.*

For a country like Bangladesh being exceptionally exposed to risks and events – and increasingly changing risk patterns - with significant and frequent negative implications for vulnerable groups a focus on resilience is particularly relevant. There are risks involved with introducing terms that may be interpreted differently within Sida and by outside partners. On the other hand the concept opens up for a cross sectoral approach and flexibility which is critical for addressing many of the countries constraints for poverty reduction.

There is no one way as to how resilience can be used in the context of a strategy.

Alternatives include:

A) The use of resilience as an overarching framework for the strategy under which separate result areas are formulated and where the resilience perspective is mainstreamed in the respective result areas (explicitly or implicitly).

B) Resilience is a separate result area that includes a broad array of programmes from various sectors of particular relevance for resilience

C) Resilience is a separate result area focusing on some specific elements and where the resilience perspective is mainstreamed in other result areas

D) Combinations of the above

The ideas presented below can best be described as alternative C. That is a focus on a specific topic that both complements and builds on existing Swedish contributions and mainstreaming in other result areas, see 4.2. This could also involve having resilience as a dialogue issue. It should be emphasized that this is a proposal to stimulate a wider discussion and preparations for a new strategy.

It has not been possible in this brief period of time to make a review of the state of other donor interventions or GoB activities in the proposed areas.

4.1 New result area: "Environmental management and basic services to build resilient communities"

As reported in chapter 1, the degradation of ecosystem services and under supply of water and sanitation solutions increases poverty both in rural and urban communities when provisioning services such as water for irrigation become scarce and regulating services

like wetlands (helping to conserve and purify drinking water for cities and helps regulate floods) are destroyed. Such development undermines achievements in under result areas aiming to support “healthy and knowledgeable people” already under current climate variability.

If successfully implemented with a rights based approach the initiatives under this heading would contribute to greater social, economic and ecological resilience for vulnerable groups in targeted communities. Both women and men should have access to information, and be able to participate in risk analysis, planning, and political processes to their benefits.

4.1.1. Result Sustained access to water and sanitation

Rationale: A large share of the urban population in Bangladesh lack access to adequate sanitation. Poor slum dwellers are to a significant extent excluded from water and sanitation services. Interventions to sustain “upstream” resilience are necessary to secure provision of these services as aquifers and surface water will come under increased stress from climate change impacts such as contamination of sewage/saline water from flooding and drought. Transboundary cooperation with upstream countries is required as efficient and equitable pricing of water.

Tentative activities: Mapping of threats to water bodies supplying water to cities. Support and sustain bodies working on transboundary water issues. Support to WATSAN, including hygiene activities and water transparency. Support IWRM programs that protects important water bodies and aquifers from climate-induced and other stresses. Develop B4D interventions that sustain urban water quality and availability, tentatively involving community monitoring of water quality in neighbouring industrial sites or export processing zones.

A number of existing programs would fit under this heading WSP, WaterAid elements of urban health, elements of BCCRF, CDMP etc.

Possible indicators:

- Access to safe water and sanitation in urban slums (measured in percentage of population)
- Number of aquifers/water bodies mapped for threats to their resilience
- IWRM programs implemented

4.1.2 Result: Sustaining critical ecosystem services

Rationale: The ongoing degradation of ecosystem services is a major threat to the results in other areas as rural livelihoods depending on natural resources are undermined as well as provisioning and regulating services for the benefits of urban population. Services from ecosystems like coastal forests and wetlands are also crucial to a successful disaster risk reduction. Sweden can play a catalytic role in dialogues with BCCRF and CDMP to promote investments in sustaining critical ecosystem services and “natural infrastructure”, the full potential of these ideas has so far not been entirely realized by the funds that rely on the ownership by GoB. Complementary efforts with dedicated programs are therefore warranted. Activities would be coordinated with ADB and the World Bank as well as NGOs working at community level. More elaborated examples in the Annex.

Tentative activities: Support to coastal communities in obtaining land rights and/or legal help against unlawful intrusion by shrimp industry. Sustaining wetlands in the “Haor” area. Develop biodiversity conservation and disaster risk reduction options in the Sundarbans that also produce benefits to local communities. Reforestation of degraded mangrove areas.

Possible indicators:

- Change in median income of communities in targeted areas from fisheries and related ecosystem services (median income increase/decrease)
- Number of communities where legal assistance on land rights have been provided Legal assistance provided to communities on land rights
- Change in Area of coastal zones reforested with mangrove (increase/decrease)

4.1.3 Result: Reducing risks and responding to natural disasters and climate change

Rationale: The extreme flooding and drought regimes at the forefront of climate change are putting stress on livelihoods and health. A cost-efficient and sustainable way of increasing resilience in farming communities to more variable conditions – further exacerbated by climate change – is to support development of more *diversified* livelihoods, including through more different drought/flood-tolerant crop types, seed varieties adapted to extreme weather and soil conditions (like high salinity), but also through better education and small-scale business development to gradually offer supplementary/alternative livelihoods. In addition, better information dissemination and training in, and use of, *seasonal* forecasts may help better priorities the balance between crop types each season. This is combined with short term early warning systems, cyclone shelters, disaster resilient housing etc.

Activities: Basically keeping CDMP and BCCRF intact [but ensure CSO involvement/role – which apparently has slipped out of CDMP.]

Possible indicators:

Draw on existing CDMP and BCCRF frameworks which include soft and hard, environment and non-environment related issues.

4.1.4 Other comments related to the result area

-We were asked to consider opportunities for highlighting ICT and its role for increasing resilience. Without having analysed this in depth we rather see ICT as an important enabler for the three areas below than a specific area. In particular in relation to early warning systems, accountability to access water and sanitation, access to information, community monitoring of water quality, use of telemedicine and e-health to reduce risks from climate change, e-governance. However, the issue may require additional thinking.

-We were asked to consider B4D activities in the result area. -Building on CSR RGM supply chain and issues of water use, Challenge funds for responsible business practices RGM targeting UK see <http://www.dfid.gov.uk/ragschallengefund> , also look at WB NGO program for agriculture challenging NGOs to bid.

4.2. Integration of a strengthened resilience perspective in existing initiatives

As said in the first chapter, a healthy and educated population is a key element in a resilient society that can adapt to change. Selected elements of existing strategy have been used to illustrate opportunities to *further* strengthen the resilience perspective in other “result areas”. Due to previous knowledge of some programmes these are commented en greater depth than others.

4.2.1 Health and Urban environment

We note that the ministry of health has established a new unit “Climate change and health promotion”. What connections are there between this unit and ongoing programmes? Could it be relevant to invite them to meetings?

When addressing the health sector a number of issues can be considered to increase the resilience of programmes. Both general and specific points are illustrated below with the programme Promoting Health for Urban Poor and CDRP.

When addressing the health sector in the 'Promoting Health for Urban Poor (**PEHUB**) and City Region Development Project (**CRDP**), the questions below could be considered to increase the resilience of programmes and deliverables. Some or all of the aspects may already be taken care of, but the information was not available to the helpdesk team when drafting this document..

- In the CRDP – are the assessments (EIAs etc. – "Initial Environmental Examinations" according to Sida's appraisal) performed by ADB adequate to ensure activities and infrastructure are planned with an eye also on hazard impacts? – e.g. designed to also function under disaster-like situations (e.g. floods in central Bangladesh, or earthquakes in the NE ?). More specifically, are all the water and sanitation interventions, drainage and solid waste handling systems supported in CRDP planned to meet more extreme rainfall and flood levels over the coming several decades? Is the right information available to allow relevant tradeoffs when decisions are made?
- Further, since CRDP will strengthen local governance, capacity building within land use policy and management etc., to what extent is all this 'planning capacity' aiming at adapting the zoning and infrastructure to changing risk patterns (with climate change, but also with changes in population distribution, health risks etc.)? Can the planning be made more "flexible and adaptive"?
- As a partner in the joint donor Program Review Committee, Sida may have opportunities to influence ADB's assessment procedures and promote the adaptive planning as far as possible.
- The coverage and outreach of maternal health activities etc. – are they also considering how to handle shifting dynamics of people due to increased mobility like migration away from coastal areas to inland areas due to rising sea levels, salinity intrusion etc.?
- Are there opportunities to advance a dialogue on benefits of preventive health care? Is there a sufficient level of awareness of environmental causes of diseases and preventions measures such as hygiene, access to water and sanitation, waste

management? In case the government system is not sufficiently addressing the preventive health care and the awareness raising it depends on, consider which (internationally linked?) CSOs may serve as supplementary to government efforts. The Helpdesk notes that this approach is promoted in the **PEHUP** programme, and if the experiences are positive, the approach should be considered scaled up. In PEHUB, note that the same suggestions for assessing to what extent programme components – including infrastructure – are designed with changing risk patterns in mind.

4.2.2 Education

We note that environment and disaster risk reduction have become part of the curricula at primary level and new cyclone shelters in many areas serve as both schools and protection.

When addressing the education sector these topics could be considered to increase the resilience of programmes.

- Do schools have locally adapted information on disaster risk and environmental risks and available preventive measures, sanitation and hygiene etc.
- What is the standard of older schools adjusted to safe standards, also in a changing risk scenario and seasonal or permanent migration?
- Are the schools prepared to serve as evacuation centres in case of emergencies in the region?

4.2.3 Women's rights and democratic governance

We note that Sweden is the lead in LCG working group on Women's advancement and gender equality. Disaster and climate and environmental risks are not gender neutral. Due to different roles, norms and laws, access to resources etc women tend to be more exposed to risks and have less flexibility to respond to change. Proportionally more women die in natural disasters than men. Women's loyalties to home and family imply that they are (figuratively speaking) "chained" to the house and are often the last to leave in a disaster situation after having seen to other household members' needs. Also time spent doing household chores away from the house and village might cause them not to receive advanced warnings of disasters. Also lower literacy rates among women makes it more difficult for them access information on disaster risk reduction and hence more vulnerable. In addition, women and children are typically more exposed to indoor air pollution. In practice, women in Bangladesh do not have the same access to tenure as men which constrains investments in more secure housing, sustainable agricultural practices or relocation to safer areas. Women's empowerment and

When addressing the women's rights these topics could be considered to increase the resilience of programmes:

- Do gender programmes have access to information on climate and disaster risks and empower women to adapt to change
- Are women involved in risk analysis, planning and political processes related to management of disasters and management of ecosystems under stress from climate variability and change?

- Do women have access to information to facilitate adaptation to change?
- Are disaster management systems gender sensitive?
- Do women have access to all relevant information, including extension services, to be able to adapt to change?
- Are women given full tenure rights and access to water?

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Annex 1 Additional suggestions for initiatives under Result area "Environmental management and basic services to build resilient communities"

1 Increased protection of coastal zones and associated livelihoods

Rationale: The low lying coastal lands of Bangladesh are frequently subjected to extreme weather events, cyclones and storm surges. The battle against saline intrusion onto otherwise non-saline fertile lands is a constant one. Where there is coastal forest the ecosystem is more resilient; the mangrove ecosystem provides a natural sponge-like buffer against the effects of cyclones. In addition mangroves are among the most productive ecosystems on the planet and act as nurseries, food stores and shelter for fish, crustaceans, mollusks and many other organisms. The forests also provide fuel and building material making local communities less dependent on raising market prizes to obtain these necessities.

Activities: Support to coastal communities in obtaining land rights and/or legal help against unlawful intrusion by shrimp industry. Developing management plans for sustainable use of coastal zones and added value for communities for products. Reforestation of degraded mangrove areas.

Possible indicators:

- Increase in median income of communities in targeted areas from fisheries and related ecosystem services
- Number of management plans developed
- Legal assistance provided to communities on land rights
- Area of coastal zones reforested with mangrove

Note: Sida is already supporting Mangroves for the future (MFF), a partnership-based regional initiative in the countries that were worst affected by the 2004 tsunami. Synergies with this project could be investigated¹²

Knowledge, BARCIK¹³, who possesses both experience and implementation skills in this area

2. Ecosystem services from wetlands protected and enhanced

Rationale: The *Haors*¹⁴ are considered the most productive wetland resources of Bangladesh. The basin supports a large variety of wetland bio-diversity and works as natural reservoir as it plays a key role in basin water resources by regulating water flows

¹² <http://www.mangrovesforthefuture.org/>

¹³ <http://www.barcik.org.bd/>

¹⁴ Haors are bowl-shaped depressions between the natural levees of a river subject to monsoon flooding, are mostly found in the eastern region of greater Mymensingh and Sylhet districts, known collectively as Haor basin covering an area of approximately 24,500 sq. km

of the Meghna River system. The haor area is rich in natural resources and supplies a great part food demands of the country. On the other hand, flash and advance floods, siltation are recent impacts region leading haor dwellers in immense danger and insecurity. In addition, unplanned coal, limestone mining, uranium mining, deforestation in the Meghaloaya hills has intensified the problems for the inhabitants of the region.¹⁵

Activities: Tree planting around haors to protect them from siltation and storms. Implementing land and tenure rights to protect and regulate dwellers access to natural resources. Establishing “no-go zones” for mining in the watershed to protect water quality in haors. Restoring degraded haors.

Possible indicators:

- Numbers of degraded Haors restored
- Increase in median income of communities in targeted areas from fisheries and related ecosystem services

Note: IFAD is in a start up phase for a project in the haor area. Synergies could be explored

3. Resilient livelihoods and ecosystems in the Sundarbans

Rationale: The Sundarbans is the largest mangrove forest in the world. About 300 species of trees and herbs and about 425 species of wildlife including the Bengal Tiger survive in this ecosystem¹⁶. The Sundarbans is also a World Heritage Site. Rapid deterioration in mangrove health is occurring in the Sundarbans, resulting in as much as 200m of coast disappearing in a single year¹⁷. As been highlighted in 3.1.4 mangrove forests provide protection to storms and tidal waves and their benefits

are crucial to local livelihoods. The mangrove forests also sequester each year a large amount of 'blue carbon'¹⁸. Mangrove losses have contributed half the total blue carbon stock reduction¹⁹.

Activities: Support GOB with technical assistance on mapping forest loss, identify strategies for protecting remaining mangrove areas, develop ideas for alternative livelihoods for displaced communities, initiate conservation policies for remaining wildlife (esp. tiger) that do not harm local livelihoods.

Possible indicators:

- Plans for protecting remaining mangrove areas established and implemented
- Number of information and dissemination activities on the importance of Sundarbans'

¹⁵ For an extensive study of the challenges of haor dwellers see

<http://www.ifad.org/operations/projects/design/103/bangladesh.pdf>

¹⁶ <http://www.indybay.org/newsitems/2013/01/12/18729985.php>

¹⁷ <http://www.zsl.org/conservation/news/bengali-forests-are-fading-away,1039,NS.html>

¹⁸ “Blue Carbon” is the carbon stored by coastal and ocean ecosystems. In particular, coastal ecosystems storing it in plants and depositing it in the sediment below them by natural processes.

¹⁹ <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0043542>

ecosystem services for local livelihoods;

- Suggested and explored biodiversity conservation options that also produce benefits to local communities

Note: The World Bank has provided non-lending Technical Assistance (NLTA) to GOB for carrying out studies for sustainable development of the Sundarbans. Coordination with this initiative is recommended.