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Civil Society Organisations in Climate Change Adaptation: Paani Committee's Movement for Tidal River Management in South-west Bangladesh

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1. Introduction

Looking back in time to Agenda 21, the detailed action plan that came out of the 1992 United Nations Conference on Environment and Development (UNCED) better known as Earth Summit, the term civil society was not even mentioned. However, that doesn't mean civil society was excluded from Agenda 21. There was constant reference to actors that constitute civil society i.e. non-governmental organisation, local community, association, so on and so forth.

Building up on Agenda 21, the global environmental discourse further expanded into territories of greater thematic concentrations. Climate change came more into the centre stage of sustainability debate. The United Nations Framework Convention on Climate Change (UNFCCC) stipulated inclusion of NGOs in promoting education, training and public awareness on climate change. The Kyoto Protocol (KP) to UNFCCC further edged the scope of climate change agenda that amounted to the scope of civil society's participation in responding to climate change scaled up as well. The scaling up reached its pick with adoption of the Bali Action Plan that was later translated into national regimes like Bangladesh Climate Change Strategy and Action Plan 2009 (BCCSAP).

In this backdrop, this research sets to examine civil society's role in responding to climate change in the context of Bangladesh with a focus on the south-west region. The following three sections are about conceptual framework, research methodology and climate change scenario of the country respectively. Then there are four sections that constitute a case study of the Tidal River Management (TRM) movement. These sections deal with respectively: general understanding of TRM approach, genesis of Paani Committee and TRM movement, institutional arrangements of Paani Committee and, strategies, activities and outcomes of TRM movement. The paper ends with some concluding observations.

2. Conceptual Framework

Agenda 21 – as a pioneer of global environmental regimes that have become so commonplace by now – stipulated about civil society's role in advancing sustainability agenda by large measures. The Section III titled Strengthening the Role of Major Groups highlighted roles of women, children and youth, indigenous peoples and communities, NGOs, local authorities, workers and trade unions, business and industry, scientific and technological community, and, farmers in achieving sustainable development. Under Section III, Article 27.1 of Agenda 21 recognises

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NGOs such as formal and informal organisations as well as grassroots movements as partners in its implementation. Article 27.3 stipulates that NGOs including non-profit organisations representing groups covered in the present section possess experience, expertise and capacity of particular importance to the implementation of environmentally sound and socially responsible sustainable development (UN 1992, pp. 206).

While the UNFCCC was also adopted in 1992 there were more discussions about specificities and action programmes. UNFCCC was mainly a scientific-technical regime involving state parties that aimed towards rolling back human induced climate change. Despite the least scope for civil society actors' role in such venture, they did not go totally unnoticed. As part of commitments of all (state) parties, Article 4.1 (i) stipulates promotion and cooperation in education, training and public awareness related to climate change and encourage the widest participation in this process, including that of non-governmental organizations. Therefore, NGOs are recognised as one set of actors in responding to climate change. It is interesting to note that NGOs are taken into consideration specially in the light of ensuring 'widest participation' in supporting core mitigation measures undertaken by states through education, capacity building and public awareness.

The KP as supplement to UNFCCC further expanded and articulated the climate change agenda. One way this happened was through stressing on specific sectors for emission reduction. Thus, special emphasis was found for such policy areas like energy efficiency, sustainable forest management, sustainable agriculture, renewable forms of energy, market imperfections, waste management etc. In terms of approach to climate change, adaptation was recognised along mitigation. Both these new set of developments increased scope for civil society's role in responding to climate change (United Nations 1998, pp. 2). Because, many of the new policy areas emphasised and the newly recognised approach of adaptation needed significant civil society involvement to attain widest participation as envisaged by Agenda 21.

What is also necessary to take note in this regard is Article 10 (b) of KP that stipulated as follows:

> "Formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change and measures to facilitate adequate adaptation to climate change." (United Nations 1998, pp. 9)

In line with the above provision, national regimes and programmes pertaining to both mitigation and adaptation started to appear. They often contained more elaborate provisions for civil society's involvement in addressing climate change specially in national and local contexts. This trend however picked up voluminously with adoption of Bali Action Plan whose main plank was to enhance actions to materialise UNFCCC mandates. It resolved "to urgently enhance implementation of (UNFCCC) in order to achieve its ultimate objective in full accordance with its principles and commitments." In deciding upon enhanced action on adaptation, one consideration was building synergies among activities of multilateral bodies, the public and private sectors and, civil society in order to facilitate adaptation in coherent and integrated manner (UNFCCC 2008, pp. 3, 4).

Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009 is a manifestation of country-level programmes inspired by UNFCCC process in general and Bali Action Plan in particular. While the process of developing BCCSAP was led by government, it was "in consultation with civil society including NGOs, research orgnanisations, the private sector and development partners." Para 6 of BCCSAP asserts itself as an adoption of the Bali roadmap to address climate change in the context of Bangladesh (MoEF 2009, pp. xviii, 2). The Para 8 stipulate:

> "Adaptation is the priority for Bangladesh in the short and medium term. The country is already a world leader in the research, design and implementation of adaptation strategies and this work will continue. In the long-term, however, climate resilience will require very deep cuts in greenhouse gas emissions by the "Annex-1 parties" including the developed industrialised nations (MoEF 2009, pp. 2)."

As one of the most vulnerable countries to climate change that cause minimal greenhouse emission, Bangladesh is in the effect side of the cause-effect chain of climate change. Therefore, it is not surprising that adaptation will be the priority for the country in terms of national actions. However, mitigation is also of high importance for Bangladesh. But for that the country has to depend on progresses in global climate change negotiations leading to meeting of emission cutting commitments by the major greenhouse emitting countries.

Para 10 of BCCSAP lays out the action plan for implementation that has six pillars: (1) food security, social protection and health, (2) comprehensive disaster management, (3) infrastructure development, (4) research and knowledge management, (5) mitigation and low-carbon development and, (6) capacity building and institutional development. The institutional set-up to execute the action plan constitutes Climate Change Unit (CCU) as the coordination body and Climate Change Focal Points (CCFPs) in all relevant sectoral ministries (MoEF 2009, pp. 3). Various civil society actors including NGOs are involved in many of the areas covered in the six pillars. The breath of such involvement is also reflected in the fact that while CCU will coordinate work of CCFPs, simultaneously it will also "network with all stakeholders, the people in general, the civil society, NGOs, the private sector and international actors in an inclusive manner (MoEF 2009, pp. 3)."

The above stock taking of global and national regimes of climate change amply shows the importance of civil society including NGOs as one major actor in this field. Specially, with respect to empowerment of weaker sections of population, expansion of popular participation in programmes and enhancement of current actions – civil society actors are deemed large part of the answers. As this is generally the case in many parts of the world, this is more so in Bangladesh where civil society specially NGOs have been a major actor in development besides government and private sector.

3. Research Methodology

Civil society is a long established concept in social sciences particularly in political science and sociology. There is wealth of definitions and approaches. While the

concept of civil society is around for centuries or more, debates about it never settled. This research will not get into such debates about the concept itself or its utility. That is partly due to its limited scope as an empirical policy oriented investigation and partly due to such practical constraints like time and resources. Therefore, civil society, for the purpose of this research, is simply understood as an organised section of citizens who are working for positive changes in society. Such sections of citizens may or may not be formally organised under certain institutional arrangements like name, leadership structure, defined membership, regular activities and organisational rituals. But when they are formally organised as such they are considered as civil society organisation irrespective of the denomination i.e. NGO, CBO or movement.

There is no dearth of roles that CSOs across denominations perform. That is evident from civil society literature in general and from our earlier discussion of climate change discourse. The latter for example emphasised on CSO role in soliciting large-scale participation of people in programmes for addressing climate change. Public participation is more vital for adaptation to climate change than mitigation since the former stipulates widespread changes and modifications in existing economic, social, cultural and political practices. That requires involvement of numerous stakeholders from different social strata in adaptation initiatives. Their successes will therefore largely depend on the successes of involving all the stakeholders. Such scope and relevance is one reason why the role of CSO in climate change adaptation is worth specific research attention.

Another reason is general insufficiency of specialised literature on the topic. There has been considerable research on various roles of CSOs in the overall areas of environment and sustainability. Frank et al. (2007, pp. 275) observed that "(in) the social sciences, it is commonplace to assert that grassroots social movement organisations (another CSO denomination) play key roles in catalysing national policy reforms (and) this causal imagery is ... presumed to hold true generally worldwide." This observation can also be applied to literature on CSOs working on environmental issues. One popular theme in that literature is influencing of environmental policy and environmental governance by CSOs. Florini (2008), Frank et al. (2007), Gulbrandsen and Andresen (2004), Bryant (2005), Bestill and Corell (2001), Broadbent (1998), Gordon (1998), Jasanoff (1997), Potter (1996), and, Princen and Finger (1994) are some good examples of this branch of literature.

However, if we narrow our focus to civil society's role specifically in climate change adaptation, breath of literature is least with exception to few policy literatures. The availability of such literature in the context of Bangladesh is even fewer. This lack is largely explained by the two general limitations about climate change literature on Bangladesh: lack of specialised literature in general and lack of social science literature in particular. Therefore, the main objective of this research is to examine if civil society organisations specially grassroots citizen movements can undertake effective climate change adaptation action/programme? The answer to this main question is sought through finding answers to the following sub-questions:

- Substance of the concerned climate change adaptation action/programme: whether the output(s) are empirically verifiable and the outcome(s) are effective?

- Considerable role of CSO(s) in the concerned climate change adaptation action/programme: whether the CSO(s) play a significant part as actor that demands in-depth investigation?
- Preferable indigenousness of the adaptation approach: whether the adaptation approach involved is indigenous to a large extent with possible original inputs of the CSO(s) concerned?
- Higher relevance for Bangladesh: whether the concerned climate change adaptation action/programme relevant for major climatic challenge(s) to Bangladesh?

Case study is the core method used for data collection in this research. As part of undertaking the case study, several other methods were also used: literature review, Key Informant Interview (KII) and Focused Group Discussion (FGD). The fields for KII and FGD were Dhaka, Khulna and Jessore. The subject of the case study is Paani Committee's movement for introduction and mainstreaming of Tidal River Management (TRM) in flood and water resource management in south-western Bangladesh.

With the research question in mind, the case study of Paani Committee's TRM movement (sections 5-8) consist of the following aspects:

- General understanding of TRM as climate adaptation approach
- Genesis of Paani Committee and TRM movement
- Institutional arrangements of Paani Committee
- Strategies, activities and outcomes of TRM movement

4. Climate Change and Bangladesh

Climate is generally defined as 'average weather' described in terms of the mean and variability (maximum and minimum) of temperature, precipitation and wind speeds over a period of 30-50 years time. Climate change therefore signifies a change in the pattern of any or all or a sub-set of these elements of the climate. One major climatic process that set in motion the above mentioned climatic variations is rising temperature due to the Greenhouse Effect. The global average surface temperature has increased by nearly 0.74 C over the past hundred years between 1906 and 2005. There was not much overall change from 1850 to 1915. An increase of 0.35 C occurred in the global average temperature from the1910s to the 1940s, Over the 50 years since 1950, the average rise in temperature per decade had been 0.026, but the second half of these 50 years witnessed a rise of 0.052 degrees per decade, double the rate for the first half. The warmest years over these 100 years or so are 1998 and 2005. In fact, 11 of the 12 warmest years have occurred in the 12 years from 1995 to 2006 (IUCN 2011).

Bangladesh is one of the most vulnerable countries to climate change according to Inter-governmental Panel on Climate Change (IPCC). It predicted that sea level rise of 45cm to 1m will inundate 10-21 percent area of the country with saline sea water (IPCC 2005). But climate change is about broader ecological changes and so the rising sea level is not the only climate change issue that the country is facing. Projections by Agarwala et al. (2006) stipulate that between 2030 and 2100, the country's surface average temperature may increase by 1-2.4° C, annual mean rainfall

may increase by 4-10 percent, monsoon may be 5-12 percent wetter and winter may be drier. There are supposed to be wider impacts of such climatic variations.

While these are slow-onset processes that are taking their toll gradually, the sudden-onset processes are taking their toll by surprise. Once every few years, there is a severe flood that covers greater parts of the country with more significant damages to lives and livelihoods. Between 1988 and 2008, the country was visited by seven major floods causing thousands of deaths and millions displaced. During the most recent severe flood in 2007, 32,000 square kilometers of area were inundated affecting about 16 million people. The damages included 85,000 houses, 1.12 million hectares of cropland and thousands of critical infrastructures like roads, bridges, culverts and flood protections. Every three years, on average, the country is hit by a severe tropical cyclone. They are accompanied by high winds and storm surges. Due to climate change, the numbers of most intense tropical cyclones are likely to increase with higher pick wind intensity and precipitation. The most recent cyclone in the country, *Aila*, affected a total of 3.9 million people. The damages included loss of 150,000 livestock, breaching of 1,742 kilometers of embankments and displacement of 76,478 families in two worst affected districts (IOM 2010).

While the whole country is vulnerable to climate change and its consequences, south-western part is in the frontline. The trajectory constitutive of three respective processes – climate change, loss of livelihoods and population displacement – is most stark in that region. The region is beset by combined slow- and fast-onset processes of climate change. Like most other parts of the country, the region is characterized by population density, flat topography and low elevation. As a monsoon influenced river delta, south-west has its share of floods, river erosion, water logging and drought that are becoming more and more intense. Their effects are exacerbated by cyclonic storm surges, tidal surges, costal erosions and salinity intrusions.

5. TRM as Climate Adaptation Approach

For millennia, the Bengal delta that constitutes most parts of Bangladesh and Indian state of West Bengal has been formed by sediments carried downstream by Ganges, Meghna and Brahmaputra river systems. This is world's biggest delta and a very active one. The south-west region of Bangladesh is a tidal basin of the Bengal delta and large parts of it is still going through active deltaic formations. As rightly pointed out by a leading environmental activist of the region, it is a tidal floodplain bounded in the north by the Ganges floodplain and in the south by the Sundarban mangrove tidal forest (Ashraf-Ul-Alam Tutu quoted by UNDP 2011, pp. 4). Traditionally, river tides would inundate vast tracts of lowland twice a day. Along tide came sediments from upstream that were rich with micronutrients. Much of these lowlands are *beels*, a natural depression that serve as tidal basins. There is distinct ecosystem of these areas that is rich in biodiversity. During high tides and wet seasons, the beels were home to various marine and amphibious life forms including fishes. During dry seasons, they produced many varieties of rice and other vegetation.

Two developments, one internal and one external, lay severe blow to the distinct ecological system of the south-western tidal basins. Within the country, first the expansion of railway during the British period led to death or choking of many rivers in the south-west. Then, from Pakistan to Bangladesh period, massive development of

water and flood control infrastructures based on embankment system almost permanently altered the flood flow ecology of the region.[1] The full range of their consequences can be summed up as a human induced environmental disaster. The natural interlocking network of rivers and beels were obstructed. While many rivers died or significantly narrowed loosing their drainage capacity, the remaining rivers failed to maintain their natural courses. As sediments brought by tides couldn't randomly flow into the lands because of polders, silt started to deposit in riverbeds shrinking depths of the rivers. The dearth of land formation from silt deposition left floodplains inside the polders lower than riverbanks outside. Rainwater or any other excess water couldn't drain out leading to chronic water logging. Then a development outside the country added salt to the wound. India's construction of Farakka barrage on the Ganges river and subsequent unilateral diversion of its water significantly reduced water flows further deteriorating the already fragile river ecosystem (Shampa and Pramanik 2012, pp. 2).

With such intensive human interventions in the ecology, climate change arrived in the south-west quite early on. Some of the manifestations of climate change with respect to water-environment nexus are: precipitation extremes resulting increased rainwater flooding, sea level rise resulting increased coastal and river flooding, increased intensity in wind speed contributing to enhanced storm surges and coastal flooding, and, reduced availability of freshwater caused by increased salinity intrusion into fresh water sources. These extreme climate events are on the rise in the south-west in frequency and intensity greater than other parts of the country. In this circumstance, climate change adaptation in the region is as essential as the acuteness of its context. Tidal River Management (TRM) is increasingly viewed as an adaptation approach that complies with floodwater ecology of the south-west.

TRM is the scientific term given to the age-old practice of flood and water management in the south-west Bangladesh. It capitalises on natural movement of tidal water facilitated by low intensity structures which are seasonal, temporary and flexible. Islam and Kibria (2006, pp. 23) nicely articulated:

> "The basic idea of TRM is to allow tidal flow into wetland basin, known as *jowar-bhata khelano* (free play of tidal flow) in local vocabulary, and releasing the tidal flow back to the river. As a result of this process, sediments carried by tidal flow deposits on the wetland basin instead of riverbed. The process is continued for several years (usually three years, the duration depends on the size of the wetland basin). It gradually raises the land on the wetland basin with formation of alluvial soil from silt. ... (It) prevents sediment deposition on the riverbed and ensures the drainage and smooth navigation in the river channels."

TRM therefore specially suits the floodplain ecology of the south-west. The estuarine rivers of the coastal region have two tidal cycles a day. Their high tides bring in muddy water flow with thick concentration of sediments. At that time, had local people cut embankment at appropriate point, the natural high tide would gush into floodplain and deposit large chunk of sediments. Thus, the low lands of the south-west would be nourished and elevated while the rivers and water bodies would be free

[1] There is more detailed discussion about these developments in the next section of this research.

of congestion (Kibria 2011, pp. 1). Floods and water logging would be effectively controlled without affecting the region's ecological balance. Soil elevation as well as increased depth and navigability of the water channels specially the rivers would address challenges from sea level rise. These are not just assumptions about TRM but empirically substantiated by successful outcomes of people's TRM in *Beel Dakatia* and *Beel Bhaina.* They are testaments of TRM's effectiveness in climate change adaptation.

Prior to the *Beel Dakatia* TRM, the bed of *Hamkura* river at the downstream of *Beel Dakatia* was higher than the latter and the width was 10-12 metres. Following the TRM, the river was reported to gain depth by 9 metres and became up to 90 metres wider. The resulting sedimentation reached up to 3.5 km from cut point over an area of 900 hectares (ha). The total silt deposits amounted to 5 million cubic metres and the land level was raised by 0.5 metres on average. On both banks of the 15 km stretch of *Hamkura* river, about 6000 ha of land were free from water logging. By October 1992, more than 1000 ha of cultivable land were available to farmers. However, soil and vegetation of the area were affected by salinity from tidal waters. Besides, the northern parts of *Beel Dakatia* that were far from the cutting points didn't receive any tidal flow and sedimentation. (Fakir 2008, pp. 2-3; Kibria 2011, pp. 16).

The results of *Beel Bhaina* TRM were also impressive. Each tidal wave carried 5 million cubic metres of water. The depth of *Hari* river increased by 10-12 metres while the width expanded 2-3 times. The depth of *Telgati* river increased 2 metres on average up to a stretch of 6 km. Further downstream, depths of *Ghangrail* and *Shibsha* rivers also increased. The sedimentation was highest 2.6 metres to lowest 0.2 metres over 572 ha of land. The total amount of silt deposition was 6.5 million cubic metres. *Beel Bhaina* was permanently free of water logging except the far flung areas (Fakir 2008, pp. 3; Islam and Kibria 2006, pp. 19).

The effectiveness of TRM as manifested in cases of *Beel Dakatia* and *Beel Bhaina* is also acknowledged by credible technical authorities on water resources and flood control. Traditionally, water experts of the country showed least interest in TRM for its humble and "unscientific" origin. Later on, Centre for Environmental and Geographic Information System (CEGIS) and Institute of Water Modelling (IWM) – two of the country's premier scientific authorities on water resources – conducted detailed studies on TRM. The CEGIS (1998) was about economic and social impacts. The IWM (2008), on the other hand, built sophisticated mathematical modelling for planning and designing of TRM. Both studies, undertaken a decade apart, gave resounding scientific evidence in favour of TRM.

6. Genesis of Paani Committee and TRM movement

The Paani Committee and its TRM movement are rooted in the historical evolution of flood and water management in south-west Bangladesh particularly from the late 20th century. As mentioned earlier, the region is a low lying coastal floodplain between large rivers in the north and the Bay of Bengal in the south. It has been a tidal basin characterised by high drainage density with frequent and extensive tidal intrusion, periodic tidal surges and regular floods.

Prior to the 20th century, there was less population pressure and lower level of agricultural production in the region. Modern water engineering technologies was yet to arrive and there was no water development intervention. The agricultural and water management practices of that era were compatible with local ecological characteristics (Interview of Hashem Ali Fakir, General Secretary, Paani Committee, 28 May, 2013). For example, in the 17th and 18th centuries, the local landlords or *Zaminders* used to build low earthen dykes around the tidal flats to prevent tidal intrusion and wooden sluice gates to drain off surplus rainwater. The tidal flats were then cultivated with indigenous varieties of flood and salinity tolerant rice. The dykes and sluice gates were seasonal installations. They were dismantled after each harvest and, people grazed cattle and fished in the tidal floodplains (Tutu 2005, pp. 118-119).

Such agro ecological balance of south-west Bangladesh first started to disrupt with expansion of railway in the then East Bengal (today's Bangladesh) during the late 19th century. The British Indian colonial government didn't necessarily keep up with floodplain ecology of the East Bengal in laying the railway tracks. In the process, many smaller rivers vanished and many bigger rivers were choked. In case of the former, the narrow river channels were earth filled to lay the railway tracks over them. In case of the latter, culverts were built on them to lay the railway tracks over that narrowed their channels. Some of the bigger rivers which were narrowed in the process of railway expansion as such are: Kumar, Nabaganga, Chitra, Bhairab and Ichamoti (Hashem Ali Fakir, *op. cit.*).

Major interruption in the agro ecological balance of south-west Bangladesh got underway during the Pakistan era. With increasing population pressure, there was ever growing demand for food production. So, there was greater eagerness for flood control in order to bring more land under cultivation all round the year. It was also the era of green revolution. The availability of modern flood control and irrigation technologies was greater than ever specially with foreign aid. The ushering in of development interventions in the country's water sector is described in Kibria (2011, pp. 13-14):

> "In the 1960s and early 1970s, flood control and drainage provisions were two key interventions in the Government's strategy for increasing monsoon season rice crops, particularly wet season (*aman*) rice. The Krug Mission was set up by the United Nations after the severe floods in 1954, 1955 and 1956. Following the recommendations of the report, the East Pakistan Water and Power Development Authority (EPWAPDA) was established and the irrigation department was merged with it."

That was the beginning of a long series of flood and water management interventions in Bangladesh for which the south-west was one of the core regions. These interventions –mainly based on western water engineering technologies – were driven by economic policy priorities rather than ecological considerations.

Coastal Embankment Project (CEP) that was conceived in the 1960s and initially financed by USAID was the pioneering flood and water management initiative. CEP consisted of mainly two sets of interventions: embankments and drainage structures. High earthen embankments were built across the southern coastal areas as a bulwark against tidal inundation, tidal surges, extreme monsoon rainfall and flash floods. Such

embankment better known as polder is a classic flood control solution that has been successfully used in The Netherlands for several centuries. The polders were supplemented by drainage structures like sluice gates set up at different river sections (Kibria 2011, *op. cit.*).

The initial outcomes of the polders were quite rewarding both economically and socially. Daily tidal intrusion became a thing of the past and floods were effectively brought under control. For the following two decades, agricultural output multiplied significantly with successive bumper productions of rice. With two seasons of bumper rice production annually, the majority landowner and farming populations of the south-west region gained more wealth than ever before. There was more disposable income and investible surpluses at their disposal. As farming became less difficult and less time consuming, there was influx of social and cultural activities. *Khelar daal* (sporting teams) and *ganer daal* (cultural troupes) became widespread. Many education institutions were set up through community initiatives (Hashem Ali Fakir, *op. cit.*).

From the mid 1980s onward, the golden times started to fade. The ecological impact of polder technology became much wider by then. The initial fault lines were river bed siltation, drainage congestion and water logging. They were soon followed by flood, worsening salinity and many more. The unfolding of ecological disruptions due to polders is well articulated by Kibria (2011, pp. 15):

> "Subsequently, the polders and gated structures, such as regulators ... throttled and restricted tidal flows and de-linked the rivers from the catchments. The polder system disrupted the indigenous river and sediment management. (...) The obstruction by the permanent embankments led to accelerated silt deposition and sediment accumulation in the rivers and channels in the area. (...) In addition, river flows during monsoon season brought vast volumes of water, which simultaneously carried extremely high sediment loads washed down from the Himalayas. The polders and other structures impeded this sediment-laden flood flows. Consequently, the floodwaters accumulated upstream of the polder embankments and the drainage structures. This caused widespread flooding and also deposited silt and sediment in the riverbeds and channels. Since the 1980s vast tracts of land went under water for up to six months in a year."

People of the south-west were initially clueless that the polders were causing siltation and water logging. They initially suspected – as also propagated by official explanation from BWDB (successor of WAPDA) sources – sluice gate (a.k.a. regulator) malfunctioning (Hashem Ali Fakir, *op. cit.*). But the actual causes started to be revealed; partly from people's day-to-day experience and partly from civil society's awareness raising.

The south-west already had a century-old tradition of citizen activism specially in relation to water. The tradition of building earthen dykes and wooden sluice gates seasonally for flood management was not driven by local landlords alone as suggested by Tutu (2005, *op. cit.*). Some community leaders and senior citizens argue instead that such indigenous flood management derived from cross-section of local peoples' collective action. The landlords used to patronise what was already initiated by local farming population (FGD with members of Paani Committee, 29 May, 2013,

Dumuria, Khulna). Their claims also echo in the term *Dosher Badh* (People's Embankment) used in local language to refer to the earthen dykes. The term is suggestive of people's collective efforts.

In the late 1930s, the south-west region specially the sub-regions of Jessor, Khulna, Satkhira and Bagerhat became centres of *Badhbondi Andolon or* Embankment Movement against the local landlords. Around that time, the landlord class were increasingly oblivious of their traditional patronage for construction and maintenance of indigenous flood management. In consequence, flood and tidal intrusion increased and agricultural output decreased. However, the landowners didn't let up in their (often repressive) insistence for revenue. The embankment movement emerged in reaction. People of south-west agitated that they cannot pay the revenue unless the landlords facilitate restoration of flood management infrastructures. Otherwise, the people will themselves restore them in which case the landlords will not get any revenue. The movement went on for over a decade. Faced with lacklustre response from the landlords, it gradually evolved from a collective demand for embankment to their collective development. Thus, the *Dosher Badh* or people's embankment became a more frequent phenomenon throughout the south-west. It escalated in the 1950s since the *Zamindary* or landlord system was outlawed in the then East Bengal (FGD with members of Paani Committee, *op. cit.*). With landlords not available for patronage anymore and large involvement of government in water sector still wanting, the onus was now totally on the people themselves.

Building on the centuries' long tradition of people's embankment and TRM, the embankment movement renewed the civic virtues of water activism in the south-west. People started cooperating more frequently and widely in setting up people's embankment and wooden boxes, their maintenance and conducting TRM. To these ends, they mobilised resources, gave voluntary labour and guarded the embankments from any breach in its defences. For many years it became customary for communities to guard the embankments with lamps and bells in multiple groups (Hashem Ali Fakir, *op. cit.*).

Krishak Shangram Shamity (Farmers' Movement Association) was at the forefront of embankment movement. Similarly, they also pioneered in raising people's awareness about environmental fallout of polders leading up to TRM movement. With people's growing realisation of the links between polders and various forms of environmental fallouts, separate issue-specific movements started in different communities across south-west. There have been about 30 such movements. Some of them are: *Bil Dakatia* movement, *Bhabodaho* movement, saving river *Hamkora* movement and movement against *Tiabunia and Kashimpur* regulator. As it appears, when negative impacts of a polder or regulator continued unabated, the affected community started a movement in response (FGD with members of Paani Committee, *op. cit.*).

While some of those movements could cause more stir than others, their overall success was limited. They suffered a number of limitations in general. First, since these movements were often exclusive to concerned communities, they used to have smaller membership and resource bases. Second, the small separate movements didn't have enough cooperation with each other. Third, their campaigns and lobbying were limited to concerned *upazilla* or *union* never reaching wider audience. Due to such limitations, the community movements could cause little revision in the environmentally disruptive water interventions. The Paani Committee was formed in

order to develop a broad based, well organised and coordinated movement. Its formation was led by a nucleus of *Krishak Shangram Shamity* together with their like-minded colleagues in local civil society. Paani Committee brought the small separate community movements spread throughout south-west under one umbrella and took up TRM as its main agenda (Hashem Ali Fakir, *op. cit.*).

7. Institutional Arrangements of Paani Committee

Paani Committee was officially established in 4 April, 1990. While a citizen driven initiative, its formation was facilitated by Uttaran, a national NGO based in Tala, Satkhira. Paani Committee is well organised throughout much of polder affected areas of south-western Bangladesh. It is organised in three tiers: central committee, *upazilla* or sub-district committees and *nodi abobahika* or river basin committees. The 51-member central committee is based in Tala, Satkhira. There exist twelve *upazilla* committees in three polder affected districts: Jessore, Satkhira and Khulna. The concerned *upazillas* are namely Keshabpur and Monirampur in Jessore, Satkhira, Kolaroa, Tala, Debhata, Ashashuni, Kaliganj, Shyamnagar and Koira in Satkhira, and, Dakop and Dumuria in Khulna (Hashem Ali Fakir, *op. cit.*).

Upazilla and river basin committees consist of 31 members each. Each *upazilla* committee is stipulated to have representation of all river basins and unions concerned and to have minimum one-third women members. The central committee is constituted of representatives from *upazilla* committees. Each *upazilla* committee send three members to central committee – president and general secretary as ex officio members and another one as elected member. President and general secretary of central committee are elected by basin committee members. All the committees – central, upazilla and basin – are elected for two years' duration. Upazilla and basin committees convene on bi-monthly basis while the central committee convene quarterly. Besides, all the three types of committees hold Annual General Meetings or AGMs (Hashem Ali Fakir, *op. cit.*).

In general, the memberships of Paani Committee units are drawn from among various conscious sections of local population. They are: development workers, local NGOs, members of *Union Parishads* and other local governments, local leaders and activists of political parties, teachers, social workers, so on (Paani Committee 2001, pp. 1). Many of them have been part of the embankment movement who later initiated many of the anti polder movements. So, the committee members are from diverse professional backgrounds. However, there are three dominant characteristics in the membership which are also overlapping at times: leftist political orientation, NGO linkage and Uttaran connection.

South-western Bangladesh is known for leftist political activism both civil and armed. Prior to the embankment movement and its successor TRM movement, the region has long been a hotbed of agrarian movements.[2] The main driving forces of these agrarian movements were often leftist political parties. The latter had large following among agricultural labourers and small farmers. However, due to political suppression of

[2] One significant agrarian movement was *Tebhaga Andolon* that took place in pre- and post-participation Bengals for several decades. South-west was one of the regions where this movement was prominent. Many of the activists of this movement were later instrumental in other agrarian and civic movements.

leftist political parties in the new state of Pakistan, the former often used front or affiliated organisations to facilitate agrarian movements. *Krishak Shangram Shamity* that pioneered the embankment movement was the farmers' front organisation of Biplobe Communist Party. There was also *Khetmajur Shamity* or Farm Labourers' Association that was affiliated with Workers' Party. When leftist party workers as such were instrumental in embankment and TRM movements, they were not necessarily advancing respective party agenda. However, the ideological solidarity and the broad based network that came along facilitated the movements' expansion and consolidation.

Another dominant characteristic of Paani Committee's membership is NGO linkage. Many of the members are either in the staff of local and national NGOs or involved with them. This is not so surprising since there was convergence among the agenda of Paani Committee and those of the many NGOs working in south-west. The growing environmental issues linked to polders were development challenges as well. So, many of the NGOs were implementing advocacy projects on water logging, salinity, flood and so on. While the NGOs found a powerful civic forum in the form of Paani Committee that reinforced their advocacy campaigns, the latter was enriched by the former's expertise and outreach. Besides, many of the NGO staffer also had leftist backgrounds and thus their association with many of the Paani Committee veterans predated its formation.

Uttaran connection is the other dominant characteristic of Paani Committee's membership. Despite being an NGO, Uttaran's involvement with Paani Committee should be seen in separate light than from other NGOs. Uttaran facilitated its formation and continues to provide financial and secretarial assistance. There are apparently three main reasons for Uttaran's greater involvement with Paani Committee. First, unlike most other national NGOs, Uttaran is based in a south-western *upazilla* instead of a major urban centre like Dhaka or Khulna. Its base Tala is at the heart of polder affected river basins of the south-west. So, Uttaran combined first-hand on-site knowledge and action bases typical of local NGO with broader programmatic approach and advance capacity of national NGO. Uttaran witnessed unfolding of both environmental degradation from polders and resulting civil society activism. Riding on the momentum, Uttaran facilitated separate anti-polder civil society actions graduate into a broad-based united forum in the form of Paani Committee. Second, a number of founding members of Uttaran including its founding head Shahidul Islam were part of leftist political movements beforehand. Uttaran's leadership thus consisted of some veterans of embankment and TRM movements. Uttaran was therefore, in a way, an outcome of those movements and shared their mission most among the NGOs operating in the region. Third, close personal relationship between leaderships of Paani Committee and Uttaran that was nurtured through but was not limited to their long years of collaboration in leftist political activism as well as embankment and TRM movements. For example, Uttaran's founding head Shahidul Islam was also long time colleague of both President and General Secretary of Paani Committee at Chuknagar College in Dumuria, Khulna.

8. TRM Movement: Strategies, Activities and Outcomes

Paani Committee's movement for TRM is a rich tapestry of strategies, activities and outcomes. Strategy in this case is simply understood as goal, objective and guidelines

that set the movement's general parametres. Activities are deemed as individual action or set of actions to achieve goal and objectives set up-front while results of those activities are considered as outcomes.

Strategies

As mentioned earlier, the TRM movement originated in reaction to water development interventions. Polders and sluice gates created a whole range of environmental fallouts from water logging to flooding. The pressing issues sometimes varied from one area to another as well as the public reactions to them. There were host of movements all with different goals and objectives like recovering a *beel* or water body, saving a river, preventing water logging in one upazilla, addressing impacts of certain regulator, so on and so forth. Paani Committee articulated the development induced environmental challenges holistically. Accordingly, the goal set for the ensuing citizen movement was drawn upon integrated approach. While at basin and upazilla levels, Paani Committee emphasised on environmental issues relevant to the respective areas, overall they were approached comprehensively as different manifestations of environment-development nexus produced by water management interventions. This is the first strategic formulation of TRM movement.

The second strategic formulation – in line with the goal discussed above – is overarching design of the movement's structure. As mentioned earlier, when Paani Committee was formed, there were already a number of citizen movements going on in the south-west over environmental issues. In a smart move, the founders of Paani Committee didn't go about for crowding in the region's civic space with yet another citizen movement. They rather went for a collectivisation of existing citizen movements. Instead of launching a new citizen movement altogether, Paani Committee designed the TRM movement as a broad-based one that combined the ongoing movements utilising their points of convergence towards achieving a greater goal.

A conscious policy advocacy orientation is the third strategic formulation of TRM movement. The other pre-existing movements also targeted environmental consequences of water development interventions and demanded policy remedies. However, Paani Committee took up policy advocacy as one of its core objectives. Since the water interventions in question were part of national programmes, Paani Committee didn't limit its campaigns and lobbying with concerned local administrations, local governments and local units of BWDB. They also covered concerned government departments and ministries and BWDB head office in Dhaka through their advocacy campaigns. TRM movement was the first among the citizen movements of south-west to effectively identify the complexity of governance structure associated with polders.

Activities and Outcomes

With such comprehensive strategic formulations, TRM movement has been materialising through extensive repertory of activities. They are diverse not only in terms of themes they dealt with but also in terms of typology. Some of the movement's major activities are information gathering and dissemination, awareness raising, publishing, mobilisation, advocacy, campaigning, lobbying, training,

participatory planning, contribute in designing TRM interventions and facilitate their execution. As we discuss the outcomes of TRM movement next, there are elaborate manifestations of the above activities. Paani Committee has been waging TRM movement for over two decades now. There are some milestones over this long period. The outcomes of the movement will be best discussed in line with the milestones, as we have done below.

Amid worsening water logging situation and other environmental fallouts, popular resentments and oppositions to polders were also on the rise. In an apparent move to address water logging specially in the *Beel Dakatia* area, the Khulna Coastal Embankment Rehabilitation Project (KCERP) was introduced in late 1980s with support from ADB. Again, there was no consultation with concerned population and there was hardly any reflection of their needs in the project design. As of consequence, water logging of *Beel Dakatia* further deteriorated leading to widespread public protest. The project was ultimately suspended in 1990 as local people initiated TRM by cutting the embankments (Fakir 2008, pp. 2). Although this was not explicitly under the auspices of Paani Committee yet some of its local leaders were among the leading figures. The TRM in *Beel Dakatia* initiated by local people continued for 3 years 9 months after the polder embankments were breached at four locations in September 1990.

After the widespread success of *Beel Dakatia* TRM, another successful citizen-driven TRM was in *Beel Bhaina*. In 1997, water upstream of Bhabadaha flooded the beel. In absence of any useful government action to address the situation, local people came together to initiate TRM. During October and November, they cut one embankment at the *beel* itself and another at one kilometre upstream. The TRM continued for the next four year.

With *Beel Dakatia* and *Beel Bhaina* together, there was a decade of citizen-driven TRM in the south-west. Paani Committee's advocacy at local, national and international levels also continued simultaneously. However, for a long period of time, instead of accepting the ecological approach of TRM, government and multilateral donors kept on reinventing the wheel by churning out ever new structural water interventions. Following suspension of KCERP, Khulna Jessore Drainage Rehabilitation Project (KJDRP) was formulated in 1993 with support from ADB. Its core objective was rehabilitating the existing drainage infrastructure to reduce congestion and enhance protection from tidal and seasonal flooding. The Project had provision for constructing 8 new and rehabilitating 25 drainage structures, rehabilitating 30 kilometers of embankments and 70 tidal irrigation inverts (locations for silt excavations to enable free flow of tidal water in irrigation canals) and 1.6 million cubic metres of river dredging. The total project area was approximately 100,000 ha of low-lying flat lands with beels supporting a population of 800,000 (ADB 2007, pp. v).

The renewed emphasis on structural water interventions and continuous de-emphasis on natural drainage processes made local population apprehensive of KJDRP. There was widespread opposition, protest and advocacy over implementation of KJDRP in its proposed form. The stand-off between local citizens and KJDRP was also the one between two approaches: TRM and structural water interventions. While this is written large throughout overall KJDRP phenomenon, there are stark manifestations

in cases of the death of *Hamkura* river and the resistance to *Tiabunia* and *Kashimpur* regulators.

The death of *Hamkura* river was a tragedy of somewhat epic proportions. It was not something unique since many rivers died in that region both before and after *Hamkura.* What is so tragic about this river is that it was almost rescued by people through TRM from the damages done to it by polders. The *Beel Dakatia* TRM restored the navigability of the river by increasing both its depth and width within a short span of time. But then the river largely died when the cut points made in embankments under *Beel Dakatia* TRM were filled up (Paani Committee 2001, pp. 3).

The *Hamkura* river was an important drainage channel for a handful of beels that cut across Dumuria upazilla of Khulna: Dakatia, Madhugram and Singa beels on the north-west of the river and Madhabkati, Khajura and Khalshi beels on the south and the east. It was also connected with *Lower Bhadra* river 15 km downstream. Previously, tidal water would flow all the way from *Hamkura* through *Lower Bhadra.* Now it flows up to 14 km from Dighulia towards north while the rest of the river is completely silted up. The dry river bed is covered by paddy fields, fisheries' enclosures and homesteads (Islam and Kibria 2006, pp. 13). KJDRP made the demise of the river permanent. Subsequently, the downstream *Lower Bhadra* river is also fast dying. There was repeated demand from local population to rescue *Hamkura* by resumption of TRM in the relevant beels specially *Dakatia.* KJDRP instead decided to let the river die and use alternative rivers as drainage channels. That option was not viable – already suggested by indigenous knowledge – as other neighbouring river basins were in higher plains (Paani Committee 2001, pp. 3).

While the local citizens couldn't persuade KJDRP to revive *Hamkura* river, they were able to prevent construction of *Tiabunia* and *Kashimpur* regulators. The same plan that let *Hamkura* die also proposed *Tiabunia* regulator to facilitate use of *Salta* river as the alternative drainage channel. But the regulator couldn't be constructed in the face of massive public protest led by Paani Committee. This made any work towards regulator construction even land acquisition impossible. Similarly, KJDRP planned *Kashimpur* regulator taking death of *Upper Bhadra* river for granted. Local population resisted the regulator's construction and initiated TRM in *Beel Buruli Pathra* as counter-measure. There was day-and-night vigil by people in *Kashimpur* point. Even a conference was organised in Khulna city where all stakeholders were invited. In the end, KJDRP had to abandon the construction of *Kashimpur* regulator (Islam and Kibria 2006, pp. 12, 15).

In addition to public mobilisations and protests in field, Paani Committee stepped up policy advocacy with government, donors and civil society. For example, a broad-based public consultation was organised in Khulna city on KJDRP in July 2001. With mounting public pressure and relentless advocacy of Paani Committee, ADB commissioned Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) of KJDRP to CEGIS. The study findings, as articulated by Kibria (2011, pp. 17), scientifically substantiated appropriateness of TRM over structural water interventions:

> "The 1998 study (of CEGIS) not only concurred with the correctness of the open cut demonstrations by the communities in Beel Dakatia and Bhaina, but also gave scientific and engineering support to formalize that practice as the most suitable design option for these areas in dealing with waterlogging and drainage congestion problems."

Following the CEGIS studies, TRM was accepted and incorporated in the project design of KJDRP in the last phase of its implementation. Paani Committee's advocacy also succeeded in persuading Operations Evaluation Division (OED), the independent evaluation arm of ADB, in undertaking a Project Performance Evaluation Report (PPER). The report rightly observed that tension between local population in favour of TRM and BWDB promoting structural solutions bogged down KJDRP:

> "The findings of the Operations Evaluation Mission revealed continued tension between local stakeholders and the lead Executing Agency, BWDB, from the start of the Project due to diametrically opposed perspectives on the solutions to drainage congestion problems. The tension caused a more than 3-year delay in project implementation. Lack of appreciation for indigenous knowledge systems and BWDB's resistance to adopting nonstructural solutions in favor of structural solutions were the main factors contributing to the rift between the local people and BWDB. The Project made progress only after the local people demonstrated an indigenous-knowledge-based "tidal river management" (TRM) approach, which was later found as technically feasible, economically viable, and socially acceptable (ADB 2007, pp. vi)."

The original position of Paani Committee on polders and associated environmental problems as part of a human induced environmental degradation instrumented by water development interventions was further reinforced with experiences of KJDRP. In the words of Paani Committee's general secretary, "It's a long time when polders and water logging are main targets of TRM movement; we are now more of an environmental movement for rescuing the south-west from ongoing ecological disaster and climate change (Hashem Ali Fakir, *op. cit.*)." Therefore, TRM movement has been giving lot of attention lately to participatory planning and long-term strategies for overall water-environment nexus in the south-west Bangladesh. Two major works in that direction are: peoples' plan for integrated river and water management in the south-west and peoples' plan for *Kopotakkhyo* river system.

Concluding Observations

In the backdrop of rising environmental challenges due to climate change, the adaptation context of south-western Bangladesh has been plagued by water development interventions. The government water agency BWDB with advice and finance from donors – first USAID and Dutch government, and then ADB – introduced structural solutions in water management. This was done with total disregard to the region's ecological characteristics. Initially, the polders and regulators could bring relief from tidal inundations and frequent floods. However, within decades, the decline in environment was worse off. Both scale and intensity of environmental challenges worsened than pre-polder days. The TRM movement led by a civil society organisation emerged in this juncture as grassroots citizen's response to environmental decline and climate change in south-west Bangladesh. This is

substantiated by the following five set of findings from our case study against the five sub-questions set forth at the beginning of the study.

First, the substance of the TRM practices as an effective climate adaptation action is widely evident from both literature and fieldwork. There is some – if not plenty of – scientific and policy literatures about application of TRM for flood and water management in south-west Bangladesh. They make strong claims backed by substantial empirical evidence about effectiveness of TRM as adaptation approach. Such findings largely corresponded with our fieldwork findings where key informants and FGD participants who reported in favour of TRM as climate adaptation approach.

Secondly, while TRM has been in practice in the south-west region for generations, it was not automatically adopted into official flood and water management programmes of the country. That only happened later on following widespread campaigning and advocacy of Paani Committee in support of TRM. It was a long and complex process. Paani Committee first articulated peoples' common interests with respect to water and environment. Then it mobilised various sections of local population under one umbrella organisation to press home their demands. Prior to Paani Committee's formation, people were dividedly organised under different interests. Those separate citizen movements had lesser impact than TRM. that is yet to be systematically investigated.

Thirdly, TRM is very much an indigenous adaptation approach. Traditionally, TRM has been a major approach for flood control, water management and flood flow zone agriculture in the south-west region. This emerged through centuries of cultural practices by local population that was developed in tandem with local ecological conditions.

Lastly, while mainly a flood and water management technique, TRM is also an adaptation approach concerning some major climatic challenges to Bangladesh i.e. flood and sea level rise. Being one of world's most active deltas, the country's ecology is characterised by regular floods. Flood flows are instrumental for availability of water, navigability of rivers and waterways, agriculture, food production, so on and so forth. Flood and water flows of the country in general and the south-west region in particular have been affected by some development interventions made mainly since the 1960s. They negatively altered local ecological conditions resulting into water logging and reduced availability of fresh water. Due to climate change, floods have increased in numbers, become irregular and more disastrous. There is increasing toll on flood and water management. TRM appears as an effective adaptation approach to climatic challenges pertaining to flood and water flows. TRM also has potential to adapt with sea level rise since it increases land elevation and river depth.

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