

Sand Mining and Its Social Impacts on Local Society in Rural Bangladesh: A Case Study of a Village in Tangail District

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Abstract Focusing on sand mining and its social impacts, this paper seeks to examine conflict and problems that have been brought to local society by deepening and geographical expansion of industrialization in Bangladesh. In recent years, sand has emerged as important resource in Bangladesh for rapidly increasing construction demand as with the cases of other developing countries. Although sand mining has begun to draw attention from some organizations and researchers, for the absence of previous studies on the matter, it is not clear how it is carried out in actual and what impacts it has on local society in Bangladesh. This paper explores the process of and actors related with sand mining and business utilizing it, and social impacts of them on local society from a case study in Tangail district. Law and the rule on sediments extraction were not observed at all there; local influential residents illegally privatized sand and sold it for factory construction. The external factors such as industrialization allying with power structure in local society, the residents who were at risk of the loss of their property by riverbank erosion were put in the most unfair circumstance.

Key words sand mining, industrialization, riverbank erosion, conflict in local society, rural Bangladesh

Introduction

While Bangladesh is well known as flood and cyclone prone areas, loss of land and population displacement by riverbank erosion have drawn researchers' attention (Hossain 1993; Lein 2000, 2009; Hutton and Haque 2003; Rahman 2010; Islam et al 2015). Previous researches have explored conflict and struggle in local society over land as scarce resource, which accretes by sedimentation in one time and disappears by erosion in another time (Zaman 1989; Hutton and Haque 2004: 46). This study also focuses on an area suffering from riverbank erosion but depicts the recent trends that sand itself has become important resource for rapidly increasing construction demand along with industrialization in rural areas and that sand mining from a river has brought conflict in local society. From a case study in Tangail district, this paper explores by which actors and how sand is mined and sold, and what social impacts sand mining and the business utilizing it have on local society. Its purpose is to unveil the tip of the iceberg of problems coming along with industrialization in rural areas.

Most of the land of Bangladesh is alluvial lowland of three large rivers; Ganga (Ganges), Jamuna (Brahmaputra) and Meghna River. The rainy and dry seasons are clear cut; the monsoon rainfall from June to September occupies about 80 percent of the annual rainfall (Mirza 2003).

In the annual rainy season one third of the country floods and of this probably a third is inundated to a depth of 1 m or more (Johnson 1975: 26). The land is covered with a mesh of large and small rivers and channels. The total length of 700 major rivers running in the country is 22,155 km (Rahman et al 2001: 59). According to Umitsu (1997: 195), almost all of the rivers run without bank protection or embankment construction. Therefore, erosion actively occurs along the outer banks during every rainy season. The sediment within Bangladeshi rivers consists primarily of fine sands and silts with little clay matrix (Coleman 1969). Hence, slight increase in flow quantity causes erosion easily and often results in washing houses and farm land away. Comparing topographical maps of past decades, the larger rivers, the greater the degree to which river channels changed in their forms and locations and an enormous number of villages disappeared (Umitsu 1997: 195; see also Miyake 2008: 260).

Bars in the middle of rivers and at riverbanks are called 'char' in Bangladesh. Livelihood and adaptation to displacement by erosion among residents of char have been studied particularly in the areas around the three large rivers mentioned above (e.g. Lein 2000, 2009; Hutton and Haque 2004; Rahman 2010; Islam et al 2015). It has been said for a long time that there was little public support for displaced people, but the situation remains unchanged (Rahman 2010; Islam et al 2015). Hossain (1993) says that

victims of erosion have received almost no attention from the government agencies or NGOs working within the affected areas. Zaman (1989) notes that local influential residents usually occupied accreted char's land by exerting violence and that redistribution of land to displaced people was not implemented properly for administrative corruption. Some displaced people have emigrated to slum areas in Dhaka or other cities as reported that in some slums in Dhaka more than 40 percent of the population named river erosion as primary cause for their migration into slums in the middle 1980s (Rahman 2010: 59; see also Miyake 2008: 248–282). Bangladesh Bureau of Statistics (hereinafter referred to as BBS) (1999) also notes disappearance of settlements by riverbank erosion as one of the reasons for generating floating population. The issues of char's land and population movement by riverbank erosion have been caused by a unique characteristic of the delta land. On the other hand, since the need for sand is rising exponentially to meet its ever increasing demand in the construction sector for rapid industrialization and urbanization over the past few decades, indiscriminate mining sand from riverbeds and floodplain areas is broadly observed and affected the health of the river ecosystems but also degraded its overbank areas to a large extent in developing countries (Sreebha and Padmalal 2011; Padmalal and Maya 2014). The case of this study also indicates that sand has emerged as important resource in local society through deepening and geographical expansion of industrialization to rural areas.

Business of selling sand or soil has been conducted since a long time ago in Bangladesh. Bengal delta is undulated and marked by natural levees particularly in the central area of Ganges delta, Jamuna floodplain and the Sylhet basin (Umitsu 1997: 192). While settlements and marketplaces have developed on natural levees, homesteads have become to be formed by piling up sand and soil in lower areas for population increase. Nowadays homesteads and houses with mounds of sand and soil are commonly observed in Bangladesh. Homesteads are usually formed by digging ponds and piling up the sand and soil (Miyamoto et al 2010: 854). Roads travelable for vehicles are also constructed by banking sand and soil up. If one wants to build a structure along with the roads, it needs to raise the ground level of a plot of low-lying land. Therefore, business of selling sedimentary sand and soil in ponds and rivers has been established. However, it is not possible for previous small trading and mining sand and soil from private ponds to meet the demand in construction sector caused by rapid industrialization and urbanization in the districts neighboring Dhaka and provincial

cities today.

Although we could not find any statistics or researches on current situations of sand and soil mining in all parts of Bangladesh, such incidents as this study treats seem to occur broadly, considering from recent news and reports on illegal sand and soil mining in the following district; Narayanganj, Tangail, Sirajganj, Rajshahi and Manikganj (Kayes 2011; Daily Star 2012, 2015; Golam 2015).¹ Sand and soil mining in Bangladesh has begun to draw attention from some organizations and researchers. For example, the seminar on 'Importance of Integrated Management in Mining Sand from the Riverbeds of Bangladesh' was conducted by SOUL (Save Our Urban Life) with the financial assistance of BWP (Bangladesh Water Partnership) on 24th September, 2011 and gathered 70 participants from government organization, NGOs and reporters of TV channels, newspapers and journals.² In the seminar, the limitations of sand mining were pointed out as well as implementation of an environment friendly integrated and comprehensive management of river sand was recommended (see also Padmalal and Maya 2014). The current situations suggest that not only measurements for natural disaster such as riverbank erosion but also prevention and resolution of environmental issues and human-made disaster which can be caused by anthropogenic activities have been emerging as new challenges in Bangladesh. However, while Khan (2011) presents administrative management of sand mining, concrete situations of it in local society have been treated only by the media as mentioned above in Bangladesh. It is not clear how it is carried out in actual and what impacts it has on local environment of Bangladesh.

Although this study does not examine what impacts in-stream sand and soil mining have on riverbank erosion, it is now established that when the rate of sand extraction exceeds the replenishment rate, significant and potentially irreversible changes occur in the hydraulic conditions and channel stability (Sreebha 2008; Sreebha and Padmalal 2010: 134). Rinaldi (2003), Rinaldi et al (2005) and Lu et al (2007) emphasized the fact that in-stream sand mining is one of the principal causes for rapid channel incision and subsequent bank failure incidences from the cases of Central Italy, Southern Poland and China respectively. To investigate impacts of sand mining on physical environment in the area treated by this study needs cooperation of experts whose field is physical geography or hydraulic engineer; therefore it will be future task. In this paper, we focus on the process of and actors related with sand mining and the business utilizing it, and social impacts of them on local society.

Study Area and Survey Method

The administrative units in rural Bangladesh are district, upazila, and union consisted of one or several mouzas (the lowest revenue collection unit), in order of upper rank. Union Parishad (Council) is the lowest local government system and composed of one elected chairman and 12 elected members. On the other hand, spontaneous village called gram consists of one or several paras. Para consists of one or several baris; homesteads composed of one or several households or families. The administrative units were introduced in British India period and do not often correspond with spontaneous ones. The study area is Haji-para in Boishak upazila, Tangail district, located about 80 km northwest of Dhaka and situated in Jamuna floodplain (Figure 1).³ Tangail district is contiguous with industrial areas like Gazipur district and suburb of Dhaka city and has many factories of garment, textile, jute mill, spinning mill, pharmaceuticals and so on. Those factories are particularly located along with the south eastern part of Dhaka-Tangail highway. Recently a torrent of factory construction has rushed to the rest part of the highway. Most of roadside land, which was low-lying paddy field, has been bought by companies for factory construction in succession. Among them, the factory construction by N-Group, one of the largest corporate groups in

Bangladesh, has significant impacts on Haji-para and around the area. N-Group has bought about 10 acre land in Donia upazila, the neighbouring Boishak upazila, and started constructing a factory there (Figure 1).

In 2011, Haji-para had 395 households and a population of 1,627 and all of them were Muslim (BBS 2012).⁴ Haji-para and the other 20 paras constitute a union. Haji-para has three parts of para; uttar (north), madha (middle) and dakshin (south) para. The river whose official name is Pongly runs across Haji-para whereas local residents called it Jinai or Jinok nodi (river) (Figure 1). Pongly river is an effluent of Jamuna river and has various names in each area; for example its downstream in Dhaka is called Briganga river (Figure 1). Pongly river flowing across Haji-para was about from 70 to 100 m wide. Shallow parts of the riverbed appeared when the river water dried up in the end of dry season, around from February to March. In contrast to it, the riverbanks were actively eroded in every rainy season. Residents of Haji-para have been suffering from the loss of their land by erosion (Mizoguchi 2010: 61–62).

Survey method is participant observation and semi-structured interview to residents of Haji-para and around the area and administrative officials at upazila or district level. Survey period is June 2012 and December 2013.

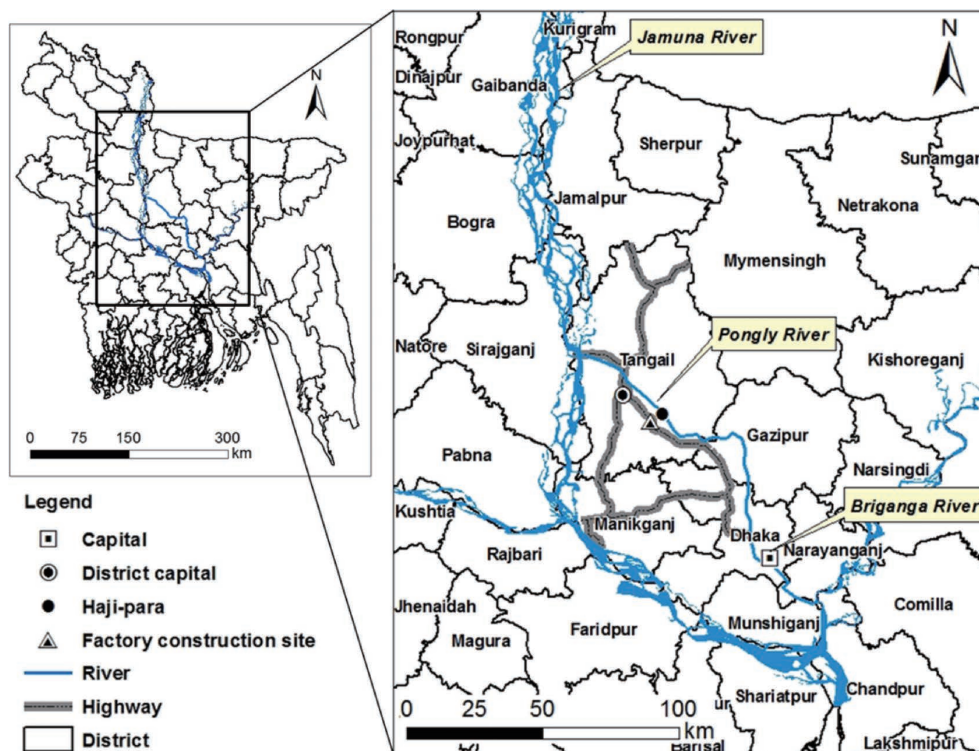


Figure 1. Study area

Source: Authors by using ArcGIS and Global Administrative Areas database, version 2.0

The Process of and Actors Related with Sand Mining and the Business Utilizing It

In Haji-para each homestead cluster was given a name. The homestead cluster being eroded by the river was literally called ‘banga bari’ (collapsed homestead). In December 2013, we identified 29 households as having transferred their main houses for riverbank erosion within/from Haji-para. Among them, only four households have emigrated to a neighboring para and upazila; the rest has moved to other parts in Haji-para.⁵ Twelve households have experienced main house transfer twice and over (Table 1). Those households have constantly transferred until 2000s and 2010s (Table 2). At once a poor household had had a shelter at a mosque building site in Haji-para.⁶ Public support such as shelters and relief for displacees and sufferers has rarely provided in Haji-para as with the cases in previous studies. Some residents of Haji-para told that Tk 500 had been provided just once in the past to each household whose homestead had been eroded; therefore displacees and sufferers have had to cope with the difficulties by themselves or help from kin or neighbors.⁷ Thus riverbank erosion was a serious problem for residents whose homestead was located along with the river. Under such circumstance, sand extraction from the riverbed and bars at banks by heavy machinery has been

started just in front of ‘banga bari’ since January 2013.

Mining sand there has been conducted along with BRRP (Briganga River Restoration Project) by BWDB (Bangladesh Water Development Board). BWDB is a government agency for water resources management. According to an official of the local branch of BWDB in Tangail district, by digging the riverbed of Pongly river down, BRRP intent to smooth the water supply from Jamuna river and increase the flow quantity. Its purpose was to make polluted water in Briganga river flow away toward the estuary. Pollution of Briganga river has a long history; drainage channels of life miscellaneous waste water and excretion in Dhaka had drained into the river in British India period (Miyake 2008: 45) whereas sewage treating water is discharged there today. We can see coal black water in Briganga river at the port of Sadar Ghat in Old Dhaka. Pongly river runs across industrial areas in Gazipur district and suburb of Dhaka, hence it has been polluted there as well.⁸

BWDB concerned that increase of the water flow by extracting sediments from the riverbed could cause acceleration of riverbank erosion. Therefore, BRRP had a plan to secure riverbank slopes with blocks after extracting sediments for prevention of erosion. However, the budget for the plan was not allocated and its implementation was not fixed.⁹ Besides, extracting sediments is regulated by law and the rule of BWDB as the following; extracted or not, sediments in rivers are legal public property; points of extracting must be in bars in the middle or at the insider banks of rivers, otherwise in the middle part of riverbeds to smooth the water flow at the same time not to accelerate erosion; sediments extracted from a river have to remain piled at sites of 30 m distant from the river; those whose land is used for the site to pile sediments will be paid compensation.¹⁰ If law and the rule of BDWD had been observed properly, sand mining and the sand distribution in the study area would have been as indicated in Figure 2. However, these were not observed at all and indiscriminate sand mining was conducted in Haji-para and around the area.¹¹ Influential residents of Haji-para, exactly we counted seven persons, committed in the matter and sold mined sand for the factory construction by N-group.¹² The influential residents here mean two types of people; formal or informal political power holders such as members of a Union Parishad (hereinafter referred to as Union members) and village leaders called ‘mattabor,’ and wielders of violence-power.¹³ The former often employed the latter to rule or dominate society (see also Zaman 1989). We will describe the process of mining and selling sand below based on Figure 2 and 3.

Table 1. Frequency distribution of main house transfer within/from Haji-para

Frequency of main house transfer	Number of households
once	16
twice	3
3 times	6
4 times	2
5 times	1
more than 5 times	1
total	29

Source: Authors Field Survey, 2012 and 2013

Table 2. Distribution of the latest period of main house transfer within/from Haji-para

The latest period of main house transfer	Number of households
1980s	2
1990s	6
2000s	17
2010s	3
unknown	1
total	29

Source: Authors Field Survey, 2012 and 2013

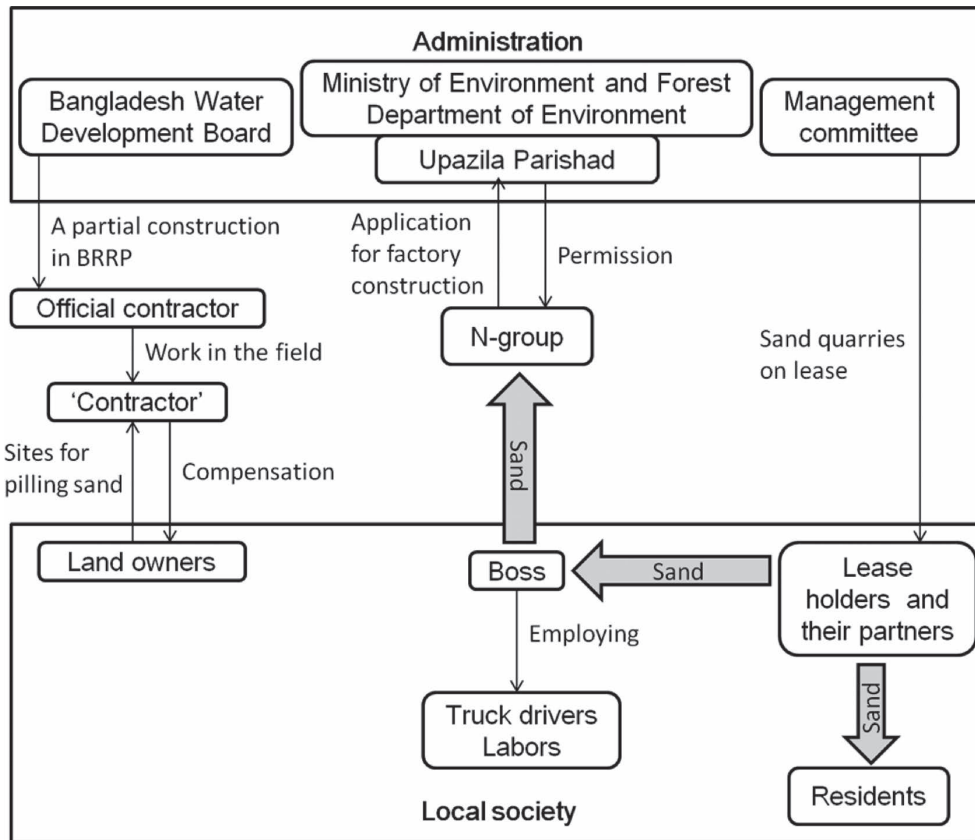


Figure 2. Sand mining and the sand distribution in a legal way
 Source: Authors Field Survey, 2013

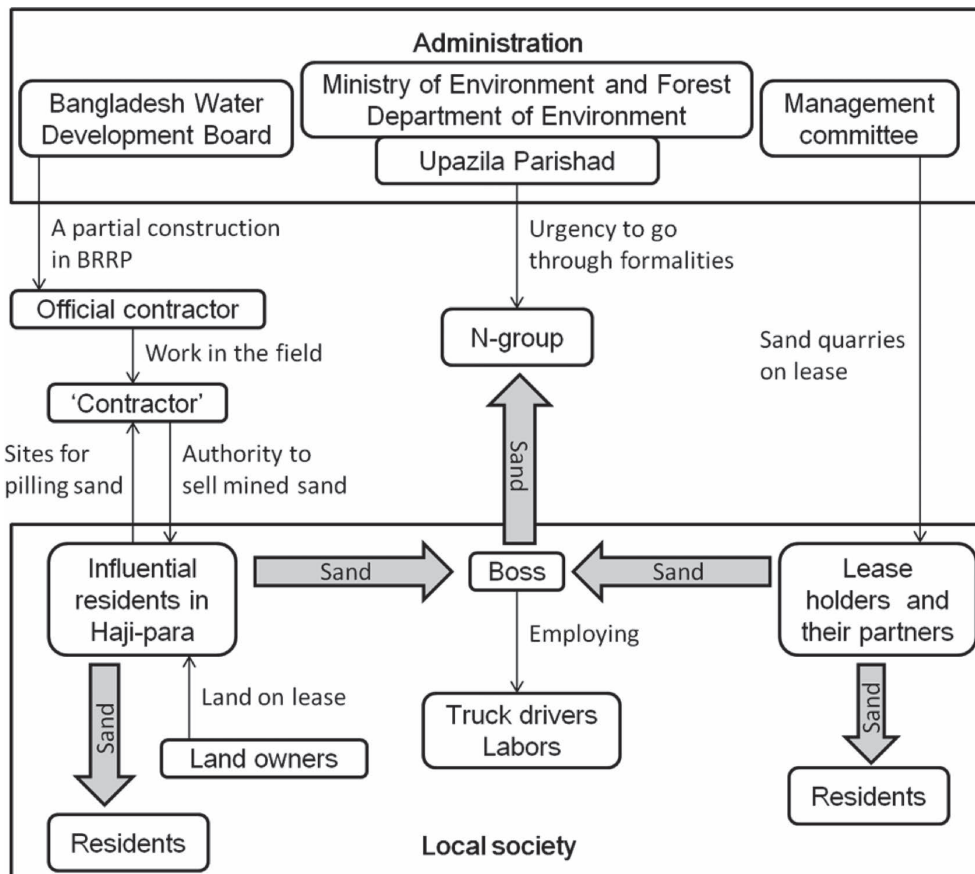


Figure 3. Sand mining and the sand distribution in actual
 Source: Authors Field Survey, 2013

Preparation for mining sand from Pongly river was rapidly progressed in Haji-para in the end of 2012. Firstly, some influential residents of Haji-para have leased land from local residents on a one year contract for the sites to pile sand (Figure 3). The sites were located where roads travelable for trucks were available regardless of distance from the river; one was located about 3 m of the river, another was about 200 m. They paid Tk 1,000 per one decimal (about 0.01 acre) to the land owners as not compensation but rent.¹⁴ Then, some engineers determined a proper zone for extraction and marked the boundaries of the zone by bamboo pillars in the river. However, a person who was called as 'contractor' and thought to be related with BRRP installed heavy machinery and facilities necessary for sand mining regardless of the zone. The installed points were located in near the riverbank, where were convenient to install sand drainage pipes. The 'contractor' contacted only with some influential residents and started extraction just in the name of 'work under the government' without detailed explanation on it to other local residents.¹⁵ According to an influential person who had a connection with the 'contractor,' he was a representative of his uncle, who has undertaken the construction of 2 km range of Pongly river with the total budget of Tk 30 million as an official contractor of BRRP, and given work in the field. The 'contractor' vested the influential residents of Haji-para the authority to sell mined sand in return to have them take land on lease for the sites to pile sand (Figure 3). Thus they started selling a large amount of sand to N-group. N-group bought sand from them for Tk 1,100 per a truck-load in December 2013. The price included expenses for transportation and employing drivers and labors who loaded sand on the truck. They sold sand to local residents for private house construction as well (Figure 3). If the destination to transport sand was around the sites piled sand, a truck-load of sand was sold for about Tk 600. The purchase price by N-group was higher because the construction site was located about 8 km of the sites piled sand and hence the expense for transportation was bigger. If N-group had not emerged as a large customer, almost all sand would have remained at the sites. To sell sand extracted by BRRP was illegal because it was legal public property and had to remain piled as mentioned above. On the contrary, taking advantage of the lack of information on law and the rule among local residents, the influential residents used the implementation of BRRP as an excuse for justifying to mine and sell sand as 'work under the government' and evading protest by some residents. In other words, extracted sand was illegally privatized and sold for the factory construction under the mask

of BRRP.

There was another reason to make protest against mining and selling sand difficult. All sand sold to N-group was through a person of near village. He was the boss who controlled sale and transportation of sand to N-group in Haji-para and around the area (Figure 3). We often heard that he monopolized transact with N-group by exerting violence to those who intent to enter into the transaction or protest it. In fact, when one of the authors rode a truck loaded sand to survey the process of transportation, the driver showed a heavy knife and said that the boss made drivers keep weapons in trucks and threaten those who protested about sale or transportation of sand with them.

On the other hand, some local residents have taken 'balo mahal' (sand quarries) in Pongly river in and around Haji-para on lease (izara) and sold sand to local residents for private house construction or pond reclamation for about a decade.¹⁶ Among them, seven were residents of near villages and two were of Haji-para. Those who originally dealt with small customers have come to sell sand to N-group since the factory construction was started (Figure 3). The factory construction by N-group created much larger demand for sand in areas around the site.

Moreover, not only the 'contractor' and influential residents but also N-group committed an offense against law. N-group has started filling up the low-lying paddy fields without going through legally due formalities. A company planning to construct a factory must obtain permission from Union and Upazila administrative offices and Department of Environment under Ministry of Environment and Forest (hereinafter referred to as MoEF) controlling the area where the construction site is located (Figure 2).¹⁷ Department of Environment obligates one to submit detailed reports and pay taxes in each industrial sector as the application for permission of factory construction.¹⁸ However, most of the officials at upazila or district level who were interviewed by us regretted that legal regulations had little practical effect and that administrative formalities became a mere name. Not a few companies gave the application after starting or finishing construction, even remained without applying. As with the case of N-group, officials of a local branch of Department of Environment controlling Tangail district and department of agriculture in Donia Upazila exposed that it started reclamation of paddy field without any permission and urged it to go through formalities (Figure 3).¹⁹ One of the reasons for accepting such situations was that environmental policies were given ignorable weight in Bangladesh. The local branch of Department of Environment which we visited controlled Tangail and

Jamalpur district (Figure 1). Despite of controlling such a broad area, only three regular officials were assigned to the branch. The official complained serious shortages of personnel to us.²⁰

Impacts of Sand Mining and the Business Utilizing It on Local Society

Here we will depict what problems caused by sand mining and the business utilizing it in Haji-para and how the residents dealt with the problems. There is enough evidence from previous researches that in-stream sand mining increases the risk of bank failure as mentioned above. BWDB intent to mitigate the risk through a plan for bank protection although its implementation was not fixed as mentioned above. It was obvious without expert knowledge that sediments extraction from riverbeds and increase of water flow might cause acceleration of riverbank erosion. Residents of Haji-para perceived that the speed of erosion has increased since sand mining by BRRP was started. As an elder woman said ‘(Land was) eroded naturally before. Now (it is) eroded by human,’ the loss of land by erosion was becoming to assume human-made disaster aspect with BRRP and the factory construction.

Until our survey in December 2013, Haji-para has experienced a rainy season since sand mining by BRRP was started. Then, a great deal of farm land was washed away as well as a household has lost its homestead in the rainy season. The risk to lose homestead by erosion has been increasing also for those who have never experienced to be displaced. We mentioned above that 29 households have transferred their main houses from/within Haji-para for erosion. Among them, five households were still put into the periphery of the riverbank for further erosion as well as not a few households had land in the riverbank. Moreover, most of the households which have lost a plot of land by erosion had the possibility to regain ownership of the plot if it appeared again by sedimentation.²¹ Hence extraction of sediments from the riverbed was nothing but the loss to those households.

Those who have suffered and were going to suffer from erosion often blamed the influential residents who engaged in mining and selling sand; as they said ‘Mat-tabors get profit by sand mining,’ ‘Bad people help to dig the riverbed down,’ ‘He became an Union member and plunged this para into difficulties’ and so on. However, these voices were drowned out by the influential residents under the name of ‘the government.’ The ‘contractor’ was so clever that he gained over the influential residents by

vesting them the authority to sell mined sand. Most of the residents of Haji-para gave up protesting from the beginning as we often heard the words; ‘(They) will turn a deaf ear to what we say’; ‘To whom what can I protest?’. On the other hand, there were a few residents who resisted being put heavy machinery for sand mining near their homesteads by the ‘contractor’ although they could not avoid its installation at last. The person who lost his homestead after sand mining by BRRP was started had immigrated from near village and served as an imam of the mosque in Haji-para for more than 40 years; it means he was a religiously important person in Haji-para. He had continued protest against sand mining but was forced to turn back to his original village for the loss of his homestead in Haji-para by erosion. Some residents of the neighboring para also initially refused installation of heavy machinery for sand mining. However, the ‘contractor’ told local influential residents including those in Haji-para to persuade the residents who opposed him. Then, local influential residents of near villages gathered in that para to force them to accept it; hence, eventually sand mining was started also in that para.

To lose homestead or land by erosion was the most urgent problem; hence the residents whose homestead or land was located in the riverbank might be chief sufferers for sand mining. On the other hand, other residents were also in trouble for the business of selling sand. The road from Haji-para to the highway was considerably damaged because dozens of trucks went to and return from the construction site a number of times all day long. According to UNO (Upazila Nirbahi Officer, the chief executive of a subdistrict) of Donia upazila, weight regulation was established according to the types of road but did not have practical effect. Administration did not have any measurement machine for a truck load; hence there was no way without depending on self-declaration by drivers. In the road from Haji-para to the highway, both ends of the paved part were scraped and the ground appeared while the unpaved part became bumpy or like a sandy beach for falling sand from trucks; it was difficult to walk there without slipping and falling in the mud in the rainy season.

Moreover, a conflict with violence between Haji-para and a neighboring para occurred initially with a quarrel about transporting sand in December 2013. An elder man could not bear that his house became full of flying grit by trucks passing in front of his homestead every day. One day, when a truck was going in front of his homestead, he asked labors who were on the truck to carry sand with giving some water not to raise sand dust. A labor who

was from the neighboring para talked back to him with scurrilous language, and then his family counterattacked with hearing the words. This quarrel escalated into violent exchanges between Haji-para and that para with involving other residents. At salish (informal adjudication) held for the matter at the later date, however, it became exposed that the para-wise battle resulted also from the dispute over distribution of the profit among the influential residents of Haji-para who engaged in the business of selling sand. Taking advantage of the quarrel, one of them had some residents of the neighboring para attack the resident who occupied much of the profit. Thus quarrel and conflict related with the business have developed to a larger scale problem involving whole two paras.

It was difficult for anyone to protest against the business openly because about half of the influential residents of Haji-para engaged in it. The other influential residents kept silent or just blamed them indirectly; a mattabor said '(They) turn a deaf ear to us. The rich do not care about the poor. Business of selling sand is done by power.' The current Imam of the mosque in Haji-para also addressed to the residents to improve samaj (society) in his khodba (a speech on Islam) on Friday; he said to us 'Any kind of business harmful for samaj is haram (prohibited in Islam) for anyone, but particularly for mattabors.'²² However, he also regretted that he had no ability to resolve the issues of sand mining and the business utilizing it.

As we described above, while the influential residents have got the profit by the business of selling sand, powerless residents were at the risk of further riverbank erosion and in trouble for their business. However, there were various situations of the residents toward sand mining and the business utilizing it. In our survey period, about 20 residents of Haji-para engaged in transporting sand as truck renters, drivers or labors. It was also observed that the residents whose interests were not matched each other in respect of sand mining and the business settled the conflict by themselves. Giving an example, a family which had the possibility to regain ownership of a plot of land if it appeared again from the river was paid some compensation by its kin who engaged in the business. Moreover, those who gave up protesting were not powerless at all. A resident told us that he gave up joining the business because his parents did not permit for anxiety that they might be criticized unfavorably by other residents and fall into disrepute in the para; it means that indirect blaming for the business among residents restrained others from entering into it. Some residents secretly resisted the situation by setting sharp pointed iron or bamboo in the unpaved road which became like a sandy beach to disturb

transportation of sand by trucks, others were setting up a protest with banding together not to make the road damaged any further.

Conclusion

We explored that law and the rule of BWDB on sediments extraction were not observed at all in the case of this study; local influential residents illegally privatized sand mined by BRRP and sold for the factory construction by N-group. Land for the sites to pile sand was leased by them and located in not proper places based on the rule but where roads travelable for trucks were available; it means where was good for transporting sand to the construction site. For those whose homestead or land was located in the riverbank, the risk of the loss of their property for further erosion was increased by sand mining. Riverbank erosion in the study area was becoming to assume human-made disaster aspect with BRRP and the factory construction. The business of selling sand also caused considerable damage in the road from Haji-para to the highway as well as conflict involving other local residents. Although we observed an atmosphere to restrain or protest against sand mining and the business among residents, it was difficult for most of them to do directly because about half of the influential residents of Haji-para and the boss of near village were related with them.

Large-scale sand mining and the business utilizing it were brought by the combination of a project dealing with an urban environmental issue and industrialization in rural areas; BRRP and the factory construction by N-group. However, if law and the rule had been observed properly as indicated in Figure 2, the business would have not been done, and then such conflict in local society as we depicted above might have not occurred. In addition to those external factors, there are internal factors, in other words social structural problems, behind the situation.

In a legal way, the most important principle was that sediments extracted from riverbeds are public property. The rule of BWDB was established on the assumption of this principle. However, taking advantage of the lack of information on law and the rule among local residents, the influential residents disregarded them and illegally privatized mined sand through the 'contractor.' Here it is not enough just to point out that establishing or strengthening systems for obedience to law such as monitoring and disclosure of information is urgent task. There are a number of researches on longtime failure of administrative reforms in Bangladesh (Khan 1998; Sarker 2004; Ferdous 2014). The issue is not as simple as it can be

reduced to defect in systems.

According to Maloney (1988: 45), ownership is not so simple in Bangladesh as in the West. It is presumed one utilizes and to some extent controls the assets which legally belong to his/her organization. To collect means personally to dispense material and subtle patronage plays important role in forming personal relationship and strengthening personal force (Maloney 1988: 45).²³ In other words, how to utilize or distribute the assets is not fixed by abstract and rational rules but contemplated by a particular person according to his/her personal relationship; this is what Jahangir (1982) called as 'personalization of authority.'

Considering such informal but common rules and practice in Bangladeshi society, what the 'contractor' and influential residents did might be considered as 'personalization of authority.' However, in the case of this study, the other local residents were not under the patronage as well as the profit by the business of selling sand contributed almost only to accumulation of wealth among the influential residents. Therefore, we may call it as privatization of authority. The external factors such as a project for an urban environmental issue and industrialization have allied with power structure and privatization of authority in local society. Here, the residents whose homestead or land was located in the riverbank, which means those who were at risk of the loss of their property by erosion, were put in the most unfair circumstance; not only solutions to an environmental issue in the city but also accumulation of individual wealth were sought at the sacrifice of them.

Along with deepening and geographical expansion of industrialization and urbanization, such problems as we observed in Haji-para have been spreading in rural areas as some cases were exposed by the media as mentioned above. This study unveiled the tip of the iceberg of problems coming along with industrialization in rural areas.

Notes

1. The case of Manikganj district was broadcasted in a TV program, 'Crime Watch' by ETV (a private TV station of Bangladesh) in March 2013. It showed that illegally mined sand was sold for a factory construction.
2. About more details of the seminar, see the website (<http://www.gwp.org/fr/gwp-in-action/South-Asia/News-and-Activities-GWP-South-Asia/Sand-Mining-in-Bangladesh-Requires-Integrated-Approach/>). BWP is a branch of GWP (Global Water Partnership); an international network founded by World Bank, UNDP (United Nations Development Programme) and SIDA (Swedish International Development Cooperation Agency) to foster integrated water resource management. About GWP, see

the website (<http://www.gwp.org/>).

3. We use fictitious names for places at from para to upazila level in this paper.
4. Household is constituted persons, either related or unrelated, living together and taking food from the same kitchen in the census definition. This study follows it to identify a household.
5. We counted those numbers by conducting filedwork in Haji-para in December 2013. There might be more households having emigrated from Haji-para to other areas for erosion in the past.
6. The site had been waqf; donated property in Islam. Even the site had been washed away later and the mosque had been transferred.
7. Tk (taka) is Bangladeshi currency. It is difficult to guess the value of the amount of money because when they had got was not clear.
8. The official name of the river flowing there is Bangshi river.
9. Even though the plan may be implemented, the cost-effectiveness of embankment construction is questionable as long as we observed the situation around Haji-para; a river wall which was constructed two or three years ago near a marketplace of a neighbouring para has already collapsed.
10. These were heard from the official of Tangail branch of BWDB mentioned above and the other two officials belonging there in the interview by us.
11. Sand mining by BRRP was conducted in three paras near Haji-para in the same way.
12. Sand (balo) and clayey soil (mathi) were usually dealt with separately in the study area. Almost all sediments of Pongly river around Haji-para were sand; therefore N-group bought clayey soil from other villages.
13. Several mattabors are generally found in a para or village in Bangladesh. There is no election for mattabor. The status is informally and flexibly recognized by local residents. Conditions to acknowledge one as a mattabor are such as economic or educational status, ability to settle conflict or connections with those who have administrative positions or political power at regional or national level like magistrates or Member of Parliament. Although Union members are elected, the position of Union member and status of mattabor are complementary each other; it is often observed that a mattabor is elected for Union member as well as a person who is elected Union member become recognized as a mattabor.
14. It was higher price more than general lease for cultivating. One hundred Tk was about 1.29 USD in December 2013. As reference, average monthly income per household in rural Bangladesh was Tk 9648 in 2010 (BBS 2011).
15. With this word, he told that those who protested would get in trouble with the police.
16. Balo mahal is leased from a management committee headed by deputy commissioner in each district through open tendering (Khan 2011). The lease period is one year from April (the new year in Bengal calendar) and the contract is renewed every year.
17. In addition to this, a new rule was established in November 2013 according to an expert of LGED (Local Government Engineering Department) in Donia Upazila. Construction of factories requires permission also from a committee headed by Deputy Commissioner and composed of experts in public

organizations. Moreover, it was under consideration to apply this rule for private house construction as well. He said that architectural regulations have been tightened up since the catastrophe of Rana Plaza in April 2013 (See Bruke 2013).

18. For more details about the application, see the website of Department of Environment (www.doe-bd.org).
19. In contrast with administrative failure, politicians belonging to the party in power wield great power practically as it is often observed that administrators are forced to do as politicians demand in Bangladesh. The official of department of agriculture in Donia Upazila emphasized powerlessness of administration with telling that the politician who belonged to the government party and engaged in Tangail City Corporation demanded Tk 1,200 per 1 decimal (about 0.01 acre) of the construction site from N-group and threatened not to allow it to run the factory without payment.
20. About other problems in Department of Environment, see MoEF Government of the People's Republic of Bangladesh (1995: 58–59).
21. According to UNO (Upazila Nirbahi Officer, the chief executive of a subdistrict) of Boishak Uapazila, if one loses a plot of land for erosion and it becomes a part of riverbed, it is owned by the government. However, if the plot of land appears again within 30 years (period of validity for land title documents), the one can regain ownership of it.
22. Samaj is an informal social unit whose members settle disputes and held religious ceremonies together in Bangladesh. Haji-para had three samajes with corresponding each sub-para.
23. It is observed in the case of char's land as well. The people displaced by riverbank erosion have committed themselves to such patronage as sharecropping or free use of land for homesteads by locally powerful village leaders while such leaders have occupied newly accreted land (Zaman 1989: 200).

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