

## LIVELIHOOD VULNERABILITY OF *CHAR* LAND PEOPLE IN BRAHMAPUTRA-JAMUNA RIVER SYSTEM

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### Abstract

The *Char* lands are the home of some of the poorest and most vulnerable people in Bangladesh. About 6.5 million people (5% of total population of Bangladesh) live in the *Chars*. The present study was conducted into a *Char* land of the Brahmaputra-Jamuna River in the Bhuapur upazila of Tangail district, namely 'Gabsara'. The data collection methods include direct observation, semi-structured interview and focus group discussions. The study illustrated the livelihood options of the study area along with the vulnerability of the livelihood. It also explored the major pathways to overcome livelihood vulnerability. The result of the study showed that the *Char* dwellers are involved in more than one livelihood option. The off farm livelihood opportunity is marginal here. The significant factors of the livelihood vulnerability are seasonal flood, riverbank erosion, drought and *Char*'s isolated position. Very poor communication system and undeveloped *Char* huts made their livelihood more vulnerable. Further, lack of institutional support and inadequate credit facility made their lives difficult to cope with the situation. Lastly, the study recommends some suggestion for the policy planners and implementers for the future development of the study area. Increase of institutional support, making better communication system can reduce their livelihood vulnerability. Besides, available credit facility and developed *Char* market can change their whole scenario of livelihood in this area.

**Key words:** *Char, Livelihood, Vulnerability, Stressors*

### Introduction

A good progress has been made in Bangladesh over the last decade and following that Bangladesh is now on the way to change its economic status from less developed country to become a developing one (OECD, 2015, UN, 2018). However, all people do not benefit from that due to the unequal distribution of resources and development activities (Attaur *et al.* 2016). Some people of the country tend to remain marginal due to limited access and rights to resources and even to fulfil daily necessities (Hossain *et al.* 2012; Rahman *et al.* 2017). In addition, this setting is getting worse when the frequency and magnitude of different climatic challenges such as cyclone, flood, river erosion, heavy rain, and drought so on are increasing (MoEF, 2009; Parvin *et al.* 2016). Along with the climatic disaster, some social, economic and political factors also increase the vulnerability of people in Bangladesh.

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Bangladesh is the most vulnerable countries to climate change in South Asia because of its physical, social and economic conditions (Huq & Ayers, 2008). Natural hazards such as flood, erosion, cyclone, heavy rain, and drought and so on are common phenomena and till today Bangladesh is facing several disasters and climate variability is one of the main reason behind it (Hossain *et al.* 2012; IPCC, 2014). Bangladesh is a country of extreme geographical vulnerability with 70% of the population living in regions at risk of flood and 26% in regions at risk of cyclone (Mahmood, 2014). Since 1970, about 39 million people have been displaced by major natural calamities such as flood, erosion and cyclone in Bangladesh (Alam, *et al.* 2007; Asaduzzaman, 2016). Experts warn that about 6 to 8 million more people of Bangladesh could be displaced due to increase in global temperature and sea-level rise by 2050 (Harmeling and Eckstein, 2013). The impact of these climatic barriers are visible in human lives by damaging livelihood elements. Along with aforementioned climatic stressors, some anthropogenic stressors such as poor communication, lack of market chain, high input costs, inadequate institutional support, scarce training and skills, inadequate micro-credit facilities and so on increase the vulnerability of livelihood of the *Char* lands people in Bangladesh. *Char* lands are the island or attached bar of a river or delta that are emerged through the erosional and depositional process of fluvial system. The deltaic nature of land in Bangladesh has been developed in the confluence place of the Bay of Bengal and three major river systems; the Brahmaputra-Jamuna, the Ganges and the Surma-Kusiarra river systems (Ahmed, 2000). In the dynamics of erosion and accretion in the rivers of Bangladesh, the sandbars emerging as islands within the river channel, or as attached land to the riverbanks, often create new opportunities to establish settlements and pursue agricultural activities on them (Sarker *et al.*, 2003; Rahman, and Rhman, 2012). The riverine sand and silt landmasses are known as *Char* in Bengali (Kelly and Chowdhury, 2002).

The *Chars* are the home to some of the poorest and most vulnerable people in Bangladesh. These areas are particularly prone to the effects of frequent climatic shocks (floods, erosion, drought and cyclones) which increase the precariousness of poor people's lives by wiping out their assets and pushing them deeper into poverty (CLP, 2006). An estimated 6.5 million people (around 5% of the Bangladeshi population) live on the *Chars* and 5% of the total land area of the country is *Char*, which comes to about a total area of approximately 7,200 square kilometer (Alam and Koudstaal, 2000). The livelihood patterns of *Char* dwellers are mostly influenced and changed by several climatic and anthropogenic stressors, which are also responsible for the livelihood vulnerability. The study aims to focus on the livelihood vulnerability of *Char* land people by exploring their major livelihood options and the stressors that make their livelihood vulnerable. Besides, it also explores major pathways to overcome the vulnerability of the livelihood.

## Material and Methods

The *Char* Gabsara of Tangail district is selected for this study. The *Char* Gabsara is an island located in Jamuna River. This *Char* connects Bhuapur on the Jamuna River's east bank to Sirajganj on its west bank (Figure 1). The *Char* Gabsara is an unstable *Char*. Maximum parts of the *Char* are submerged by the water during rainy season. The area of the *Char* Gabsara is 76.73 km<sup>2</sup>. Jamuna is a braided river, every year *Char* area is increasing through deposition and washed away other side by erosion. *Char* Gabsara also inherent this common characteristics with its surrounding large perennial lands. The households of this *Char* land are isolated from the mainland. Boat is the only communication mode to mainland.

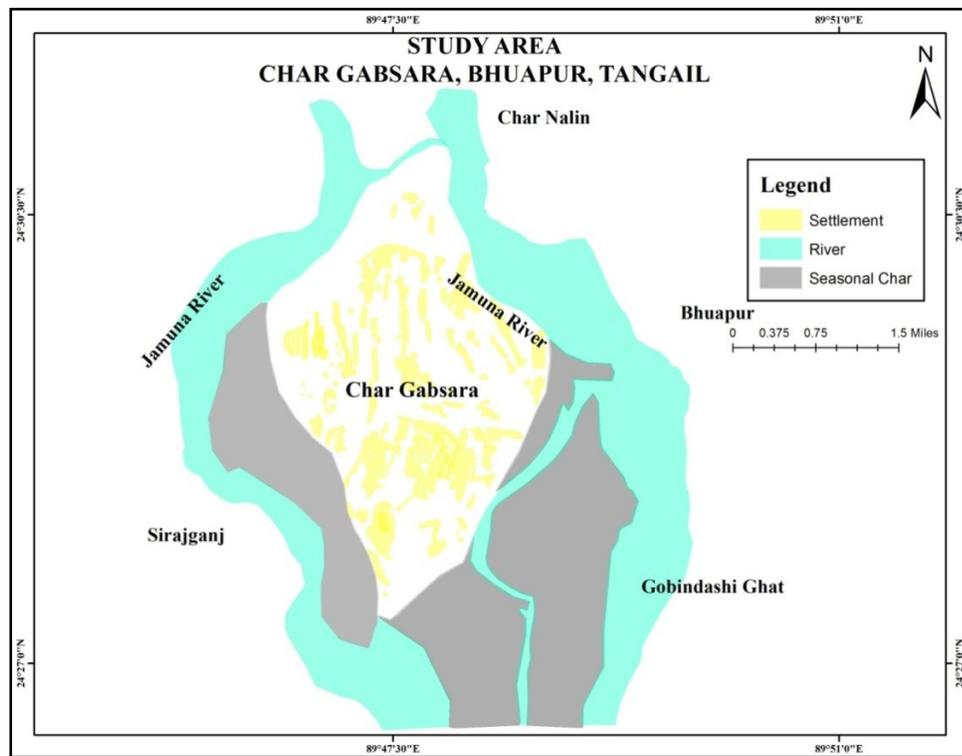


Figure 1. Study area.

Qualitative research design was used to identify the livelihood vulnerability of this research project. Qualitative research was chosen to explore the thought, knowledge and the reality of the participants. The in-depth information of *Char* land people was collected in the context of climatic and anthropogenic vulnerability of livelihood capitals. Semi-structured interview and Focus Group Discussion was conducted to gather demographic data, livelihood options, livelihood patterns and livelihood vulnerability. For the semi-structured interview, participants were selected from different livelihood groups such as agriculture, fishing, labouring and so on. A

few of interview participants were selected from key stakeholders group such as school teacher, local elected representative, government officer (agriculture, fisheries, health, education and administration). Only marginal people from different livelihood groups were participated in focus group discussion. Total 15 interviews and 2 FGDs were conducted for this project. Each interview was lasted on average 30-40 minutes and each FGD lasted on 1 hour. The interview and discussion was conducted through local Bengali language. After the consent from participants, all the interviews and discussion were recorded with an audio voice recorder. After conducting the semi-structured interview and focus group discussion the conversation and discussion were transcribed at first and then translated from Bengali to English.

## **Results and Discussion**

### ***Livelihood Options***

The dwellers of *Char* Gabsara are very dynamic in the case of their livelihood. Almost all dwellers are involved in more than one livelihood option. This is because; the nature doesn't give them scope to settle down in one definite livelihood strategy. Here off farm opportunity is rare. This study found 10 types of livelihood options that the dwellers take as their main livelihood strategies (Table-1). These are farming, livestock, poultry, fishing, day labouring, cloth business, soil lifting, shop keeping, steering boat, and vehicle driving. Maximum dwellers take agriculture as their main livelihood strategy. In the case of subsidiary livelihood option livestock and poultry are well ahead than the other options like business, day labouring and farming.

### ***Major Livelihoods and Responsible Stressors***

In the study site (Map 1), 10 types of livelihood options are found. Among them agriculture is dominating as primary livelihood option and livestock is dominating as subsidiary livelihood option. The stressors are divided into climatic stressors and anthropogenic stressors.

Table 1. Major livelihoods and responsible stressors.

<b>Category</b>	<b>Items</b>
Livelihood Options	Agriculture, livestock, poultry, fishing, day labouring, cloth business, soil lifting, shop keeping, steering boat and vehicle driving.
Climatic Stressors	Flood, river bank erosion, drought, thunderstorm, rainfall variation.
Anthropogenic Stressors	Very poor communication, lack of market, undeveloped market, high input costs, inadequate institutional support, scarce training and skills, inadequate micro-credit facilities, Robbery.

### ***Livelihood Specific Vulnerability***

**Agriculture.** The *Char* crops are a little bit different from the main land because of the different texture of the soil. The texture of the soil is mostly sandy. That is why Corn, Ground nuts, Sesame, Jute and Peas are cultivated more than Paddy.

Seasonal flood is the main reason of the livelihood vulnerability in the *Char* land. Seasonal flood inundates all the agricultural lands. Crops are submerged in water in that time. Almost all the livelihood options become vulnerable by this flood. In the study area wet season starts from the mid May and it continues to mid-October due to its lower elevation. In these 4 to 5 months period all the agricultural low lands are inundated by the river water. Not a single crop can be cultivated in this time. Due to this seasonal flood most of the crops are rotten. For example, March is the appropriate month for the sesame seed plantation. If the rain delayed, the sesame could not plant in the right time. On the other hand, if the early flood can touch the plant the sesame becomes damaged. Further, in the case of *Aus*, *Boro* paddy and Jute are usually planted in the mid April, but in the case of early flood these crops become damaged.

Inversely, drought or heat wave is another component of livelihood vulnerability as water become more crucial in the dry season. If rain delayed, the only option remains for the farmer is irrigation through pump. As a result the cost of the cultivation increases. Additionally, a huge number of dwellers still only depend on the rain for their cultivation.

Institutional support is very inadequate here. Agriculture officer don't come to visit this *Char* regularly. There are only 3 huts in the Gabsara *Char*. These huts are not developed yet. The availability of seed, fertilizer and pesticide are very inadequate. So it's a great problem for the farmers to collect quality seeds and sell their agro products at fair price. The nearest main land market of the study area named 'Gobindasi *hut*', where almost all types of agro elements are available and farmers can sell their agro product in fair price. The dwellers that live in the outer circle of the *Char* are vastly dependent on the 'Gobindasi *hut*' because of the availability of quality agro equipment and crop selling opportunity in fair price. On the other hand, the dwellers living in the inner circle of the *Char* are mostly dependent on the local *hut* due to the worst communication system in the *Char*. The price is little bit high here. Farmers pay excess money for seed and fertilizer. Further, in the case of selling crops, farmers don't get fair price. Additionally, they cannot sell all the crops are in the local *hut*. In that case, crops are carried to the 'Gobindasi *hut*' considering extra transportation cost. Crops are often damaged as there is no cold storage in the *Char* land. Inadequate credit facility is another cause of vulnerability in agriculture of the study area.

**Livestock.** Livestock is another popular livelihood practice in *Char* land. Maximum dwellers are involved in it and they take livestock as their subsidiary livelihood option. Cows and goats are very common livestock here. There are several reasons behind make this livelihood option vulnerable.

Livestock feed is one of the main vulnerable elements of the cattle farming in the study area. The dwellers face severe livestock feed scarcity in this area. Grazing land is not so available here. Respondents having no grazing land usually collect their livestock feed by cutting the grass from distant grazing lands or buy it from the *hut*. In the time of seasonal flood, all the grazing lands are inundated and the prices of the livestock feeds are increased.

Because of the isolated location of the *Char*, dwellers are deprived from the institutional support. Livestock officer doesn't visit the land regularly. That is why, they mostly depend on the local veterinary doctor. There are 3 local doctors here to serve both human and livestock. In the case of livestock products, those are sold mainly in *Char hut* because of its high perishable nature. But few of the dwellers who live close to the main land sell their products in the main land *hut* (Gobindasi *hut*). The prices of the livestock products are comparatively low in the *Char hut* then the Gobindasi *hut*. Where 1 liter cow's milk is sold in the Gobindasi *hut* at 70 taka, the same thing is sold at only 40 taka in the *Char* hut.

**Poultry.** Similar to the most of the rural areas in Bangladesh, poultry is one of the important subsidiary livelihood option in *Char* land. There is no poultry farm in the study area but dwellers are rearing chicken and duck at home. Poultry feed is one of the main vulnerable components in the study area. The dwellers suffer more for collecting poultry feed. During seasonal flood the collection of poultry feed become more difficult and expensive. In that time *Char* dwellers buy their poultry feed from outside the *Char*. In the meantime, the poultry can be seen in the prevalence of various diseases. Beside this, the habitat of the poultry become vulnerable. As a result many *Char* dwellers sold their poultry in that time at a lower price. Further, the vaccine facility is not good here (Table 2). Maximum poultry don't get any vaccine either. Additionally, poultry and poultry products price are very low in the *Char hut*. This makes the poultry rearing more vulnerable in this land. Poor communication system is the main barrier of the poultry and poultry products marketing.

**Fishing.** Fishing is another important livelihood option in the study area. Where most of the livelihood options become vulnerable in the flood time, only the fishermen can do their job at full swing. The most vulnerable time for the fishermen is dry season, where the water level of the Jamuna River becomes low. Besides, thunder storm, hail storm are the components which make this livelihood vulnerable. As fish is a very perishable item, sometimes fishermen don't get fair price due to oversupply. Further, many fishermen don't have their own boat and fishing net

(Table 2). In that case, they borrow these from others or take loan to buy. If the boat or net damaged due to thunder storm or hail storm, they become trapped in a net of debt for a long time.

Table 2. Vulnerability of the livelihood.

<b>Livelihoods</b>	<b>Climatic Vulnerability</b>	<b>Anthropogenic Vulnerability</b>
Agriculture	Infertile sandy soil, Early and Seasonal flood, Riverbank erosion, Drought, Rainfall variations	High price of seed and fertilizer in <i>Char</i> hut, High input costs, Limited irrigation facilities, Crisis of agro loan, Low crop prices in <i>Char</i> hut, No cold storage
Livestock	Shelter problem and feed crisis during flood.	Inadequate grazing land, Low price of livestock products, Robbery
Poultry Rearing	Shelter problem and feed crisis during flood	Inadequate vaccine facility, Low price of poultry products, Uncertain marketing, Robbery.
Fishing	Thunder storm, Declining flow of water in dry season	Lack of enough fishes, Low price in <i>Char</i> hut
Day Labourer	Flood, Drought	Crisis of work, Poor wages, Lack of skills, Deprived by authority
Vehicle Driving	Flood, Thunder storm	Fuel crisis, Increasing competition
Steering Boat	Drought, Thunder storm	Almost every family has boat, Sometimes familiar person don't paid
Small Business	Cloth Business	Not so beneficiary in <i>Char</i> , Low capital, Robbery
	Sand Lifting	Drought, High tender rate, Naval accident

This table shows the both climatic and anthropogenic vulnerability of the each and every livelihood option in the study area.

**Day Labour.** The people who have a little amount of land or don't have any land works as day labourer here. The common vulnerable factors of this livelihood option are flood and crisis of

work. The crisis of work mostly happened due to the flood in this area. The wet season is the crisis period for the day labourer. In this time all the agro lands are inundated and the day labourers become jobless. To survive in workless time, most of the day labourers migrate. Some of them work in sand lifting vessels and some of them work in brick field in the main land.

**Vehicle Driving.** The only vehicles that run in the study area is motor bike. There are only 13 motor bikes in the *Char* Gabsara. This livelihood option is more profitable than any other. The daily income of a motor bike driver is 1500-2000 *taka*. Seasonal flood is the main vulnerability for this livelihood option. In the wet season the lower parts of the *Char* are inundated by the river water and the main transport become boat. The vehicles drivers become jobless in that time.

**Small Business.** There are two types of businesses are very common in the study area. These are cloth business and sand lifting. Cloth business is not so profitable in the *Char* land. That's why they buy cloth from wholesale market and sell it at Jamalpur, Chittagong even in Cox's Bazar. More *Char* dwellers involve in this business at Ramadan when the festival of Eid-ul-Fitr is knocking the door. These seasonal businessmen lend money for their business before the big festivals. Sometimes the cloth businessmen become a victim of robbery. Then those seasonal businessmen are trapped in a net of debt for a long time.

In the case of sand business, extreme weather condition is harmful. In the time of the seasonal flood, the sand lifting becomes more difficult. Again in the time of drought, the sand lifting becomes easier but the sand transport becomes difficult.

**Pathways to Overcome the Vulnerability of the Livelihood.** Table 3 shows the immediate and long-term mitigation option of different livelihood. Immediate mitigation options commonly include credit facility and ensuring fair price in the *Char* hut. *Char* friendly crops and diversification of crops will be good options for agriculture to overcome the situation. Promoting meadows, vaccination and medicine will be helpful for livestock and poultry in the study area. Besides these, cold storage facility, increase the number of *Char* market and better communication system can be the long-term mitigation option of the study area.

Table 3. Mitigation Option.

Livelihoods	Immediate Mitigation Options	Long-term Mitigation Option
Agriculture	<i>Char</i> friendly crops, Diversification of crops, Crops preservation, Increase credit facility, Better irrigation system, Agro training.	Cold storage, Increase the number of <i>Char</i> market.
Livestock	Promoting meadows, Livestock medicine, Ensure fair prices in the <i>Char</i> hut, Prevent robbery.	Increase the number of <i>Char</i> market.

Poultry	Vaccination, Medicine, Make available poultry feed, Ensure fair price of poultry product, Prevent robbery.	Increase the number of <i>Char</i> market.
Day Labourer	Food for work program.	Skill training.
Fishing	Provide credit for boat and net. Ensure fair price of the fish in the <i>Char</i> hut.	
Business	Provide credit facility, Stop robbery.	Ensure better communication system.

### **Conclusion**

The *Char* livelihood strategies are quite different from the main land. Life is more challenging here. *Char's* isolated location and seasonal floods are main reasons of livelihood vulnerability. Besides, few climatic and anthropogenic stressors are also responsible to make their livelihood more vulnerable. Seasonal flood inundated most of the *Char* land because of its low elevation. With their land, their dreams are also inundated by the river water. Almost all the agricultural lands become submerged. Their sufferings exceed the limit when early flood washed away their crops. Beside this, drought is another factor which delayed the time of seeds cultivation and increase the irrigation cost. *Char* Gabsara is an island *Char* which is similar to the other *Char* land of Bangladesh. The dwellers are suffering for its isolated position, lack of institutional support and poor communication system. Inadequate market facility makes almost all livelihood strategies vulnerable here. This research addresses some immediate and long term mitigation strategies that include better communication system, institutional support and *Char hut* development which are essential for the development of the study area. Beside these, increasing credit facility will play a significant role to reduce their livelihood vulnerability.

### **References**

- Ahmed, M. (2000) Guidelines for development of coastal *Chars* in southern Bangladesh In: Wilde, K. (ed.), *Out of periphery*, The University Press Limited, Dhaka, 6-14.
- Alam, K, Rahman, A, Farook, O & Fatema, N. (2007) *Drowning sand and the holy banana tree: The Tale of People with Disability and Their Neighbours Coping with Sharbanasha Floods in the Brahmaputra-Jamuna Chars of Bangladesh*, Handicap International, Dhaka, Bangladesh.
- Alam, M. and R. Koudstaal (2000) *Riverine Chars in Bangladesh environmental dynamics and management issues*, Environmental and GIS support for water sector planning (EGIS), Dhaka: University Press Limited.
- Asaduzzaman, M (2016) *Livelihood vulnerability of women in the context of climate change impacts: insights from coastal Bangladesh*, 2016, <http://hdl.handle.net/1959.13/1311968>.

- Attaur, R, Parvin, GA, Shaw, R & Surjan, A. (2016) '3 - Cities, Vulnerability, and Climate Change', in *Urban Disasters and Resilience in Asia*, Butterworth-Heinemann, pp. 35-47.
- Blaikie, P, Cannon, T, Davis, I & Wisner, B (1994) *At risk: natural hazards, people's vulnerability and disasters*, Routledge, New York, USA.
- Cannon, T. (1994). "Vulnerability analysis and the explanation of 'natural' disasters."
- CLP (*Char s Livelihoods Programme*) (2006) Annual Reports of Unnayan Sangh under the DFID project. pp. 13-16.
- DFID (1999) *Sustainable livelihoods guidance sheets*, Department for International Development, London, UK.
- Ellis, F (2000) *Rural livelihoods and diversity in developing countries*, Oxford University Press, UK.
- Hahn, MB, Riederer, AM & Foster, SO (2009) 'The Livelihood Vulnerability Index: A pragmatic approach to assessing risks from climate variability and change—A case study in Mozambique', *Global Environmental Change*, vol. 19, no. 1, pp. 74-88.
- Harmeling, S & Eckstein, D (2013) *Global Climate Risk Index 2013. Who suffers most from extreme weather events? Weather related loss events in 2011 and 1992 to 2011.* , viewed 23/03/2018, <<https://germanwatch.org/en/download/10333.pdf>>.
- Hossain, MA, Reza, MI, Rahman, S & Kayes, I (2012) 'Climate change and its impacts on the livelihoods of the vulnerable people in the southwestern coastal zone in Bangladesh', in *Climate change and the sustainable use of water resources*, Springer, pp. 237-59.
- Hossain, MA, Reza, MI, Rahman, S & Kayes, I (2012) 'Climate change and its impacts on the livelihoods of the vulnerable people in the southwestern coastal zone in Bangladesh', in *Climate change and the sustainable use of water resources*, Springer, pp. 237-59.
- IPCC (2014) *Climate Change 2014—Impacts, Adaptation and Vulnerability: Regional Aspects*, Cambridge University Press.
- ISPAN (Irrigation Support Project for Asia and the Far East) (1995) The dynamic physical environment of riverine *Char* -lands: Padma River, Prepared for flood plan coordination organization (FPCO) (Unpublished technical report), Dhaka, Bangladesh, pp 5 —8.
- Kelly, C. and M. K. Chowdhury (2002) "Poverty, disasters and the environment in Bangladesh: a quantitative and qualitative assessment of causal linkages." Bangladesh Issues Paper. UK Department for International Development, Dhaka.

- Mercer, K. L., and Wainwright, J. D., (2012), "Climate change and the transgenic adaptation strategy: Smallholder livelihoods, climate justice, and maize landraces in Mexico." *Global Environmental Change*, **22**(2): 495-504.
- MoEF (2009) *Bangladesh climate change strategy and action plan 2009*, Ministry of Environment and Forests, Government of the People's Republic of Bangladesh, viewed 22-03-2018, [https://www.iucn.org/downloads/bangladesh\\_climate\\_change\\_strategy\\_and\\_action\\_plan\\_2009.pdf](https://www.iucn.org/downloads/bangladesh_climate_change_strategy_and_action_plan_2009.pdf).
- OECD (2015) *Securing Livelihoods for All; Foresight for action*, Development Centre Studies, OECD Publishing, Paris, 162pp.
- Parvin, G, Shimi, A, Shaw, R & Biswas, C (2016) 'Flood in a Changing Climate: The Impact on Livelihood and How the Rural Poor Cope in Bangladesh', *Climate*, vol. 4, no. 4, p. 60.
- Paul, SK (2013) 'Post-cyclone livelihood status and strategies in coastal Bangladesh', *Rajshahi University Journal of Life & Earth and Agricultural Sciences*, vol. 41, pp. 1-20.
- Rahman, A, Alonge, O, Bhuiyan, A-A, Agrawal, P, Salam, SS, Talab, A, Rahman, QS-u & Hyder, AA (2017) 'Epidemiology of drowning in Bangladesh: an update', *International journal of environmental research and public health*, vol. 14, no. 5, p. 488.
- Rahman, M. A. and M. M. Rahman (2012) "*Char* formation process and livelihood *Char* characteristics of *Char* dwellers of alluvial river in Bangladesh." ICSE6 Paris—August: 27-31.
- Sarker, M. H., Haque, I., Alam M., Koustaal R., (2003) "Rivers, *Chars* and *Char* dwellers of Bangladesh." *International Journal of River Basin Management*, **1**(1): 61-80.
- United Nations (2018) *Leaving the LDC category: Booming Bangladesh prepares to graduate*, Development Policy and Analysis Division, United Nations, Department of Economics and Social Affairs, viewed 25/05/2018, <https://www.un.org/development/desa/capacity-development/2018/04/10/leaving-the-ldc-category-booming-bangladesh-prepares-to-graduate/>