Climate-related direct, indirect and induced impacts: evidence for Bangladesh

Topic: Disaster analysis
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The threat of climate change is a reality for many emerging countries, and it may jeopardize their future development. Bangladesh is a good example; it has been suffering the effects of extreme weather events in recent years, such as floods, cyclones, significant storms, and droughts that have caused, on average, GDP losses in 2016-2021 of up to 1.32 percent per year (Government of the People's Republic of Bangladesh, 2022). Bangladesh is considered the seventh most vulnerable country to climate change, and its population is threatened with displacement shortly. One in seven Bangladeshi citizens is estimated to be displaced by climate change (ILO, 2023). Extreme climate events affect primary industries such as Agriculture, Fisheries, and Livestock (Bangladesh Bureau of Statistics, 2021), so the socioeconomic profile of the climate migrants would be concentrated in low-skilled workers from rural (and coastal) areas (ILO, 2023).

The future economic performance of the country could be compromised, so in this paper, we propose using an input-output disaster model to estimate the total (direct, indirect, and induced) value-added impact given the potential disruptions of the supply chains downstream (Arto et al., 2015; Huang et al., 2022; Lenzen et al., 2019). To capture induced effects, we propose developing a SAM (DejuÃ¡n et al., 2013) for Bangladesh with rural and urban household differences to evaluate how economic impacts would increase the degree of vulnerability of the country (Okuyama and Santos, 2014).

Although the urban population in Bangladesh has grown up to 39.7 percent of the total population in recent years, generating an exacerbated increase in urban population density ADB (2023), the Agriculture sector dominates the Bangladesh economy structure with the highest value-added generation and employment, while in terms of total output, Construction or Textile industries appears as dominant. Trade figures show the increasing immersion of Bangladesh in the global value chains for the Textile industry with an outstanding sextupling of the total exports, which is dominated, by large, by foreign value added.

Preliminary results show how extreme events forcing climate migration in Agricultural sector, estimated in a -8.2 percentage shock total in output and -16 percentage points in value, would be transferred, besides the Agricultural sector (17.6 percentage point), to mainly, the manufacture leading industries in Bangladesh, such as Textiles (-8.5%), Machiner (-9.5%) and Electrical and optical equipment (-8.1%). Regarding value-added embodied in exports, more significant shocks are generated in main manufacturing sectors, with a higher incidence in the Textile industry. These results confirm the necessity to assess the effects of climate change on the economic performance of most vulnerable emerging economies as its consequences can compromise the pillars of their recent and globally motivated economic awakening. Further research on spreading the shock in terms of households' reduced income and expenditure using the SAM model and the effects of displacements from rural to densely populated urban areas is expected to fulfill all the paper's goals.